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ज्ञान-विज्ञान विमुक्तये

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CONTENTS OF PART - I

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1. Study of Connected Cars under IOT Smart Vehicles

Mrs. Jagruti Jadhav
Co-ordinator, Assistant Professor, ZSCT's Thakur Shyamnarayan Degree College, Kandivali, Mumbai.
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Abstract

In recent times, it has been of interest the prospect of enabling a com munication between the cars and the In ternet, in order to access a variety of data sources, and to provide advanced multi media and infotainment services to the driver and passengers. Advancement in In telligent Transport System (ITS) has paved a way for the same. A vehicle equipped with connected car technology is not re stricted to communicating only with the cloud. Such a car is capable of exchanging data and information with road in frastructure, and this functionality is called V2I – Vehicle to In-frastructure com munication. A car processes information from in-frastructure components – road signs, lane markings, traffic lights to support the driving experience by suggesting decision makings. Another highly valuable type of com munication provided by connected car technology is V2V – Vehicle to Vehicle. Every vehicle can use the information provided by a car belonging to the network, which leads to a more effective communication covering traffic, car parking, alternative routes, issues on the road, or even some worth-seeing spots.

Keywords: connected car, internet, data, ve hicles, ITS, V2V, communication

I. Introduction

In this paper, we will use the following definition of connected car:

"A connected car is a vehicle

- Capable of accessing the Internet at any time, either using a built in device, or brought in user devices;
- Equipped with a set of modern applications and dynamic contextual functionalities, offering advanced infotainment features to the driver and passengers;
- Capable of interacting with other smart devices on the road, or in mechanical shops,

leveraging vehicle-to-road infrastructure com munication technologies;

- Capable of interacting with other vehicles, leve-raging vehicle-to-vehicle communication technologies.
- Capable of collecting real-time data from multiple sources which is likely to play a fundamental role in the foreseeable Internet Of Things."

According to [Kleberger et al. 2011], "the con nected car consists of three domains: the vehicle itself, consisting of the in-vehicle network and the ECUs, the portal at the automotive company, and the communication link between them" [1]

II. Services

A. Traffic safety

- Driver's fatigue, anger and stress detec tion.
- Accident avoidance and assistance. • Night Vision Assistant (NVA) and Head Up Display (HUD)
- Remote maintenance, roadside and stolen vehicle assistance

B. Infotainment

- Music streaming
- Video streaming, games and Internet browsing
- In-car Wi-Fi networks

C. Traffic efficiency

- Navigation, online route planning, street view
- Traffic, weather and road condition moni toring
- Assisted driving and autonomous vehi cles.

D. Convenience, interaction and others • Smart Home integration

- Integration with Wearable devices
- Car sharing
- Hand-free controls
- Driver profiles

III. Technologies for Communication

A. To Sensors On Board Communication (V2S) In order to make roads safer, cleaner and smarter, sensor and communication technologies are increasingly considered in research, standardization and development. While today's vehicles are already able to sense the surrounding environment, we expect that future cars will communicate with a roadside

communication infrastructure and with each other. Connected vehicles create a funda-mental building block of intelligent transport systems (ITS) and can provide nu merous application services to improve safety and comfort of driving.

B. Vehicle To Vehicle Communication (V2V) Vehicle-to-vehicle (V2V) communication enables vehicles to wirelessly exchange information about their speed, location, and heading. The technology behind V2V com munication allows vehicles to broadcast and receive omni-directional messages. V2V communication technology can increase the performance of vehicle safety systems and help save lives. Connected vehicle technologies will provide drivers with the tools they need to antic-ipate potential crashes and significantly reduce the number of lives lost each year.

C. Vehicle To Road Infrastructure Communica tion (V2R)

Vehicles can communicate with infrastructure such as signs and traffic lights etc which could be updated in order to be compatible with connected cars. RFIDs will likely be used for smart infrastructure systems. VANET offers many applications related to safety, data transfer, entertainment and vehicle traffic optimization based on vehicle-to-Road Side Unit (V2R) communication.

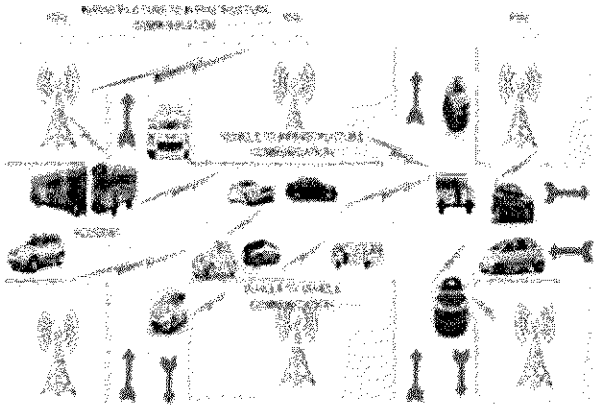

Fig. 1. Communication using VANET [7]

IV. Possibilities & Barriers

The adoption of autonomous and possibly un manned vehicles comes with a number of indis-putable advantages, going beyond the simple enthusiasm for cars driving their selves.

Advantages

- Driver & Passenger Safety- Driver and passenger safety are the key benefits of a Connected Car, which warn the driver of external hazards and internal responses of

the vehicle to hazards. The central monitoring system tracks multiple sensors for warning signs and indications related to the health of the car. It can even check external weather conditions and hazardous road conditions to alert the drivers in time.

- Traffic optimization- Including reduced traffic congestion and CO2emissions. Connected cars send information about their locations and velocities and this data can be used to make roadways more efficient by re-routing cars in real time to less congested routes, or timing traffic lights to interrupt the flow of traffic as little as possible. Connected cars wouldn't waste gas idling in traffic or circling for parking spots. Instead, they would be re-routed to traffic-less routes and communicate with parking spots ahead of time to find an open spot. This increased mobility could also increase fuel efficiency and reduce CO2 emis sions.
- Fuel and Cost Efficiency- Connected Cars allow the driver to reach a destination quickly, safely, and in a cost-efficient manner. By communicating with the traffic signals and the road in frastructure, a smart car can slow down before reaching a signal. [2] It can even automatically stop and start the car just before the lights turn green. This feature translates to greater fuel efficiency. By tracking the driving patterns, Connected Cars can assess the wear and tear of a vehicle. This informa-tion can be leveraged by in surance agencies in calculating the premium that's based on usage and the maintenance of the car.

Disadvantages/Barriers

- Technology and Standards- There is still need for solid research for all autonomous vehicle technologies to be deployed on mass-marketed cars and not just on proto-types. For instance, V2V communication technologies, which are fundamental for overcoming the remaining issues of sen-sor-based autonomous cars, are still far from be ing extensively deployed.
- Coexistence with non-autonomous ve hicles- In February, 2016 a Google Car caused the first reported car crash caused by a self-driving vehicle [The Verge 2016b]. The accident was caused by a car making contact with a passenger bus after having predicted -wrongly- that it was stopping. Until vehicles driven by humans will still be on the streets, there will al-ways be risks associated to missing nego-tiation

(often made, by motorists, with simple glances) and incorrect predictions.

- Unemployment- As the artificial intelli gence continues to overcome the roles and responsibilities of humans, taxi, trucks, or even co-pilots may be laid off as their services will no longer be needed. This may significantly impact the employment rate and economic growth of a certain country.

V. Challenges For Software Engineering

A. Security & Hacking

If your car is connected to the Internet, it can be hacked just like any other IoT device. The biggest concern here is that once a cybercriminal gets their hands on your ve hicle's controls, they can disable the car's brakes to cause a crash. Or they can activate the vehicle's microphone to listen to your conversations and turn off the car's security mechanisms to steal it.

Connected cars themselves make pretty good spies as they are now being created to collect specific data, such as your GPS coordinates and your driving habits. By monitoring our everyday movements, car companies collect massive amounts of our personal information. While automakers claim that such data collection can help improve their services, corporations, governments and law enforcement agencies would also love to have this data. [4]

To prevent hackers from breaking into your phone and getting access to your vehicle from there, it's recommended to install a VPN (Virtual Private Network) app to your device. Virtual Private Network technology is by far the most trust ed security tool when it comes to protecting your private data from snoopers and cybercriminals. [3]

B. Usability and Safety

A lot of the features of connected cars, even though some can improve safety, can be seen as distractions to drivers, and distractions while driving are known to cause accidents. V2S communication also makes the sensors less reliable than using wires and if V2S communication is used for crucial sensors a malfunction could be devastating. Advertisers taking ad vantage of connected cars seem almost inevitable and that further increases the privacy concern. When a connected car's connection to the internet fails, autonomous vehicles that rely heavily on internet connection could have fatal consequences. [5]

Conclusion

Connected vehicle platforms will emerge as a key element to the development of

vehicle autonomy as a critical enabler to the optimal connectivity coverage, having a unified visi bility to the connected vehicle fleet and providing the right insights. As more parts of the connected vehicles ecosystem start talking to each other, the advantages for the driver will also expand. From vehicle insurance to entertainment channels – the land of opportunities for vehicle manufacturers is surely going to only open further with the backbone of seamless connectivity. [6]

References

1. Coppola, Riccardo; Morisio, Maurizio (2016). Connected Car: technologies, issues, future trends. In: ACM COMPUTING SURVEYS, vol. ACM Computing Surveys (CSUR) Volume 49 n. 3. - ISSN 0360-0300
2. Vehicle-to-Vehicle Communication, https://www.nhtsa.gov/technology innovation /vehicle-vehicle-communication
3. Maxim Kalinin, Peter Zegzhda, Dmitry Zegzhda, Yuri Vasiliev, Viacheslav Belenko, "Software defined security for vehicular adhoc networks", Information and Commu nication Technology Convergence (ICTC) 2016 International Conference on, pp. 533- 537, 2016.
4. Y. U. Devi and M. S. S. Rukmini, "IoT in connected vehicles: Challenges and issues — A review," 2016 International Conference on Signal Processing, Communication, Power and Embedded System (SCOPES), 2016, pp. 1864-1867, doi: 10.1109/SCOPES.2016.7955 769.
5. K. M. Alam "Toward Social Internet of Vehicles: Concept, Architecture, and Applications" Fellow, IEEE, pp. 343 Vo.3, April 27, 20
6. BLOG: IoT and automation: the future of connected vehicles, TATA Communications. [7] Efficient dynamic caching for geocast routing in VANETs – Scientific Figure on ResearchGate. Available from: https://www.researchgate. net/figure/V2V and-V2X-communication-in VANETs _fig1_281304467 [accessed 19 Nov, 2021]

2. Block Chain in IOT

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Abstract

This research is about Blockchain, Its pros, cons and alternatives and about what is banking on Blockchain. This research also gives us idea of what is next in Blockchain. Its gives Ideas about what are new bitcoin invensions its uses its variants in banking industry. and also about use of bitcoin and it tells about the role of bitcoin

I. Introduction [1]

Blockchain is one of the greatest buzzwords in technology right now. But what is it?Let's start from the beginning. The one of the major application of blockchain technology was bitcoin which was released in 2009. Bitcoin is a cryptocurrency and the blockchain is the technology which underpins it. A cryptocurrency devotes to a digital coin that runs on a blockchain. Understanding how the blockchain works with bitcoin will allow us to see how the technology can be transferred to many other real-world use cases. Bitcoin is the brainchild of a mysterious person or group known as Satoshi Nakamoto. Nobody knows the identity of Nakamoto, but their vision was laid out in a 2009 whitepaper called "Bitcoin: A Peer-to-Peer Electronic Cash System."

II. The Bitcoin Blockchain

A. What is it? [1]

The blockchain behind bitcoin is nothing but a public ledger of every transaction that has taken place. It cannot be tampered with or changed retrospectively. Advocates of the technology says that this makes bitcoin transactions secure and safer than current systems.

So here are a few facts about bitcoin:

- It is not issued by a central authority
- There is a limit of 21 million. Currently just over 17 million are in circulation.
- The first transaction using the bitcoin is widely believed to be carried out by a programmer named Laszlo Hanyecz, who has spent 10,000 bitcoin on two Papa John's pizzas in 2010.

- Bitcoin creator Satoshi Nakamoto's identity remains a mystery.
- Bitcoin has often been used to purchase illicit products.

B. How does it work? [2]

The bitcoin blockchain is "decentralized," meaning it is not under the control of one central authority.While traditional currencies, bitcoin has no central authority. The bitcoin blockchain is maintained by a network of people known as miners. These "miners," also sometimes called "nodes" on the network, are the people running purpose-built computers that are actually competing to solve the complex mathematical problems in order to make a transaction go through. For example, let say lots of people are doing bitcoin transactions. Each of the transaction originates from a wallet which has a "private key." This provides mathematical proof that the transaction has come from the owner of the wallet also known as digital signature. For example, lots of transactions are taking place across the world. These transactions are grouped together into a block, organized by strict cryptographic rules. The block is then sent out to the bitcoin network, made up of people running high powered computers. These computers compete to validate the transactions by trying to solve complex mathematical puzzles. This validated block is then added onto previous blocks that creates a chain also known as blockchain.

How The Blockchain Is Tamperproof

One of the advantages of blockchain is that it can't be tampered with. Each block that is added onto the chain carries a hard, cryptographic reference to the previous block. That reference is part of the mathematical problem that needs to be solved in order to bring the following block into the network and the chain. Part of solving the puzzle involves working out random number called the "nonce." The nonce, combined with the other data such as the transaction size, creates a digital fingerprint called a hash. This is encrypted, thus making it secure. Each hash is unique and must meet certain cryptographic conditions. After this a block is completed and added to the chain. To meet this condition, each earlier block, of which there are over half a million, would require the cryptographic puzzles to be remined, which is next to impossible.

III. Pros, Cons and Alternatives [2]

It seems like an unnecessarily complicated process for moving money. But the blockchain has its advantages. With traditional methods of payment every transaction in the world is registered on privately-held databases owned by corporate and state entities. These databases are not accessible by the public and therefore closed. They are also usually owned by one entity. Because of this nature, they could be open to fraud or to being hit by an attack

that could cripple a network, unlike bitcoin's blockchain. Think about the blockchain as a beefed up database. It records all transactions in bitcoin, doesn't allow repeat payments, and requires several parties to authenticate the movement of the digital coin.

Because the blockchain is not centralized, it means that if one part of it went down, the whole network would not collapse. There are many different parts of the bitcoin network that require it to work. So even if one miner went out of action for example, transactions would still work.

A. Problem with Bitcoin's Blockchain [3]

- Bitcoin's blockchain was designed to be a decentralized network because it has its advantages. With that, however, has come a number of problems.
- One big issue is that transaction times and costs in bitcoin have soared as the network has become more congested. This has actually led to disagreements by a number of parties that uphold the network regarding how the technology should develop in the future in order to address these issues.
- For example, last year, a group of developers that didn't agree about the future of bitcoin, broke off and split the underlying blockchain. This led to the discovery of a bitcoin offshoot also known as bitcoin cash. Another socalled fork happened, resulting in bitcoin gold.
- These standard image or video files would be encrypted alongside the legitimate bitcoin data and so are very difficult to find.
- One other weakness of bitcoin's blockchain is also the very thing that makes it attractive: rewards. As mentioned earlier, miners who maintain the network are rewarded in bitcoin. But mining costs a lot of money in the form of energy to run the purpose

Ankingn Lockchain

The promises of the blockchain technology have been praised by the banking industry in particular. They see it as a way to reduce costs, make processes more efficient and potentially underpin a lot of their operations. Banks often call blockchain "distributed ledger technology" or DLT to distinguish it from bitcoin's blockchain. Many major banks have begun carrying out blockchain experiments.

- A number of other issues have also been flagged up, including the presence of illicit material buried in the bitcoin blockchain. We know that a single block contains data

required for a bitcoin transaction to go through. But within that data, researchers have found some instances of content such as child pornography. built computers and specialist hardware. There are different estimates as to what price bitcoin has to be to be profitable. One of the most recent studies came from Wall Street analyst Thomas Lee of Fundstrat who said $8,038 for one bitcoin would be profitable for miners. But if bitcoin remains below that for a long period of time, many miners could theoretically walk away, causing transaction times to increase further and pushing users away. This can be result in a meltdown of the bitcoin network. So far, this has not happened.

- But this kind of volatility and infighting is clearly not fit for business. Therefore, many companies began looking at the principle of blockchain technology and adapting it to what would work for their business. The parts of blockchain technology that have so far attracted companies include the ability to have a shared ledger of activity to help to make transactions more efficient, a reduced number of intermediary parties involved, and lower processing costs. When we delve into real-world examples of blockchain technology, it's clear that many of the things that have caused problems with the bitcoin blockchain have not been adopted.

B. What other blockchains are there? [4]

The bitcoin blockchain is not really made for companies to build apps and processes on. But a number of other companies have created blockchain platforms to help firms interested in the technology build processes.

Ethereum, Ripple, Hyperledger, IBM, R3, are just a few names that have developed such platforms.Ethereum is one of the important blockchain platform that specializes in smart contracts. It has a digital coin known as ether linked to it. Ether is the world's second-largest cryptocurrency by value. Like bitcoin's blockchain, Ethereum's is also public. Think of how companies like Apple and Google release software developer kits to allow people to build apps on their various platforms. Ethereum does something similar, allowing people to build "decentralized apps" on its platform, leveraging its blockchain and potentially using the digital coin ether to power their product. Smart contracts are the contracts that executes automatically when certain conditions are met from all interested parties. The automation can help to speed the process up, ensuring no mistakes along the way.

IV. BOB [5]

Meanwhile, Ripple is a blockchain specifically designed for cross-border currency transactions. The movement of money from one currency to another across the world, particularly for large businesses, is expensive and takes a long time. The process involves lots of different parties from banks to clearing houses. Ripple's blockchain system, known as xCurrent, helps to cut out some of the intermediaries, cutting down a cross-currency transaction to seconds. Ripple also has a cryptocurrency attached to it known as XRP, but it is not necessarily needed to power its xCurrent product.

BBVA and the $90 million loan

Spanish bank BBVA carried out a pilot project in which it issued a 75 million euro ($89.7 million) loan using blockchain technology to a company called Indra. The current loan issuing process requires lots of back and forth between various parties, a number of different versions of one contract, and lots of time and effort. BBVA's solution, which was built-in house, is aiming to try to cut down the time and cost. It is based on smart contracts explained above. To execute this loan, BBVA and Indra were both using an app developed by the Spanish bank. In this, Indra would put all the details required to request the loan. BBVA would then put in changes. This back and forth would continue, but each step would be registered on the blockchain — so it created a ledger of activity. When all parties had agreed to all the parts of the loan agreement, the contract was executed. The final contract was recorded on the private, internal blockchain developed by BBVA.

Only the people with permission would have access to this. But BBVA then also cryptographically secured the contract and hosted it on the Ethereum blockchain.

A. Who else is trailing this technology [1]

The simple answer is any entity hoping to make processes cheaper, faster and more traceable. Let's take a look at a handful of examples across different industries, not just the banks.Last year, stock exchange group Nasdaq partnered with Swedish bank SEB to trial a blockchain-based mutual fund trading platform for example. Nasdaq also trialed blockchain to allow shareholders of listed Estonian firms, who weren't physically present for meetings, to vote. Blockchain technology can also use for tracking products across a supply chain or route. For example, diamond producer De Beers recently announced that it had trialed the technology to trace the stones from the time they were mined to delivering them to a jeweler. The blockchain can also be used to track ownership of assets such as fine art of even property.

Elections are another field which blockchain technology could be applied to. In West

Virginia's primary election in May, voters were able to vote via a mobile blockchain-based platform

V. What's Next for Blockchain ? [1]

Despite the hype and promise of blockchain or DLT, it's not something that will be widespread in the next few months.

The current state of play sees banks who are doing the experimenting with the technology, but not adopting it on a wide scale. It is being used for the singular processes, such as loans in case of BBVA or cross-border currency movement like Santander is testing. But there are numbers of other use cases and even industries that the blockchain can touch. Insurance, health care and government agencies just to name a few.

Still, there are a number of stumbling blocks that the technology needs to overcome to be viable across major organizations and industries at large. One of the major ones is interoperability. Essentially, how will blockchains developed by one firm work with DLT run by another company? There's a number of companies as outlined before developing blockchain platforms. But there is no guarantee that the each one will be compatible with another. It can be likened to the early days of mobile operating systems, where there were several systems including iOS, BlackBerryOS, Android and Symbian. Now iOS and Android dominate the smartphone market.

References

1. CNBC Everything you need to know about block chain Witten by arjun kharpal.
2. Why bitcoin is used and why its back by Bryn Bache.
3. How wall street is embracing bitcoin by matt clinch.
4. Bellare, Mihir; and Rogaway, Phillip. (September 21, 2005).
5. "Introduction." In Introduction to Modern Cryptography. [5] Morris, David Z. (15 May 2016). "Leaderless, Blockchain-Based Venture Capital Fund Raises $100 Million, And Counting". Fortune. Archived from the original on 21 May 2016.
6. Retrieved 23 May 2016.

3. Study Paper on IoT Smart Homes and Devices

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Abstract

The smart home is presently a set up space of interest and exploration that adds to comfort in current homes. With the Internet being a fundamental piece of expansive correspondence in present day life, IoT has permitted homes to go past working to intelligent habitations. Shrewd home incorporates numerous parts, advances, and gadgets that create significant information for anticipating home and climate exercises. This work presents the plan and improvement of a pervasive, cloud-based shrewd home computerization framework. The framework controls, screens, and administers the security of a home and its current circumstance through an Android portable application. Our work utilizes a camera to catch pictures of articles set off by their movement being identified. To stay away from bogus alerts, we utilized the idea of AI to separate between pictures of ordinary home tenants and those of an interloper. The help vector machine calculation is proposed in this review to group the highlights of the picture caught and decide whether it is that of an ordinary home tenant or an interloper prior to sending a caution to the client. The plan of the portable application permits a graphical presentation of the exercises in the house. Our work demonstrates that AI calculations can further develop home robotization framework usefulness and upgrade home security. The work's model was carried out utilizing an ESP8266 board, an ESP32-CAM board, a 5 V four-channel transfer module, and sensors.

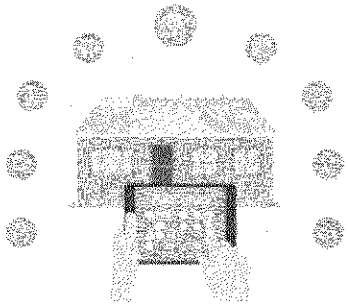

Fig1: Smart Home Controls

I. Introduction

With the expanding commonness of theft and individual dangers to home tenants and property harm, it is critical to have a viable framework to monitor security in the home and climate. The wellbeing and security of lives and properties are of incredible concern and ought to be focused on. Along these lines, a home ought to be furnished with an astute framework to screen from a distance, control, and report exercises to the tenant. To accomplish security, wellbeing, comfort, and control of a home, the need emerges for an insightful home computerization framework[1]. A shrewd home is a utilization of the Internet of things (IoT) that empowers inhabitants to screen, control helpfully, and administer their home exercises from any area. As per the Internet of things is an interconnected framework that permits electronic gadgets to convey and trade information through network availability[1].

Smart home mechanization frameworks are accordingly vital in guaranteeing a top notch of life by observing and controlling the home climate. The essential points of a smart home mechanization framework are wellbeing, like distinguishing hurtful gases, fire or home gatecrashers, accommodation through remote checking and control of machines and the actual climate, and decrease in energy and water utilization. Apparatuses and gadgets are organized through the IoT home equipment advancements of sensors and actuators for correspondence and robotization, offering confined or remote home control in this way making the home smart by offering administrations that include minimal human information or communication[1][2]. For instance, through the Web, one could handle a home from any area, the control system being conveyed through committed programming or a portable application running on a PC, tablet, PC, or cell phone. A home populated with sensors produces a ton of readings and information. Nonetheless, distributed computing administrations and AI calculations have improved the brilliant home's usefulness. Distributed computing

administrations that advantage home robotization frameworks are the capacity of information, decreased danger of server blackout and information misfortune, simplicity and effectiveness of collaboration with gadgets in the home, and mechanization of routine administrations[8].

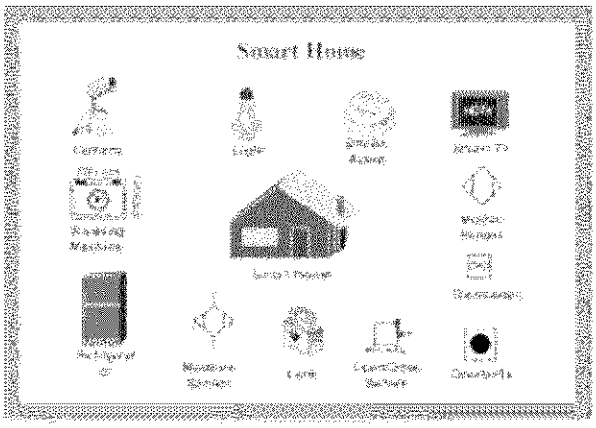

Fig2: Smart House Devices

Since each house might have a few tenants, including individuals and creatures, numerous developments will be identified in the home. There must, in this manner, be a system to recognize the development of real home tenants and their pets and that of a gatecrasher. When joined with IoT innovations, an AI calculation can aid the location and separation of developments in the home. AI calculations upgrade security by separating between and characterizing exercises in the house[3]. A model is the help vector machine calculation, which can recognize human and creature development in the home.

Breaking down and assessing information to foresee activities and ecological conditions and streamline computerization is one more benefit of utilizing AI calculations in smart home robotization. At the point when the idea of AI is joined with IoT innovations in the plan and improvement of a smart home robotization framework, the framework yields incredibly proficient execution. In this work, we present an Android versatile application-based framework to control electrical apparatuses, screen and measure ecological elements, development, and catch pictures of conceivable home gatecrashers[8]. The framework is intended to be minimal expense, adaptable, and extensible[2][8]. The versatile application provides the order to turn OFF or ON any of the electrical home apparatuses for effective utilization of energy. It estimates the current mugginess and temperature in the home and advises the client, shows graphical readings of the home exercises, and stores or recovers the information in or from the cloud[1].

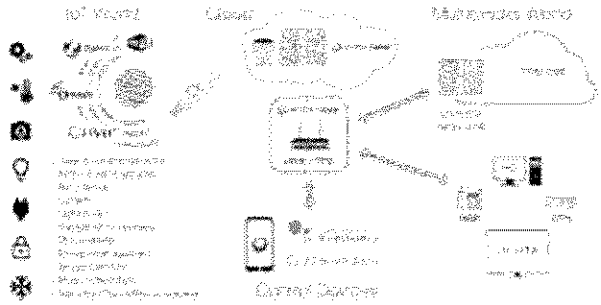

Fig3: Online Control Devices

The objectives of this work are as follows: ❖ To develop an Android application for the remote control of basic electrical appliances, the monitoring and display of environmental factors in the home and its surroundings.

- To implement a sensor-based automation system for the detection of movement and intrusion in the home.To use a machine learning algorithm for distinguishing images in the home to avert false alarms by the security system.

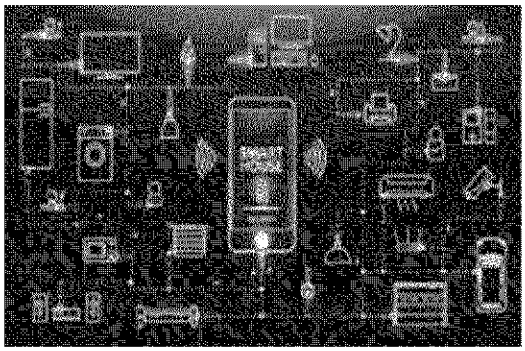

Fig4: Interconnection System

II. Related Work and Methodologies Used

Layered design of the IoT-based Brilliant Home Framework is portrayed by Kang Bing et al., in [8]. The brilliant home framework is separated into three layers: application layer, network layer, and detecting layer. Beginning from the base, detecting layer is answerable for information assortment from every one of the home machines and it sends information to the center layer that is network layer. Organization layer utilizes web for sending information to the upper most application layer which has various applications on various level for various purposes. For information assortment and information handling at the detecting layer it utilized chip SAMSUNG S3C2440A which is a kind of ARM microcontroller[4][5]. To move the gathered information to the organization layer it utilizes

Zigbee module which depends on IEEE 802.15.4 remote standard [7-8]. Fig. 3: Layered engineering of the IoT-based Shrewd Home Framework [5] A reconfigurable smart sensor interface gadget that incorporates information assortment, information handling, wired and remote transmission together is as of now plan for modern Remote Sensor Organization (WSN) in IoT climate utilizing CPLD by Qingping Chi et al.

The brilliant home control framework utilizes a shrewd focal regulator to set up a radio recurrence 433MHz remote sensor and actuator organization (WSAN). Radio recurrence modules, switch modules, control modules, and so on have been intended to control straightforwardly a wide range of machines by Ming Wang et al., and Sarita Agrawal et al. The brilliant framework holds the elements of machine screen, control and the executives, home security, energy measurements and examination [4] [5]. RF ID utilized by Gaurav Tripathi et al., Ming Wang et al., and Sarita Agrawal et al., in] is exceptionally valuable for security reason.

This innovation allots an exceptional character to every family gadget. Thus, that, every gadget can be extraordinarily distinguished. Scope of the RF can be expanded or diminished. It is not difficult to send and has low arrangement cost. RFID labels take low ability to work and labels can be dynamic or detached. Each gadget that associates with the web needs IP address [6].

Individuals are as yet dealing with IPv4 which has exceptionally low location space. As number of clients expanding individuals need to move towards IPv6 which offers enormous location space. Vittorio Miori et al., has proposed a fascinating methodology of DomoNet, Which is a 'environment" programming made to conquer the issues of similarity with previous frameworks of smart home, absence of interoperability in brilliant home framework which is because of the way that current market practice viably ties shoppers to exclusive innovations, along these lines compelling them to buy just gadgets adjusting to a explicit producer's framework to appreciate full interoperability. DomoNet has been coded utilizing Java language and open source libraries and apparatuses IPv6 and DomoNet interface together and cooperate [5]. For better execution of framework and to offer better types of assistance by the framework organization ought to have the capacity of self-association [6]. Arjun P. Athreya et al., has proposed five critical parts of self-association which are as per the following [6]:

- Neighbor discovery

- Medium access control
- Local connectivity and path establishment
- Service recovery manageme

III. Problems and Challenges

There are numerous issues, issues and key difficulties could be come in the Smart Home framework. As the uses of IoT are expanding quickly it is hard to deal with every one of the applications in IoT climate. It comes out issues that how to oversee and control these different expanding applications. The entire framework couldn't be more agreeable, secure if these expanding applications not controlled proficiently and advantageously. Security is less on the server side as no extraordinary technique for validation is utilized. This could prompts the uncertain framework. An assailant can gain admittance to casualties home and he would break the entire Smart home framework. Availability is likewise the issue could happen . It likewise comes into challenge that how to accomplish availability at any spot any time[6][7]. For correspondence towards web 3G administrations are utilized. In any case, it could have signal issue henceforth it won't associated without fail. The working of the brilliant home framework in IoT climate ought to be done progressively. RF distinguishing proof is utilized at 433MHz

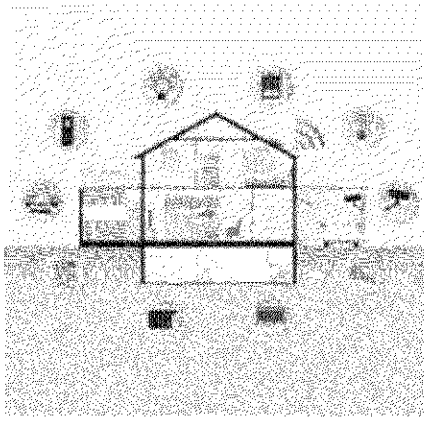

Fig5: Smart House Security

It might cause the issue of impedance. Many key difficulties have examined by Dhananjay Singh et al., and Sarita Agrawal et al., in [4]. 3.1 Norms: Normalization is exceptionally fundamental for IoT climate as it is extending internationally. Difficulties are comes related which standard ought to be utilized, which will give secure medium, how it will make framework more solid. 3.2 Distinguishing proof: ID is needed for every gadget so every

gadget can recognize particularly. 3.3 Security: The client's information ought to be classified. Association ought to be finished with giving protection. 3.4 Verification: Confirmation is must to get Shrewd Home framework from an assailant. Server needs to give access just legitimate clients. 3.5 Security: The framework ought to ready to make fitting moves on security dangers. Furthermore, framework ought to have the option to reconfigure without help from anyone else after assaults. 3.6 Combination: The principle challenge with IoT is to incorporate applications in IoT climate. 3.7 Coordination: Coordination is needed between the around the world associated objects, people, programs, process, and so on 3.8 Information Stockpiling: As uses of IoT are expanding, the measure of information getting gathered is enormous. The test is the place where to capacity the gigantic information. Gigantic information base can tackle this issue. Man-made brainpower calculations should be applied to separate importance information from excess information. 3.9 Organization Self-Association: Organization design ought to be made so that each gadget associated with it could self-coordinate them[5][6]. As a matter of fact it is network which ought to have the option to self-arrange Styling

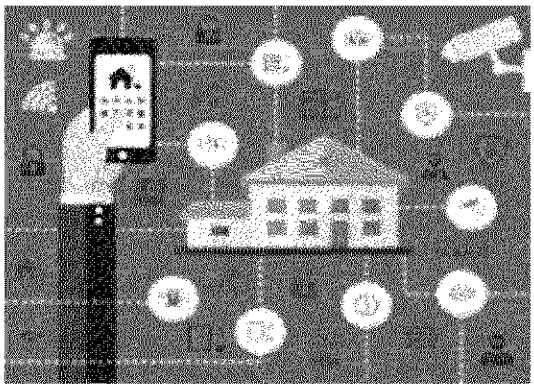

Fig6: Smart House in Mobile

Before you start to design your paper, first compose and save the substance as a different text record. Complete all substance and authoritative altering prior to designing. If it's not too much trouble, note segments A-D underneath for more data on editing, spelling and punctuation.

Keep your text and realistic records separate until after the text has been arranged and styled. Try not to utilize hard tabs, and breaking point utilization of hard re-visitations of just one return toward the finish of a passage[7].

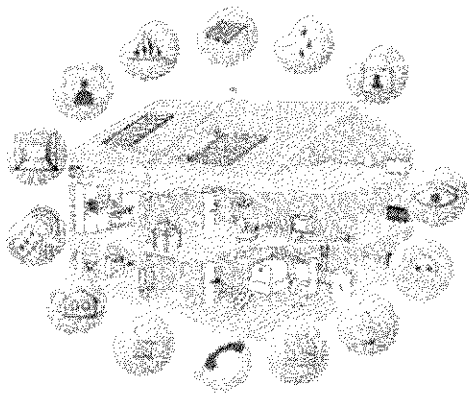

Fig 7: Various Smart Devices

IV.Possible Research Direction

IoT climate and Shrewd Home Framework has exceptionally low security at the server side. Planning of secure framework can be the piece of future work[6][7]. Kerberos innovation can be utilized to make the climate safer at server side.

Computerized reasoning calculations can be made in future for making more straightforward information extraction process from excess information. A cloud stage can give progressive and likely arrangements .

V. Conclusions

Web of Things has numerous applications in various regions. IoT has been now intended for modern WSN. It has been produced for Brilliant Homes Framework. This paper presents the engineering of IoT and design of Brilliant Homes utilizing IoT. There are a few issues found in IoT and Smart Homes. New advancements could assist with limiting some of them. This paper presents the issues and difficulties that could come. New advancements and approaches which are now used to further develop uses of IoT have been talked about in this paper. CPLD regulators, zigbee modules, RF modules are right now in utilized for IoT[7].

Reference

1. K. Ashton, "That "internet of things" thing," RFiD Journal, vol. 22, no. 7, pp. 97–114, 2009.View at: Google Scholar
2. C. J. Diane, "How smart is your home?" Science, vol. 335, no. 6076, pp. 1579–1589, 2012.View at: Publisher Site | Google Scholar
3. C. Wilson, T. Hargreaves, and R. Hauxwell-Baldwin, "Benefits and risks of smart home technologies," Energy Policy, vol. 103, pp. 72–83, 2017.View at: Publisher Site | Google Scholar

4. Sarita Agrawal, and Manik Lal Das, "Internet of Things – A Paradigm Shift of Future Internet Applications", International Conference on Current Trends in Technology, December, 2011
5. Qingping Chi, Hairong Yan, Chuan Zhang, Zhibo Pang, and Li Da Xu, "A Reconfigurable Smart Sensor Interface for Industrial WSN in IoT Environment", IEEE Transactions on Industrial Informatics, vol. 10, no. 2, May 2014
6. http://www.engpaper.com/homeautomation2015.html
7. https://www.ijres.org/papers/Volume-9/Issue-7/Series 5/C09071215.pdfR.
8. Majeed, N. A. Abdullah, I. Ashraf, Y. B. Zikria, M. F. Mushtaq, and M. Umer, "An intelligent, secure, and smart home automation system," Scientific Programming, vol. 2020, Article ID 4579291, 14 pages, 2020.View at: Publisher Site | Google Scholar

4. IOT Smart Homes and Devices

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Abstract

Smart-home technology surround a huge range of everyday household devices that can connect to each another and to the Web. This connectivity allows owners to program simple tasks and, in some cases, to control device operation from a distance. Designed for convenience, smart homes also hold the promise of improved independent living for aged people and those with disabilities

Keywords: convience, elderly, encompasses

I. Introduction

Smart Home is pact of technology and services through a network for better quality living it allows the all home to be automated and therefore give ease and convenience to daily activities in home. This make all electronic devices to act 'smart'. In future all the electronic devices will take lead of this technology through home networks. Almost of them think this technology as pure network. Some think this technology will overcome their work load, but smart home technology is union of both .This technology is currently being execution for whole house Basically this facilitates users with security, cosy living and energy management features as well as added benefits for disabled individuals.

This technology may sound new but it just people that uses the available technologies. A smart device is a common appliance with a much more complex computer installed to give it more functionality. These functions makes it so different. Cable broadband, DSL, and wireless technologies provide a way to have a home networked for devices to communicate with one other as well as internet. These technologies are either wired or wireless provide foundation on which smart home will work.

The research standards have already predict a smart, connected home where much more devices cooperate to cosset to users wishes with small or no effort. For example, in a home

with remotely rulable lights, cameras and locks, it should be easy to automatically alter lights based on the weather and time of day as well as remotely seen who is at the door before opening it. But such straight forward home-wide tasks are not available from the mainstream despite the fact that the needed hardware devices (such as wireless light switches, and cameras) are reasonably priced. Many observer predict that the smart home of the future is likely to contain 10 to 20 connected devices and sensors, all linked with a home network The collective revenue generated from home automation and home energy management segments will be worth more than $44bn according to the predication made from market analyst companies ABI and Berg Insight. The comprehensive revenue possible of the smart home, however, will be somewhat on a higher side as devices from the entertainment, health and home security sectors will also become connected

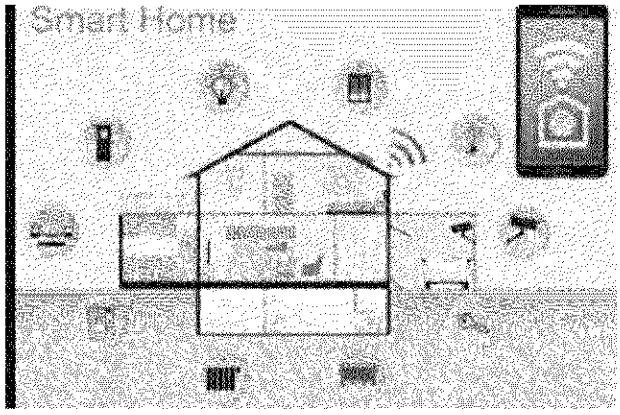

Fig 1: Smart Home Devices that makes Home Inviting

II. What is Smart Homes Technology

In terms, smart homes are the homes that employ electronic devices productively, and users control the systems. Opening doors, turning lights and many more on or off, even controlling ventilation and heating systems remotely are smart home examples.

You can control many other functions of your home from a remote location by smartphone app. In addition, smart has made it possible to users to adapt to highest development efficiently as the technology helps you to save energy resources. Sometimes, smart homes also include the usual home and kitchen appliances such as cooking stoves, refrigerators, and microwave ovens.

III. Evolution of Smart Homes

The full sight of smart home services will be realized in ongoing stages. At present, fix connectivity is a newness in a few high-end home devices. Laterely, connectivity will be usual and a feature of close to all devices.

Objective

Accordingly, a news and opinion website that covers financial and investing news, "Few years ago, just 13 percent of American households had some sort of smart technology integrated into their homes. In 2019, it's anticipated that at least 38 percent of American households will have entered the market." Energy and cost savings are the greatest drivers in the global smart housing market, but there are a number of other important factors contributing to its growth—including the increasingly ripen population and the marked upgrade in comfort and benefit. Let's explore the extra perks of the smart home and discover how one can help your people take advantage of the smart home technology.

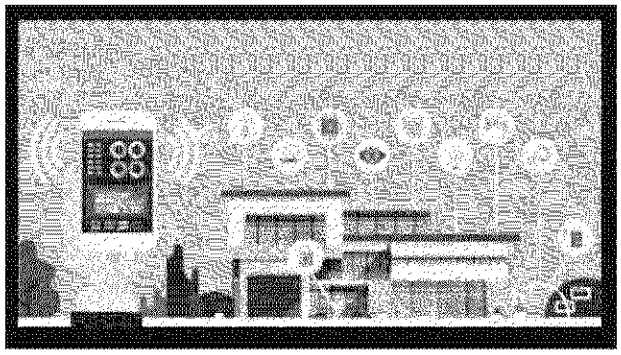

Figure 2: Best Smart Home Devices

IV. Identification and Automation

A context-aware smart home can determine location, identity. This technology is considered equal with home automation and often referred to as such.

As part of the Internet of Things (IoT), smart home automation systems and devices ideally operate together, sharing consumer usage data among themselves to determine an algorithm of automated actions based on the homeowners' preferences.

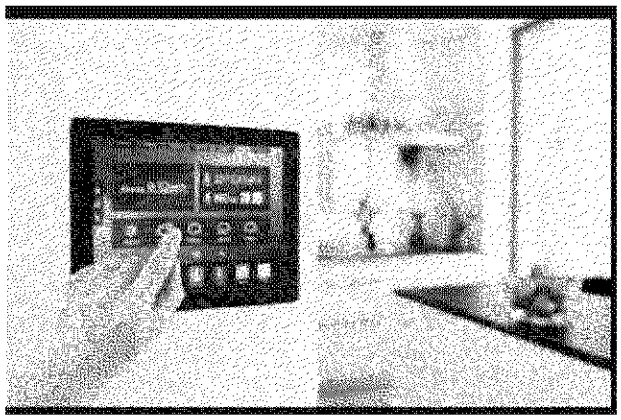

Figure 3: Room By Room Guide to Home Automation

V. What is Advantages of Smart Homes

It's the numerous advantages of smart homes that this market is on the growth these days. Building a smart home is helpful in several aspects, from saving energy resources to security. The following are some viable reasons why you should build a smart home.

1. Convenience is one of the major advantages of Smart Homes

Smart homes are more fit than conventional buildings as you can access almost every room, the lightings, Air conditioners, bathroom using a centralized control system.

All systems can be automated and integrated to meet your general to needs. For example, you can control the heating system while binge-watching or even turn off or on your room lights at your comfort.

2. Home Automation Lets you Save Energy

Smart appliances can help you use energy efficiently during brow demand times by responding to signals from utility companies. Since lighting wastes the more amount of energy, you can save a lot with smart appliances.

You can adjust the atmosphere inside your smart home and save a lot of energy by turning the system off whenever you are far from home Moreover, given that everything is under your control, you can manage all the electrical and electronic appliances as per your use.

3. Security is One of the Leading Benefits of Building Smart Homes

The ability to detect fires and intrusion are big benefits of having a smart home. In addition, since an automated home is array with all the necessary locking-unlocking mechanisms, the thermal sensors can detect even a slight temperature change.

You can also detect gas or water leaks and many more from anywhere and circumcise the situation. With a multi-view screen, you can spot faults in any area of your house and act timely to avoid any issue.

4. Smart Homes have More Value

A smart home has every splendour one can ever dream of, HD CCTV cameras, Internet, Wifi network, and an anti-theft system. An automated home is a perfect concept in a society influenced by highest development. At this century features built into a smart home eventually adds to its value.

According to the National Association of Realtors, consumers are willing to get more for a home with smart features such as security, climate control, smart appliances, and a 24/7 internet facility. If you already have automated your home, its resale value will be more after a few years. increased value is one of the main advantages of smart homes.

5. Ease of Communication

Communication is one of the requirement needs of people. Homes issue with smart features are based on the internet entirely. In addition, new technologies are include the internet and IoT to become more natural and practical in use.

You can control many things by signal and motion sensors. With all the features, it's easy for us to communicate with your house using the automated communication systems such as email, text messages etc.

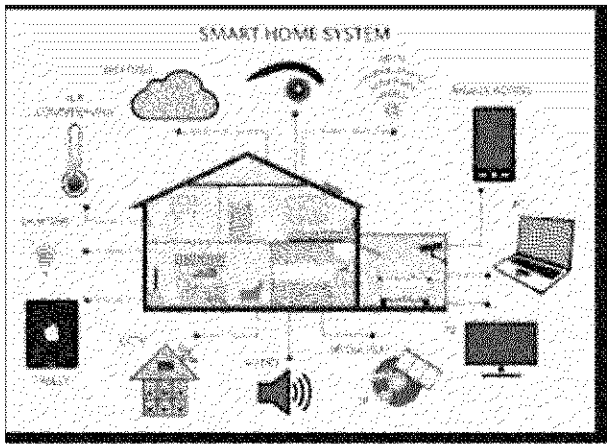

Figure 4: Smart Home, Home Automation

VI. What are the Disadvantages of Smart Homes?

After understanding the major benefits of home automation, it comes to know the snag. The same friendly features can turn into the big disadvantages of Smart Homes in situations.

1. Cost

Once installing low energy appliances into your homes, to set free from confinement. But the in advance costs of actually buying and installing electricals and electronic devices can be expensive.

Compared to regular homes, smart home technology requires a higher investment. This problem is one of the common cases or disadvantages of smart homes. Several companies provide the smart home system, but all of them are little expensive.

2. Internet Dependency

The most requirement of every smart technology is the internet, without it isn't easy to control your smart home. If there is no internet connection things may even take a bad turn leading to complications even in simple tasks.

Many problems do occur if your internet connection is not strong . To get good network efficiency, the smart appliances will need at least 5G or 6G speed.

3. You'll Need Professional help

From installation to nuture, you'll need a team of professionals to deal with settings and leadership. In case of a problem, you can't call a tiler or loppy to sort it out. You repair a bug; you'll need to have an expert available.

Given that you'll need another hand to handle your smart home consider nuture costs and service fees they may charge you. Apart from that, professionals will only be able to take care of your automated home if they are available. You have to work without them,

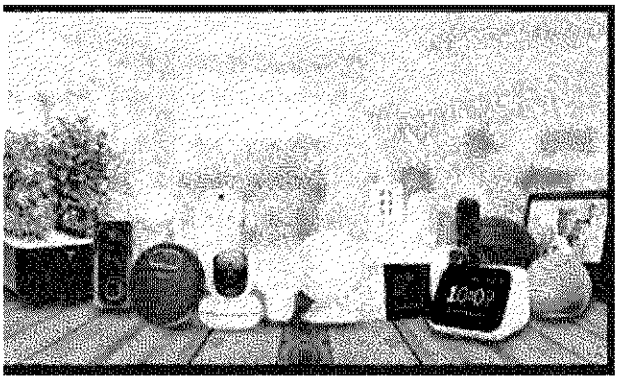

Figure 5: Smart Home Devices

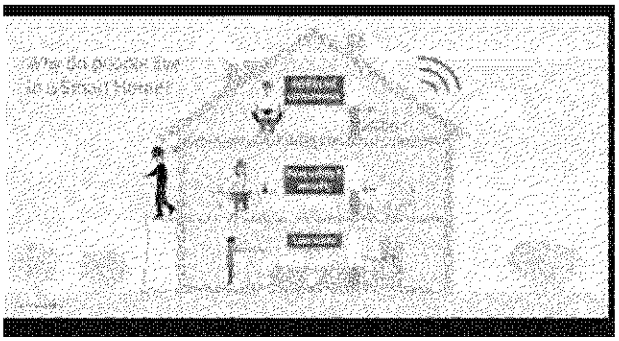

Figure 6: Future Smart Home

VII. How Smart Homes Work

When you're not home, wail little doubts can start to mob in your mind. Did I turn the juicer off? Did I set the security alarm? Are the kids doing their homework or going out?

With a smart home, you could quiet all of these tension with a quick keek at your smartphone or tablet. You could connect the devices and appliances in your home so they can interface with each other.

Any device in your home that uses electricity can put on your home network and at your order. Whether you give that order by voice, remote control, the home reacts. Most applications relate to lighting, home security, home theater and entertainment.

The idea of a smart home might make you think of George Jetson and his futuristic abode or maybe Bill Gates, who spent more than $100 million building his smart home [source: Lev-Ram]. Once a draw for the tech-savvy or the well off, smart homes and home automation are becoming more common.

What used to be a weird industry that stir out hard-to-use and tucked products is finally maturing into a full-blown consumer trend. Instead of start-up companies, more established tech organizations are launching new smart home products. Sales of automation systems could grow to around $9.5 billion by 2015 [source: Berg Insight]. By 2017, that number could balloon to $44 billion [source: CNN].

Much of this is due to the usuccess of smartphones and tablet computers. These ultra-portable computers online are everywhere, and their constant Internet connections means they can be configured to control myriad other devices. It's all about the Internet of Things

VIII. Conclusion

The IoT device market has gone through radical changes in only a few years. Starting with varying devices and no ecosystems to speak of, the market has now grown to encompass enterprise players working together to create ecosystems, adapt for mobile technology, which allows IoT devices to become interconnected.

Automaton of the home may have once seemed like a peculiar and unlikely concept, but as our devices become smarter and more investment is poured into the development of ioT consumer products, we are likely to see growth competition prod on further innovation in the field.

References

1. Y. Nakamura, Y. Arakawa, T. Kanehira, M. Fujiwara, and K. Yasumoto, "SenStick: comprehensive sensing platform with an ultra tiny all-in-one sensor board for IoT research," Journal of Sensors, vol. 2017, Article ID 6308302, 16 pages, 2017.View at: Publisher Site | Google Scholar
2. Mordorintelligence, "Global smart homes market—growth, analysis, forecast to 2022," https://www.mordorintelligence.com/industry-reports/global-smart-homes-market-industry?gclid=CIjd6MXjydYCFYYDKgod4ZQFaw.View at: Google Scholar
3. V. Ricquebourg, D. Menga, D. Durand, B. Marhic, L. Delahoche, and C. Loge, "The smart home concept: our immediate future," in 2006 1ST IEEE International Conference on E-Learning in Industrial Electronics, pp. 23–28, Hammamet, Tunisia, 2006, IEEE.View at: Publisher Site | Google Scholar

4. W. K. Edwards and R. E. Grinter, "At home with ubiquitous computing: seven challenges," in Ubicomp 2001: Ubiquitous Computing, pp. 256–272, Springer, Berlin, Heidelberg, 2001.View at: Publisher Site | Google Scholar
5. N. Balta-Ozkan, R. Davidson, M. Bicket, and L. Whitmarsh, "Social barriers to the adoption of smart homes," Energy Policy, vol. 63, pp. 363–374, 2013.View at: Publisher Site | Google Scholar
6. R. Lutolf, "Smart home concept and the integration of energy meters into a home based system," in Seventh International Conference on Metering Apparatus and Tariffs for Electricity Supply, pp. 277-278, Glasgow, UK, 1992, IET.View at: Google Scholar
7. C. Kidd, R. Orr, G. Abowd et al., "The aware home: a living laboratory for ubiquitous computing research," in Cooperative Buildings. Integrating Information, Organizations, and Architecture, pp. 191–198, Springer, Berlin, Heidelberg, 1999.View at: Google Scholar
8. A. M. Adami, T. L. Hayes, and M. Pavel, "Unobtrusive monitoring of sleep patterns," in Proceedings of the 25th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (IEEE Cat. No.03CH37439), vol. 2, pp. 1360–1363, Cancun, Mexico, 2003, IEEE.View at: Publisher Site | Google Scholar

5. Study Paper on Smart Homes and Devices using Internet of Things

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Abstract

Internet of Things (IoT) is an emerging technology that makes our world smarter. The idea of a connected world cannot be imagined without it. Smart Home is an excellent example of IoT. In IoT enabled Smart Home space various items such as lamps, household appliances, computers, security camera etc. they are all connected to the internet and allow the user to monitor and control the amount of items regardless of timeand place. This article describes the Frugal Labs IoT Platform for building an IoT-enabled Smart Home. In this we will discuss the various functions of Smart Home and its applications and I will present you with FLIP properties using Smart Home services using FLIP in the proposed program. The proposed system introduced in this article is used to monitor and control the Smart Home environment.

Keywords - IoT platform architecture; smart home; machine-to-machine communication;

1. Introduction

A smart home also called a connected home or Smart Home is a living room with highly advanced automation systems. A smart home seems to be "smart" because its daily activities are monitored by a computer. A smart home contains a lot of technology using a home network to improve quality of life. A smart home is a place with highly advanced automation systems to control and monitor light and temperature, household appliances, multi-media equipment, security systems and many other functions. The internet of things plays an important role in building a smart home. With the internet of things almost everything in our daily life at home can be connected to the internet. IoT allows us to monitor and control all these connected objects regardless of time and place

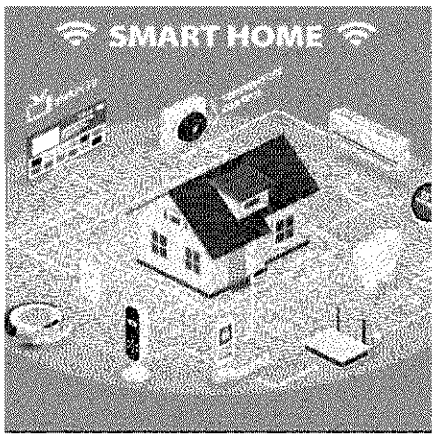

Fig 1: Smart Home Overview

2. Benefits

As a result of the digital India system, the cities of India will soon be transformed into smart cities. A smart city with a lot of internet-dependent infrastructure to connect to services. IoT is therefore an important factor in building smart cities. A smart home plan is part of a smart city. The main purpose of this is to promote a smart home system that can be used in all the smart cities of India.

3. Smart Home Functions

The smart home system contains applications built on IoT infrastructure. Smart home apps can have the following important functions: -

1. **Alert:** The smart home system can detect its location and properly send alerts to the user on a registered device or account. Alert data contains information related to environmental data. This information may include different gases in the area, temperature, humidity, light intensity etc. A warning can be sent to the user at any time specified. Alert can be sent via email, such as text message, tweets or any other social media platform.
2. **Monitor:** This is the most important function of a any smart home. A smart home is capable of monitoring its surrounding with the help of various sensors and camera feed on its own. Monitoring is an important function as it keeps track on every activity in a smart home which is the primary need on basis of which any further action can be taken or decision can be made. For example monitoring room temperature, sending alert to user to switch on air-conditioner if temperature is above threshold or sending alert to the user incase of any intrusion, etc.

3. **Control:** This function of smart home allows user to control various different activities. These activities include switching on/off lights, air-conditioner and appliances, lock/unlock doors, open/close windows and doors and many more. User can control things from same place or from remote location with just in one click. This function even allows user to automate activity such as automatically switch on/off air-conditioner when
4. **Intelligence:** This is the most important function of any smart home. The smart home is able to monitor the surroundings with the help of various sensors and the feed of the camera itself. Monitoring is an important function as it keeps track of all the work of a smart home which is a key requirement when any further steps can be taken or a decision made. For example monitoring room temperature, sending a warning to the user to turn on the fan if the temperature is above the limit or sending a warning to the user in the event of any intrusion, etc.

HI creates an integrated environment in the smart home in which the AI mechanism can identify and suitably react according to changing conditions and events. By identifying abnormal or unexpected events HI can alert user and provide an immediate automatic response if desired. Some scenarios for illustration are automatically prepare coffee as soon as user arrives, send alert to user whenever suspected activity is detected at door or inside home, automatically order stuff whenever there is a shortage in refrigerator, sending notification to electrician/plumber whenever maintenance is needed etc.

This smart home function allows the user to control a wide variety of tasks. These functions include lighting / closing lights, air-conditioner and electrical appliances, locking / opening doors, opening / closing windows and doors and much more. The user can control items in one location or remotely with just one click. This function even allows the user to automatically perform tasks such as automatically turning on / off the refrigerator when the temperature is high / low. Intelligence or Home Intelligence (HI) is the most important function of a smart home and refers to the intelligent behavior of the intelligent home environment. HI function is related to automatic decision-making by the occurrence of different events. HI relies on an Artificial Intelligence (AI) approach built on a smart home environment. HI not only gives the HI creates an integrated environment in an intelligent home where the AI approach can identify and respond appropriately depending on changing circumstances and events. By identifying unusual or unexpected events HI can alert the user and provide a quick automatic response when required. Some image modes automatically set up coffee as soon as the user arrives, send a warning to the user whenever a suspected employee is at the door or

home, order items automatically when there is a shortage in the refrigerator, send a notice to the electrician / woodworker whenever needed repairs. etc.

E. Difficult Home Applications

Although the use of the intellectual home is limited by human imagination, this article outlines some of them described below: -

1. Smart Light

Smart lighting is used to save energy that can be achieved by adjusting the light in local conditions and by turning on / off or dimming the lights according to the user's needs thus reducing unnecessary power consumption. Energy saving also helps to reduce costs. Smart lighting can be done with Solid State (LED) or LED-enabled lights (Internet or wireless). A clever lighti

FLIP developed by Frugal Labs Bangalore, India is an open source IoT platform aimed for developers, Hobbyists, and anyone interested to learn and work on IoT to transform their idea to "Proof of Concept". FLIP is a complete IoT platform and not just collection of devices and sensors or cloud services International conference on I-SMAC for building IoT infrastructure The FLIP architecture has four distinct layers device, gateway, cloud, and app & SDK. FLIP architecture represented below.

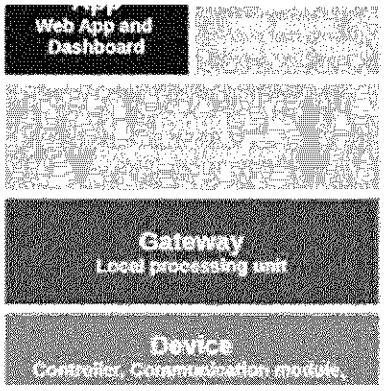

Fig 2: Device Layer

A. Device Layer

Device layer consists of controller, communication module, sensors and actuators. In this layer FLIP base board is used as controller. FLIP base board is based on Arduino Nano. For smart home application this layer also uses FLIP smart home shield. The smart home shield stacked over base board to extend functionality of the base board. Smart home shield has temperature & humidity, light intensity (LDR) sensors attached to it and also allows to connect other sensors such as PIR and various gas and air quality sensors, sound sensors and many more. Smart home shield also has Alternating current (AC) relay which can be used to control

anything up to 7 amps of current and 250 volts AC current. It enables to connect home appliances, home lighting etc.

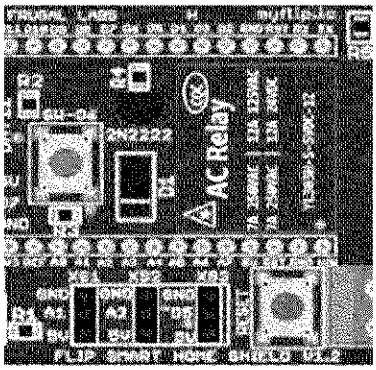

Fig 3: Flip Smart Home Shield

B. FLIP Smart Home Shield

For connectivity at device layer FLIP board uses Wi-Fi/Bluetooth module. Both modules can be connected to FLIP base board directly via 6-pin interface, directly connect FLIP device to the Internet and Bluetooth module connects FLIP device to Internet via gateway layer in the architecture.

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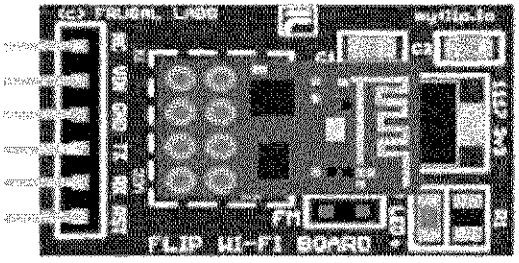

Fig 4: 6 Pin Interface

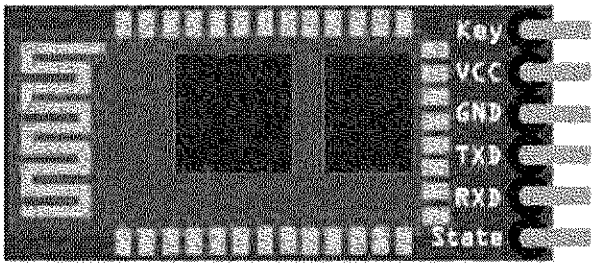

Fig 5: Bluetooth Module

C. Gateway Layer

Gateway layer consists of local processing unit which is based on Linux operating system. FLIP uses Raspberry PI as gateway Gateway layer consists of local processing unit which device. Gateway device has Bluetooth connectivity which allows other devices to connect to it. In the architecture all the devices are connected to gateway and it is connected to the Internet. Gateway is connected to Internet through Ethernet or Wi-Fi.

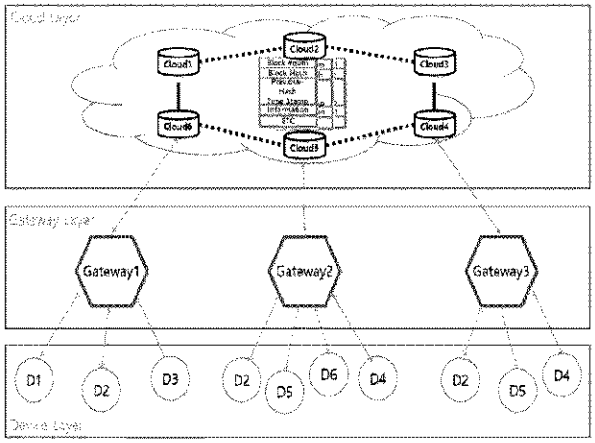

Fig 6: Gateway layer

D. Cloud Layer 978

Cloud layer consists of broker and the database. Broker connects to all the devices and database stores the data coming from the devices. The cloud layer has three main structures MQTT broker named Mosquito, Mongo DB database and Node.js for backend processing.

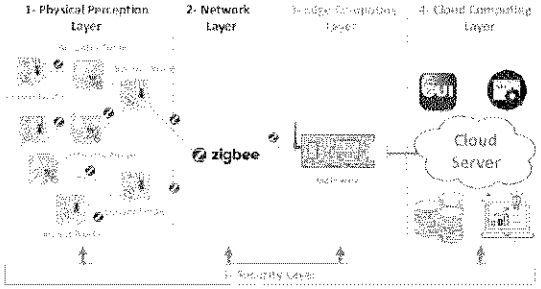

Fig 7: Cloud layer 978

E. App & SDK Layer

The top layer is App & SDK layer. consists of web app and dashboard and is used for data visualization using widgets and graphs. dashboard devices can be monitored and controlled. SDK has rule engine based on python Python SDK has two scenarios one is to define logic to your device i.e. if temperature is this much then switch on air-conditioner, and second to social media or third party apps.

1. Proposed System

The proposed system discussed in this study is based on FLIP. The proposed system has four main application modules smart lighting, smart appliances, intrusion detection, and smoke/gas detection as discussed in the previous section

In the proposed smart home system FLIP connected to sensors, lights, air-conditioner, camera, windows and door system, and various appliances. The flip device is connected to the Internet via gateway. Gateway in the proposed smart home network plays an important role as security layer to the smart home network thus making the proposed system more secure. smart home system is capable of performing various functions such as monitoring environment for air quality and security purpose, controlling appliances, locks, doors and windows location, generating alerts and notification conditions, adjusting room lighting and temperature by sensing light intensity and temperature level in the room and thus automatically controlling lighting system and air-conditioner. Language firmware code, uploaded on one of the FLIP device, publishes temperature light intensity data and also allows on/off remotely.

The following code segment from proposed smart home system sends temperature, SMAC 68 proposed smart home system FLIP device is conditioner, camera, and various appliances. he flip device is connected to the Internet via the proposed smart home network plays an important role as it add an extra security layer to the smart home network thus making the proposed system more secure. The proposed of performing various functions such as monitoring environment for air quality and security purpose, controlling home locks, doors and windows from remote and notifications at preset ing and temperature by sensing light intensity and temperature/humidity automatically controlling conditioner.

2. Future Scope

The proposed IoT based smart home system can be implemented in future smart cities in India. Currently the proposed system performs various functions as described in above sections. In future, the proposed system can be extended to perform other functions such as water and waste management.

4. Conclusion

With the rapid development of Internet and communication technologies today's homes also have strong computation and communication abilities. An IoT based smart home is emerging as an important part of the smart and intelligent cities which are being proposed and developed around the world. The purpose of a smart home is to improve living standard, security and safety as well as save energy and resources. The smart home plays an important role in development of society.

References

1. Jayavardhana Gubbi, Rajkumar Buyya, Slaven Marusic, Marimuthu Palaniswami, "Internet of Things (IoT): A vision, architectural elements, and future directions", Future Generation Computer Systems (Elsevier), 2013, pp. 1645- 1660.
2. Boban Davidovic, Aleksandra Labus, "A SMART HOME SYSTEM BASED ON SENSOR TECHNOLOGY", Electronics and Energetics Vol. 29, No 3, September 2016, pp. 451 – 460.
3. Jayashri Bangali, Arvind Shaligram, "Energy efficient Smart home based on Wireless Sensor Network using LabVIEW", IJER, Vol. 2, Issue 12, 2013, pp. 409-413.
4. David Bregman, "Smart Home Intelligence - The eHome that Learns", International Journal of Smart Home, Vol. 4, No. 4, October, 2010, pp. 35-46.
5. Frugal Labs Tech Solutions Pvt Ltd, www.frugal-labs.com.
6. Arduino Nano Board, http://www.arduino.cc.
7. Raspberry Pi 3, http://www.raspberrypi.org.
8. MQTT a machine-to-machine (M2M)/"Internet of Things" connectivity protocol, http://mqtt.org/.
9. Mongo DB Database, https://www.mongodb.com/.
10. Node JS Java Script environment, https://nodejs.org/en/.

6. Research Paper on Cyber Security and Cloud using IOT

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Abstract

Internet of thing and cybersecurity is a growing industry which cover most of the new operations of technology within the time. This publication seeks to boost the mind of the necessity of cybersecurity in IoT and suggests colorful styles and models to try to do so. It explores the reasons behind certain security styles over others while echoing the necessity to form druggies' conscious of the pitfalls and results. It also educate people from academia, and pupil perspective as to why cybersecurity has increase the usage in the world while at the same time pressing it uses on IoT systems. It also empower druggies to form opinions supported data and colorful qualitative styles while praying them to consider on posterior challenge during this amazing trip of humans.

Keywords: IoT, cyber security, Internet of Things, cloud

I. Introduction

Cybersecurity and thus the Internet of Effects came indeed more applicable in times. Many decades before Cyber Security and thus the Internet of Effects were considered as separate disciplines. They were not studied together. Effects have changed drastically over the times and Cybersecurity and Internet of Effects came one among the foremost studied motifs in assiduity also as academia. Cybersecurity primarily revolves round the miracle of guarding systems, software and colorful other computers from attacks on the connected also as standalone networks. This permits systems to be run securely on any cipher terrain like data centers, particular computers, mobile phones and IoT bias. Internet of Effects is that the wisdom of connecting all possible bias with the web. When a machine or a computer is claimed to retain Internet of Effects technology, it implies that the machine are frequently controlled or covered by sitting anywhere within the world. it always has capacities like monitoring, admonitions and recording preliminarily unknown problems to the system.

A. Problem Statement and Purpose of Research[1] This paper revolves round the admixture of cybersecurity and Internet of Things. Since, including the power of the Internet of Things in any system makes it exponentially more capable, it becomes important for a

Scientist or organization to take necessary steps to prevent unauthorized or malicious use. The paper will explore and answer various questions on the implication of using/not using cybersecurity like what, how and why.

II. Relevance and Significance [2]

Cybersecurity threats to iot are especially prevalent in organizations which have extremely powerful internet of things ecosystems and tremendous amounts of compute like self-driving Car companies. One such great example of a car company which utilizes internet of things systems in its cars is tesla. They have a host of software and Hardware systems integrated in their car which assist and, in some cases, completely take over the control from the driver. If a bad actor were to gain access to their system, it can result in proliferation Of multiple years of research to other state Sponsored or individual hackers and result in significant monetary loss to tesla. There might be some bad actors whose intent may be to remotely Take control of the car and possibly cause loss of human lives. It becomes extremely important for companies like tesla to have a strong and dedicated approach to cybersecurity along with the internet of things the problem has become extremely far ranging in recent times as more internet of things devices come online. In today's world people's entirehomes are connected to the internet. From the main door deadbolt to the lights in the living room, all are connected to the internet. Any lapses in security have serious impact in modern society. If a person's deadbolt can be compromised remotely then it might cause serious problems for them. It can result in risk of life, injury and in some cases even death. If a hacker is able to remotely compromise someone's security cameras, then they can invade ontheir privacy. It may result in embarrassment for them, serious violation of privacy and the hacker May even use this footage to gain intelligence to commit crimes such as theft.

III. Research Questions[1]

This paper would attempt to answer the three big questions -

TheWhat, The Why and The How.

1. What are the known cyber securitythreats in IoT?
2. Why are the cyber security threats are critical?
3. How to upgrade the cyber security for IoT systems?

A. Barriers and Issues[4]

The problem is significantly difficult to unravel because the web of Things ecosystem has grown tremendously. It is hard to come up with general solutions that can have a large impact on the entire ecosystem. The paper will require digesting multiple ideas that are out in the industry and then making highly analytical conclusions from them. It also involves the writer to have and develop domain knowledge in this spectrum which demonstrates the abilityto learn and digest complex data. There are multiple issues that can occur during the research. One of the first challenges is the obfuscation of good research articles by private organizations which makes it difficult to access industry data. The second challenge arises in finding solutions that can be applied across a large ecosystem and typically not affected by factors such as geographic region, cost, and skill level.

B. Research Literature and Analysis[2]

It also illustrates how the development of technologies relatedto the Internet of Things are still in an infancy stage. It mentions that there are several issues related to this technology that need to be solved. Then it delves deeper into the most issue which is that the biggest risk for Internet of Things which is security. It explores the varied ways during which cybersecurity around IoT devices can be used. The key highlights within security that the article explicitly states are the protection and integration of heterogeneous connected devices and technologies which are used in communication with those devices.

I. Common Cyber-Attacks for Iot Devices Andhardware-Assisted Mitigation Techniques[3]

Figure 1 reproduced from the article gives an in depth insight of how IoT threat prevention systems can potentially work. It analyzes violations and fault injection. The flow chart further Describes the utilization case scenarios which may occur when anatackis happening.This chart is a crucial function of highlighting the common use cases to the reader which may aid in creating mitigation strategies.

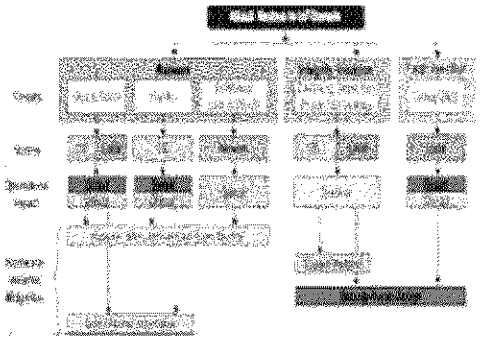

Fig. 1

Research article titled Cybersecurity Challenges and Opportunities within the New "Edge Computing + IoT" Worldby Jianli Pan and Zhicheng Yang talks about the huge shift being witnessed within the adoption of the Internet of Things and the security concerns that arise with those changes. It not only describes the present changes happening withinthe industry but builds upon the longer term of IoT and cyber security. The everyday uses include smart home automations, transportation, hospitals and health, energy and power grids, robotic assisted devices, and finally industrial scale applications. It first analyzes the cybersecurity challenges that exist and then aims to offer potential solutions for it. One of the most interesting points in the article is that it very clearly describes the overall scope of the problem. The current number of IoT devices are in billions and potentially expected to cross into the trillion-count territory. It becomes vastly important to recognize the size and scale of the development and its potential consequences.

I. Operation of the data protection system transmitted in the IoT system[3]

The system is described as a model and it is difficult to qualitatively or quantitatively analyze the practical application of this model. The article also does not provide any pointers for this.Article titled Cybersecurity of healthcare IoT-based systems: Regulation and case-oriented assessment by Anastasiia Strielkina, Oleg Illiashenko, Marina Zhydenko, Dmytro Uzun talks about the implications and application ofIoT devices in healthcare. It also analyzes the security angle for it. The article takes a comprehensive approach to analyzethe scope and scale of increasing IoT devices in healthcare, then changes course to include the complete medical architecture. This is especially the interesting part since it gives a significantly better picture of the overall ecosystem and the ways that it affects complicated medical architecture. It then gives special attention to the analysis of IoT tools using cybersecurity methods, suggests a normative model for international cybersecurity standards and then uses a case- based technique to analyze a real-world issue.IT reproduced from the article is especially helpful. It depicts overall ecosystem and workings of an IoT system in healthcare. It serves as a great resource to model and analyze any upcoming challenges that might occur. It also follows a flow pattern which enables the user to think in a specific way and aids in coming up with remedies for Cybersecurity threats in IoT. Paper titled Considerations for Managing Internet of Things (IoT) Cybersecurity PrivacyRisks by Katie Boeckl, Danna Gabel, O'Rourke, Michael Fagan, Deloitte & Touche LLP, William Fisher, Naomi Lefkovitz, Katerina N.

Results

In This section it will describe the approx. the results by the analysis on this paper. This paper aims to ultimately encourage the utilization of IoT devices as a force permanently.

Including the topic of cybersecurity enables to try to do this because it enhances the extent of protection and makes these devices secure and safe for people to use. It also demonstrates the commitment of individuals during this industry to form this technology accessible for people that traditionally might not be a neighborhood of this ecosystem. It seeks to empower through knowledge, security and therefore the right use case for IoT. It is the pillar for future references on cybersecurity threats and because of It, it gives the reader a general overview of the processes involved in both IoT and cybersecurity. It also emphasize the reader to know and try everyday technology and therefore the risks that comes with it . It explains the reader to explore major challenges and their fixes.

References

1. Boeckl, K., Boeckl, K., Fagan, M., Fisher, W., Lefkovitz, N., Megas, K. N., ... & Scarfone, K. (2019).
2. Rahman, F., Farmani, M., Tehranipoor, M., & Jin, Y. (2017, December). Hardware-assisted cybersecurity for iot devices. In 2017 18th International Workshop on Microprocessor and SOC Test and Verification (MTV) (pp. 51-56). IEEE.
3. Lu, Y., & Da Xu, L. (2018). Internet of Things (IoT) cybersecurity research: A review of current research topics. IEEE Internet of Things Journal, 6(2), 2103-2115.
4. Strielkina, A., Illiashenko, O., Zhydenko, M., & Uzun, D. (2018, May). Cybersecurity of healthcare IoT based systems: Regulation and case-oriented assessment. In 2018 IEEE 9th International Conference on Dependable Systems, Services and Technologies (DESSERT) (pp. 67- 73). IEEE.

7. IoT and Li-Fi Technology

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Abstract

In the field of information communications, Li- Fi technology represents a new and relevant research area. At the end of 2015, in one of the laboratories in Estonia, During the lab test, the transmission rate reached 224 Gb/s, a very high transmission rate. and during tests in offices - up to 1 GB/s was recorded. However, due to some limitations, the existing technology could only be applied in certain specialized areas. Li-Fi technology is presented as well as a comparison between Wi-Fi and its potential application in this article for the IoT network.

Keywords: IoT (Internet of Things), Li-Fi (Light Fidelity), Wi-Fi (Wireless Fidelity), VLC (Visible Light Communication), LEDs (Light Emitting Diodes)

I. Introduction

WiFi runs our life. In fact, a survey conducted by Opinium Research online for Direct Line shows that it is the number one thing that respondents can't live without. There is a good chance that you have encountered internet connectivity problems at some point, no matter where you are in the world.

Introducing LiFi, a type of wireless connection that can be 100 times faster than WiFi. Think about a world where you can connect to the internet just by switching on your light switch. LiFi is a wireless optical networking technology that transmits data over LEDs. As a matter of fact, LiFi can be described as a light-based WiFi that transmits data using light instead of radio waves.

Professor Harald Hass

Professor Harald Haas from Edinburgh University was the inventor of LiFi technology. He was the one who coined the term "Li-Fi".

"Li-fi networks can deliver speeds 200 times faster than Wi-fi."- Professor Harald Haas.

During his tenure at the university, Professor Harald spearheaded the creation of the D-Light project and Pure VLC for commercial use. He has been developing LiFi technology for

over 10 years and is also the author of VLC (Visible Light Communication) technology based on LiFi LED technology. ("light" and "fidelity" (accuracy)). In June 2011, According to Dr. Harald Haas, an LED lamp is equipped with a modulator that encodes the signal, A high definition (HD) video image could be transmitted to the computer. By using light emitting diodes, it is possible to connect to the Internet from nearly anywhere using Li-Fi technology. This research was funded by the British Council for Engineering and Physical Sciences, the project for the study of data transmission using ultra-parallel Visible light communications (VLC) project was initiated. [3]

So, What actually Li-Fi is?

Li-Fi (Light Fidelity) is high-speed wireless communication through light-emitting diodes(Which allow current to flow in only one direction but not another) (LEDs). VLC technology was prescribed in a limit of 96 Mbit/s, while Li-Fi technology had a limit of 102 Mbit/s. Through a micro-light tube, you could achieve a data rate of 3.5 GB/s of the track colors - red, green and blue, - which together constituted white light. This meant that by collapsing the spectral channels, data could be transferred at an overall speed of 10 Gbps. Signal reset for LEDs and photodiodes are used (A photodiode is a semiconductor device with a switchable PN junction. photons (or light) into electrical current) was fast enough to not withstand a pause for its reliable attenuation.

How does it work?

LiFi is a visible light communication system that transmits very highspeed wireless internet communications. This technology allows an LED bulb to emit light pulses that are undetectable to the human eye, and within those emitted pulses, data can be transmitted to and from receivers. The machines then collect the information and interpret the transmitted data. Conceptually, this is similar to decoding Morse code, but at a much faster rate - millions of times per second. LiFi line speeds can exceed 100Gbps, 14 times faster than WiGig, aka the world's fastest WiFi.

A VLC system has two qualifying components

1. At least one device containing a photodiode in order to receive light signals; and
2. The light source is equipped with a signal processor for signal transmission.

First, it uses data from the Internet. It is sent from the server to the LAM driver, which has the program code to send the data as a binary blink light. The LAM driver is tied to a binary flicker of light. LAM driver connects to LED. LEDs have a unique advantage that can flicker "OFF" or "ON" at a very high speed. "ON" signifies a binary "1" and "OFF" signifies a binary "0". The frequency of these "ON" and "OFF" sequences is so high that the human eye

can't see the light changing, so for us, the light remains "ON" all the time. The photoreception receives these flickers and amplitudes them.

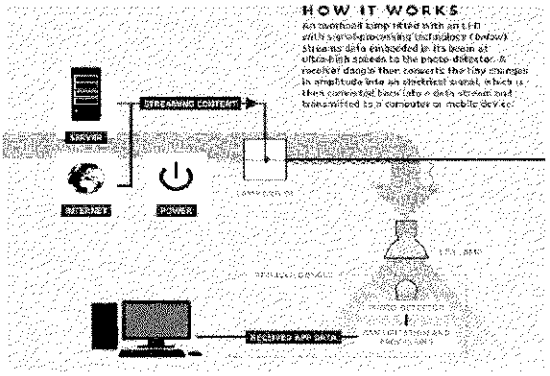

Figure. 1: Typical Li-Fi Working Scenario

Comparison of LiFi and famous Wifi technology The biggest difference between Li-Fi and Wi-Fi is when using Li-Fi data, it uses visible light as a communication channel (unlike radio waves in Wi-Fi). From this, in comparison with Wi-Fi, Li- Fi technology has several advantages and disadvantages.

II. Advantages of Li-fi: [4], [5], [6]

First, you can now transfer data over the network via LiFi at speeds up to 1 GB/s, which means 100 times faster than the speed of transfer to Wi-Fi. Even in the lab, you can achieve a high transfer rate of 224 GB/s, so you can download 20 HD movies in a blink of a second. According to Haas, Li-Fi can achieve a data transfer rate that is 100 times more than Wi-Fi. This is because LiFi is contained in a small area and the radio signal is propagating at this point.

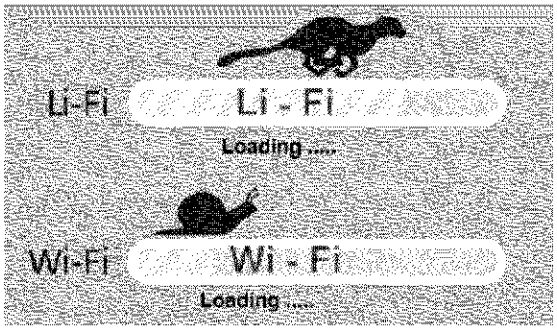

Figure. 2: Difference in Data Transfer Speed between LiFi and WiFi.

In Wi-Fi networks for data transmission, it is necessary to expand the allowable frequency band, which is limited and paid, In LiFi networks, additional bandwidth is allocated free of charge and no licensing process is required which will simplify the use of the technology of the Li-Fi.

Visible light does not penetrate walls, so LCV technology is potentially more reliable than traditional Wi-Fi in terms of data privacy. Unlike radio frequency technologies, the array beam using Li Fi technology can completely cover the sealed target room of a signal. (for example: a room, an office, a hall...) and will not go beyond it.

This means that it is possible to secure a high level of data confidentiality and an easier way for people to protect them from unauthorized access. In the area of 10 Square. Meters, by using the technology of Li-Fi, the researchers of the Fraunhofer Institute of Telecine have already transmitted data at a speed of 800 Mbit / s. This allows Li-Fi technology to be an excellent solution for creating and using a wireless network in a home environment. And the low price of 4, micro LED bulbs combined with the energy- saving features make it cheaper and more energy efficient to build LiFi networks. Another advantage of the new, according to Professor Haas, is the technology is to evenly distribute the LED emitter, which can achieve internet connection with much higher accuracy. It is accurate and stable inside the building. The drawback of the traditional Wi-Fi router always existed that with increasing distance from the transducer the signal weakens, as well as in homes and offices with an area where communication is so weak that the connection to the Internet becomes unstable or even interrupted.

III. Disadvantage of Li-fi: [1], [2]

Despite the fact that there are many advantages, the current LiFi technology is still a new technology, in the early stages of research. Therefore, this technology also has some limitations, which in fact, we can avoid using LiFi.

First of all, this change in infrastructure. Well- known technologies of wireless data transmission today like Wi-Fi, Bluetooth, and LTE are widely used on the basis of a solid infrastructure, and they work well and satisfy most of the users' needs. To become popular, LiFi requires a change in the manufacturer of the auxiliary equipment, the unit that builds the corresponding infrastructure.

This process requires a lot of time and money. As shown above, LiFi technology uses light to send data, which is vulnerable to interruptions because it is sent directly and cannot pass through obstacles. This means that in home conditions, objects such as curtains, plants or the user ... It can interfere with the communication between the user and the Internet.

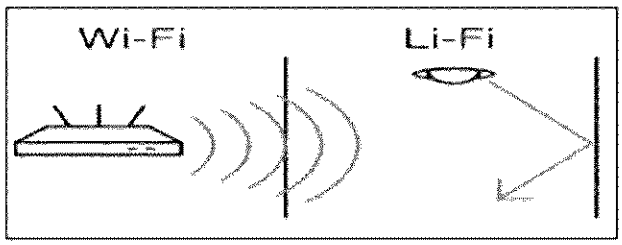

Figure. 3: Li-Fi and Wi-fi Compare to Data Transmission

Also, LiFi cannot be used in mixed lighting environments such as sunlight or fog calculations. In such environments, the interference is formed, the light transmission is prevented, the light is weakened, which leads to a loss and loss of information at transfer.

The main drawback of LiFi technology is the problem, especially when used in the dark. In most cases, users who want to connect to the Internet in the dark, for example, before going to bed. Then the use of light to transmit information causes a feeling of disk-fort for users. To become a simple part of life, LiFi technology must overcome existing obstacles. Nonetheless, scientists say that in the future, LiFi will not be able to completely replace traditional technology, but will co-exist and be used only in specialized disciplines.

IV. Actual Usage Perspectives of LiFi for IoT [5], [7]

1. Security

Security is a very important element in IoT connectivity. When sending or receiving a stream of data, it is essential to make sure that the IoT device or server has a correct authorization to send or receive the data. With an open gateway to the Internet, IoT devices are dangerously vulnerable. Therefore, end-to-end encryption is required between IoT devices. In contrast to radio frequency waves used by Wi-Fi, lights cannot penetrate through walls and doors. This makes it more secure and makes it easier to control who can connect to a network.

2. Omnipresent Detection

It is the ability to know immediately when an IoT device is dropped or connected to a network. Universal discovery provides accurate status of all devices connected to the network. LiFi is capable of monitoring IoT devices and solving any problems that may arise in the network. Thus, LiFi improves the reliability of the Internet of Things.

3. Spectrum usage

The visible light spectrum is 1000 times larger than the 300 GHz combined spectrum of radio, microwave and millimeter wave, so there is a huge untapped resource for wireless systems. Current and future wireless data traffic growth means that the radio frequency spectrum will not provide enough resources by 2025. Phosphorus- coated white LEDs are

mainly used in all. commercial lighting fixtures can deliver up to 'at about 100 Mbps. A LiFi scheme based on unipolar orthogonal frequency division multiplexing (UOFDM) provides high-speed data transmission with room light. Thus, providing enough bandwidth to accommodate a large number of IoT devices.

4. Li-Fi everywhere

Vehicles could communicate with one another through front and back lights to increase road safety. Also street lights and traffic signals could also provide information about current road situations as shown in figure. Most Remotely Operated Underwater Vehicles (ROVs) use cables to transmit command, but the length of cables then limits the area ROVs can detect. However, as a light wave could travel through water, Li-Fi could be implemented on vehicles to receive and send back signals. LiFi facilitates data connections in closed, controlled environments such as aircraft cabins because light waves do not interfere with high frequency signals.

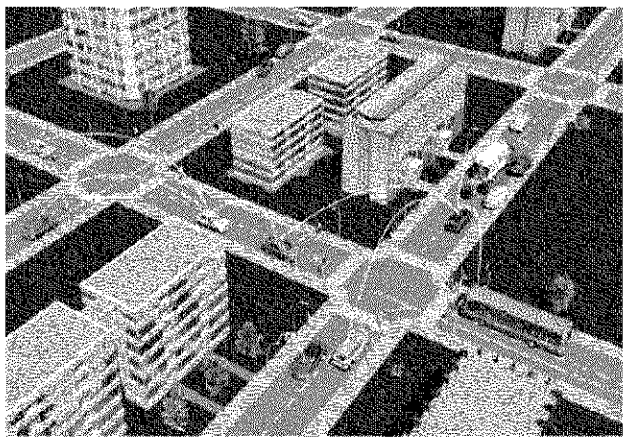

Figure. 4: The use of Li-Fi Technology

V. Conclusion

Today, science and technology are changing rapidly to meet the needs of human life. With the advent of LiFi technology, people can solve the problem of limited radio frequency range of existing technology and transmit data at very high speed. Despite significant drawbacks, LiFi technology is still in its early stages of development. Next, LiFi will be a bit more advanced with the advancement of IOT.

References

1. F. Kalyani, M. Khakhariya and D. Nandy,(2016) , LI – FI : LIGHT FIDELITY – A CRITICAL TECHNICAL STUDY , Proceedings of International Conference on Computer Science Networks and Information Technology

2. G.C. Goats, ,(2018), Microwave diathermy, British Journal of Industrial Medicine, Vol 24, No. 4, pp. 212-218.a. https://doi.org/10.1136/bjsm.24.4.2 12
3. P. Kamsula ,(2015), design and implementation of a bidirectional visible light communication testbed, University of Oulu, Department of Electrical and Information
4. S Chatterjee., S. Agarwal and N Asoke., (2015), Scope and Challenges in Light Fidelity(LiFi) Technology in Wireless Data Communication, International Journal of Innovative Research in Advanced Engineering (IJIRAE) Issue 6, Vol. 2, pp. 2349-2163.
5. F. Aftab, (2016), Potentials and Challenges of Light Fidelity Based Indoor Communication System, International Journal of New Computer Architectures and their Applications,Vol. 6 ,No.(3) ,PP.
6. Li-Fi: the net with light and shade, (2017), https://www.tystems. com/us/ en/ newsroom/ perspectives/networks/performance/li-fi- 664738

8. Robotic Surgery

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Abstract

In Robotic surgery robots are used to perform surgery. Major implicit advantages of robotic surgery are perfection and miniaturization. With professed surgeons and the robotic system, we can now use minimally invasive ways in indeed the most complicated procedures like cardiac surgery, gastrointestinal surgery, gynecology, urology, pediatrics, orthopedics etc. da Vinci, Aesop, Hermes etc, are different sorts of the robotic systems. The combination of increased view and inexhaustible dexterity is helping us to overcome some of the limitations of other types of lower invasive surgery.

Keywords: Robotics, Surgeries, Patients, Devices.

I. Introduction

Robotic surgery comprises of a system wherein a surgery is performed with the help of veritably small tools that are fixed to a robotic arm. The surgeon does not physically operate during a robotic surgery but he controls the movements of the robotic arm via a computer.

During a robotic surgery, after administering general anaesthesia to the case, the surgeon seated ahead of a computer makes small lacerations on the patient body to fit certain instruments into it. All this is frequently done by the surgeon by controlling the robotic arm during a motorized manner.

II. Background of Surgical Robots

The Czech playwright Capek used the word "robot" in his play Rossom's Universal Robots in 1921. This word is derived from the word robota, which means forced labor. In 1985, the first non-laparoscopic robot was the Puma 560, which was used to perform neurosurgical necropsies with less accuracy. Davies et al used the same machine three times later. PROBOT is a robotic system designed specifically for transurethral resection. Integreated Surgical Inventories of Sacramento, CA developed ROBODOC to aid in hipsterism relief surgery. This came the first robot approved by the FDA.

III. Chronological History

March 7 - 2000- Intuitive Surgical Inc. and Computer Motion Inc., two leading medical robotic companies, signed an agreement merging their respective products for operative surgical robots, telesurgery and operating room integration.

July 7 - 2004- A robotic system-such as this one-was cleared by the FDA for use during coronary bypass surgery. This system allows the surgeon to do heart surgery while seated at a computer and videotape examiner.

Apr 9 - 2005- With the use of the da Vinci Surgical System, surgeons at the University of Illinois Clinic at Chicago successfully performed a laparoscopic right hepatectomy, removing approximately 60 percent of her liver along with the excrescence.

IV. New Robotic Surgical Systems and Companies

1. Revo-i®

The first Korean robotic system, Revo-i® (Mere company Inc., Yongin, South Korea), has been approved for clinical use by the Korean FDA since August 2017. Revo-i® features an impact console, a four-arm robotic cart, a vision cart with HD quality, and multi-use endoscopic instruments (Figure 3). It has a design almost like that of the da vinci Si robot. Abdel Raheem et al reported their porcine model preclinical study in 2016, and a clinical trial of robotic cholecystectomy in 2017.

Fig.1

2. Micro HandS

The Micro Hand S first Chinese robotic system was developed by Tianjin University together with Central South University in 2013. In 2014, the first clinical trial was reported by Yi et al, who treated patients with gastric perforations and two patients with acute appendicitis.

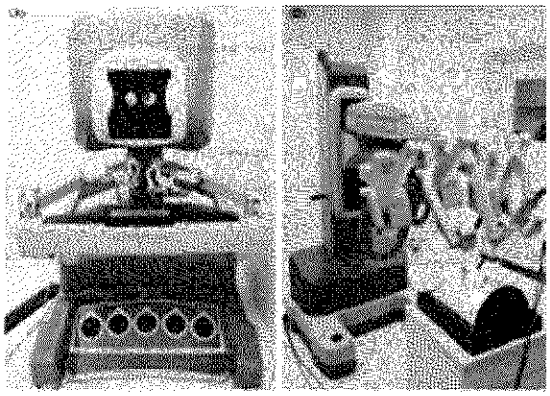

Fig.2

3. EMARO

EMARO is the first pneumatically powered endoscopic manipulator robot with an air pressure system which was developed by a Japanese company based in Tokyo. The operator drives the robot with the assistance of a head sensor. We await more information on its clinical application and studies.

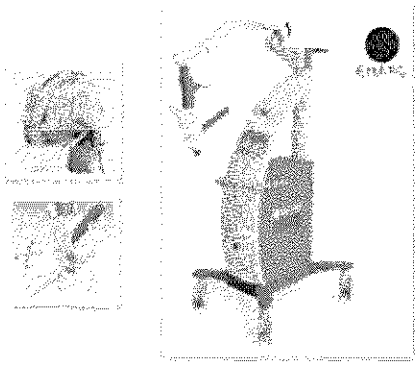

Fig.03

V. Future of Robotic Surgery

We believe that robotics will come an integral element of surgery within the future, replacing endoscopic and open approaches in numerous settings. Still, the transition should be precisely covered, pitfalls and benefits strictly estimated, and analysis performed to work out a secure part for robotics in each stage of its elaboration and in different clinical operations. In order to make sure patient safety, care should be taken around espousing new technologies which are supported by low- quality exploration, as numerous inventions show no advantage over current practices when estimated in duly controlled studies.

VI. Conclusion

Although still in its immaturity, robotic surgery has formerly proven itself to be of great value, particularly in areas inapproachable to standard laparoscopic procedures. It

remains to be seen, still, if robotic systems will replace conventional laparoscopic instruments in less technically demanding procedures. In any case, robotic technology is about to revise surgery by perfecting and expanding laparoscopic procedures, advancing surgical technology, and bringing surgery into the digital age. Likewise, it's the implicit to expand surgery modalities beyond the bounds of mortal capability.

VII. Ackhnowledgement

I gratefully acknowledge the support, guidance and encouragement of my Dissertation Guide Assistant Professor Jagruti Jadhav Mam for this Nobel work.

VIII. References

1. Da Vinci decisions: factors to consider before moving forward with robotic surgery. ECRI Health Devices [Internet]. Jan, 2013. [cited 2015 Jan 12]. pp. 6–18. Available from: www.ecri.org Subscription required.
2. Telemanipulation systems, surgical [Internet]. Plymouth Meeting (PA): ECRI Institute; Oct 1, 2014. [cited 2015 Jan 5]. Available from: www.ecri.org Subscription required.
3. Australia and New Zealand Horizon Scanning Network, Australian Government Department of Health and Ageing, Australian Safety and Efficacy Register of New Interventional Procedures - Surgical, Royal Australasian College of Surgeons.
4. Horizon scanning technology prioritizing summary: transoral robotic surgery (TORS) for head and neck cancers [Internet]. Canberra (AU): Department of Health and Ageing, HealthPACT Secretariat; Feb, 2009. [cited 2014 Dec 22]. Available from: http://www.horizonscanning.gov.au/internet/horizon/publishing.nsf/Content/ A21BB57C2AA8FA71CA257 5AD0080F3DF/$File/PS%20Transoral %20robotic % 20surgery%20for%20head %20and%20neck%20cancers.pdf.
5. Glazer TA, Hoff PT, Spector ME. Transoral robotic surgery for obstructive sleep apnea: perioperative management and postoperative complications. JAMA Otolaryngol Head Neck Surg. 2014 Dec 1;140(12):1207–1212. [PubMed]Friedman M, Hamilton C,Samuelson CG, Kelley K, Taylor D, Pearson-Chauhan K, et al. Transoral robotic glossectomy for the treatment of obstructive sleep apnea hypopnea syndrome. Otolaryngol Head Neck Surg. 2012 May;146(5):854– 62. [PubMed]

9. Study on IoT and Smart Homes and Devices

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Abstract

Over the past decade, smart home systems have grown in popularity as they make life more comfortable and easy. The majority of smart home systems are controlled by smartphones and microcontrollers through smartphone apps. Smartphone apps can monitor and control functions in the home.

Keywords: technologies.RFID, NFC, low energy Bluetooth, low-energy wireless, low energy radio protocols, LTE-A

I. Introduction

Several technologies, including the classical smart home, the internet of things, cloud computing, and rule-based event processing, make up our proposed advanced smart home integrated compound. In addition, you can attach sensors to appliances at home, such as air conditioners and lights.The cloud computing platform provides scalable processing power, storage space, the ability to develop, maintain, and run home services, and allows users to access devices from anywhere at any time.The function of rule-based event processing is to control and orchestrate home India devices. Recent literature has provided a variety of ways to combine technologies to improve smart homes.

II. Internet of Things Vs. Smart Home

A. What is the Internet of Things?

The Internet of Things, or "IoT" for brief , is about extending the facility of the web beyond computers and smartphones to an entire range of other things, processes, and environments.[1]

Technology that enables basic home amenities to operate remotely or automatically is known as smart home technology. It includes things like: a. The types of appliances that you

use, such as washing machines, refrigerators, and garage door openers The types of security systems, cameras, and apps that you use b. Home entertainment systems

c. Home security systems

d. Environmental controls, like air conditioning, heating,and lighting .[2]

III. Aim and Objective

As well as enhancing quality of life for residents and providing convenience and safety, smart home applications also help maximize the use of energy in the home.... A wide variety of smart home applications have been developed in the last few years, all of which aim to make our lives easier.

1. Can turn on or off fans easily by a smart phone
2. Turn on the led or to change the colours of light
3. To down the curtains

A. How is IoT making homes smart? IoT home automation is that the ability to regulate domestic appliances by electronically controlled, internet connected systems. A central hub connects all the devices and allows remote access to controls via a mobile app, including complex heating and lighting systems and alarm systems.

Smart Home Challenges [3]

- Security smart homes can hacked by some hacker so it's a major problem
- If the smart devices drain off the battery so you have to wait till its get to use easily
- Smart home devices are difficult to control
- Network connectivity is the most important factor without internet you can't do anything
- Too expensive

B. How do IoT or smart home devices work? It consists of mini-computers that are connected to the internet and have sensors. Machine learning is used to process the data collected by the sensors. The mini computers are themselves computers. A smart thermostat can send the right temperature to your smartphone when you get home from work, for instance, by communicating with your smartphone. Another plus? Smart devices contain sensors and minicomputer chips, as well as embedded sensors that can be used to collect and analyze data. Smart phones play a major role in the IoT. Another plus? If you are away, you may avoid wasting energy by not heating or cooling while you are away. [3]

D. What does the future hold for smart home? Greater compatibility between devices: Devices will start integrating and communicating with each other on a more frequent basis, providing the ultimate user experience.This is currently still in its infancy, which can lead to greater health, safety, and a sense of well-being.This is especially relevant for older family members, where a smart home product can alert others in case of an emergency.Even Greater Savings: With washer or washer when electricity is at its cheapest, not only saving you money but also lowering on greenhouse gases. The same applies for your Identify applicable fune. If none, delete this text Identify applicable funding agency here. If none, delete this text box.home thermostat, which can turn itself off once the desired room temperature has been reached.Or even smart sprinklers can shut off once a certain amount of water is used. [3]

Iv. Enabling Technologies for IOT

The Internet of Things relies primarily on standard protocols and networking technologies.RFID, NFC, low-energy Bluetooth, low-energy wireless, low energy radio protocols, and LTE-A are among the main technologies and protocols needed for IoT.Rather than a typical uniform network of common systems, these technologies support the precise networking functionality required in an IoT system.

To maximize the benefits of the IoT, the IoT relies on several other technologies in addition to these enabling technologies. These include:

- BigData.
- CloudComputing.
- Sensors.
- AnalyticsSoftware.

IoT devices connect to these supporting technologies to ensure data is gathered, stored, and analyzed. However, let's delve deeper into Web of Things enabling technologies. [3]

A. Application Areas of SHAS

There is an ongoing struggle to remotely control our homes for reasons such as turning on or off lights, televisions, air conditioning outlets, or even opening and closing door panels whenever we are away from home,In the study, Smart Home Automation System (SHAS) is proposed to be developed using the Internet of Things. Smart Home Automation (SHAS-IOT) proposes controlling portions of the home environment using a smart phone

operated by particular Android applications, more secure, more versatile, and easier life for people of all abilities.. Security and energy savings are among the main [4]

B. Structure

It is possible to define a smart home by choosing a residence equipped with advanced items; the ability to share records between items is created by a home community; and the connection between the smart home and the outside world is achieved through a residential gatewayInteracting with or studying residents is possible thanks to clever items. Technically, home Automation system includes 5 building blocks.

1. Devices under Control A house automation device is a system that includes all equipments in the house, such as electrical appliances and client electronics, that are included in and controlled through the automation system. Wireless networking technologies such as WLAN, Bluetooth, Z-Wave, among others, contribute to its integration.
2. Sensors and Actuators- A wide variety of sensors are also employed within the home system, such as those that measure temperature, moisture, light, fluid, and fuel, and those that determine movement or commotion. There are mechanical actuators such as pumps, siphons, and electrical engines, as well as digital actuators like switches, which are used by the eager system to accomplish its goals. In the near future, IoT gadgets equipped with sensors will traverse the country as government, and the ones equipped with actuators will roam as entertainers. A system that combines sensors and actuators will be able to see and respond to things around it. [4]

Problem Formulation with Security

For the IoT-based fantastic house we will make use of the OCTAVE Allegro method to play out security threat appraisal and problem formulas. At that factor, an association to lessen these hazards will be proposed, combining basic records advantages with vulnerabilities and capacity risks., For the purpose of making the security danger appraisal as accurate as possible, we want to first emphasize the security threat assessment SHAS-IoT services that enable the creation of itself, as well as all key words which constitute the security threat assessment. Risk appraisals are conducted to acknowledge the present framework and conditions, to understand the dangers and impacts of the collected data, and to develop a plan in responseA security risk appraisal is designed to give guidelines without impacting the usefulness or ease of use of the assessment while additionally covering sophistication,

respectability, and accessibility. In "presenting octave allegro: improving the statistics security threat evaluation technique" we discuss the meaning of some terms that we will be using within our safety risk appraisal process.

Model Design

The major part of the project involved planning a house model for running simulations, finding out the effects and understanding them. AutoCAD was used to design the different components of the house model. As an entry to the laser cutter, the design was processed into cardboard parts to be sliced and then assembled to form the space model shown below. [4]

IV. Conclusion

A number of Internet of Things applications exist in various areas. IoT is starting to be implemented in the area of mechanical WSNs. It has been made for Smart Homes System. Iot has made a lot of devices that are really very helpful but there are some kind of issues that they need to improve in upcoming years.As looking at iot and smart homes and devices the future is looking bright . IoT is gaining momentum in the area of mechanical WSNs due to its wide application in various areas.. Keeping in mind that technology is rapidly changing, it is important to recognize how technology is changing how we function within our households. Despite technology's advancements, human interaction will not be replaced. Human interaction is necessary to make the technology work and is a fundamental human need. [4]

References

1. Timothy Malche, Priti Maheshwary, and Monika Craig. "Internet of Things (IoT) for Building Smart Homes, 2017 International Conference on I-SMAC (IoT for Social, Mobile, Analytics, and Cloud). IEEE, 2017."Smart Homes System Using Internet-of
2. Things: Issues, Solutions and Recent Research Directions."
3. Research Perspectives on Smart Homes Systems Using Internet of Things: Issues, Solutions and New
4. Directions." The Intel Journal on Electrical and Electronic Technology (5), 1965: 1969. Khan, Akram, et al. "Design of an IoT smart home system." 2018 15th Learning and Technology Conference (L&T). IEEE, 2018.

10. Study Paper on Air Pollution Detector and Monitoring

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Abstract

The Web of Things might be an overall arrangement of savvy gadgets w will detect and interface with their environmental factors and communicate with clients and different frameworks. Worldwide air contamination is one of the main issues of our time. The degree of contamination has expanded with times by a great deal of things as the expansion in populace, expanded vehicles use industrialization and urbanization which winds up in hurtful consequences for human prosperity by straightforwardly influencing the soundness of the populace presented to it. Air quality goes down when enough measure of hurtful gases are available noticeable all around like carbon dioxide, smoke, liquor, benzene, NH3.to investigations, we are fostering an IoT Based contamination Observing Framework which we'll screen the Air Quality over the web server. Existing observing frameworks have substandard accuracy, low affectability, and need research center investigation. Along these lines, further developed observing frameworks are required. To beat the issues of existing frameworks we propose a three-stage contamination observing framework. It will show the air quality in PPM on the LCD and furthermore on a page in the request that we will screen it without any problem. In this IoT project, you can screen the contamination level from anyplace utilizing your PC or cell phone. The framework utilizes MQ2 and MQ7 sensors for checking Air Quality.

I. Introduction

Acquaintance Atmospheric conditions proceed with crumble every year because of the development of ci Introduction-Atmospheric conditions keep on decaying every year because of the development of progress and expanding messy emanations from businesses and autos. Despite the fact that air is a fundamental asset forever, many individuals are not interested in the seriousness of air contamination or have as of late perceived the issue. Among different

sorts of poisons like water, soil, warm, and clamor, air contamination is the most risky and extreme, causing environmental change and hazardous illnesses. As indicated by the World Health Organization (WHO), 90% of the populace currently inhales dirtied air, and air contamination is the reason for death for 7 million individuals consistently. The wellbeing impacts of contamination are exceptionally extreme and cause Stroke, cellular breakdown in the lungs, and coronary illness. Moreover, air contaminations contrarily affect people and the world's environment, as seen in late worldwide air contamination issues like ozone exhaustion. Along these lines, air quality observing and the board are the principle subjects of concern.

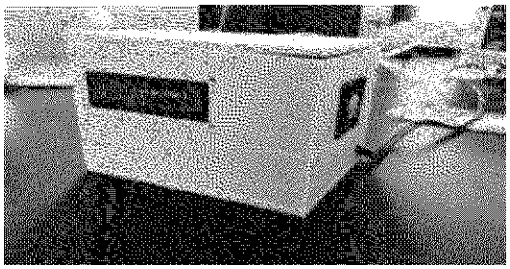

Fig 1: Air Pollution Detector and Monitoring Overview

According to the United States Environmental Protection Agency (EPA), indoor air is multiple times more tainted than outside air. Most current populaces burn through 80 to 90 percent of their time inside; accordingly, indoor air straightforwardly affects human wellbeing than outside air. In addition, as opposed to environmental contamination, indoor poisons are multiple times bound to be communicated to the lungs, causing illnesses, for example, debilitated structure condition, different synthetic sensitivities, and tipsiness. Indoor air quality administration is vital, as it can forestall openness through proactive prudent steps. In this manner, productive and powerful observing of indoor air is important to appropriately oversee air quality.

To decrease openness to air tainting (particularly sprayers), new measures have been sought after, including the improvement of air quality estimating gadgets and air purifiers. The Ministry of the Environment in Korea evaluated the viability of 17 generally utilized air quality estimating gadgets by breaking down their precision and dependability. The outcome showed that main two gadgets gave exact readings of indoor air quality. Different gadgets didn't present exact estimations of spray and absolute unpredictable natural mixtures aside from carbon dioxide. As per the report, the Ministry recommends that the low dependability of indoor air quality estimation esteems in many gadgets relied upon many factors like estimation strategies, gadget design, and information transmission. Subsequently, an

innovatively progressed air quality observing stage should be created dependent on a comprehension of the requirement for more precise checking gadgets. as of late, the presentation of innovations like the Internet of Things (IoT) and distributed computing has uncovered new abilities of continuous checking in different fields. Accordingly, numerous researchers have concentrated on coordinating these advancements into indoor air quality checking frameworks. In any case, these investigations were just centered around coordinating an engineering of IoT stage to screen the air quality continuously. Since the innovations highlight a remote sensor organization to consequently communicate, process, break down, and envision information, consolidating these new advances can likewise offer incredible benefits to further develop indoor air quality.

Therefore, an IoT-based indoor air quality observing stage dependent on the incorporation of distributed computing and IoT is introduced in this exploration. Likewise, a gadget called "Shrewd Air" was created to exactly screen indoor air quality and effectively communicate constant information to a distributed computing based web server utilizing an IoT sensor organization. The distributed computing based web server presented in this stage breaks down ongoing information and adds enhanced visualizations to represent the states of indoor air quality. What's more, the webserver was intended to give ready portable application clients or office chiefs of moderate or helpless air quality with the goal that people in question can make a prompt healing move. Constant observing and a fast ready framework produce an effective stage for further developing indoor air quality. Significant commitments of the proposed study are as per the following: We propose the utilization of the Smart-Air for the exact checking of indoor air quality. [4,6]

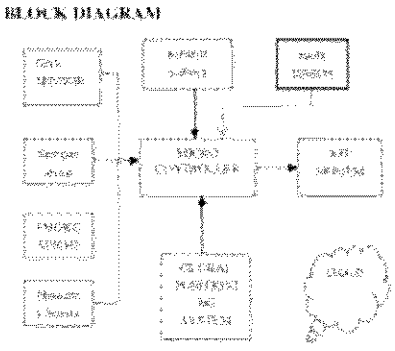

Fig 2: Air Pollution Detector and Monitoring Overview

II. Working

The sensors are utilized to detect the current status noticeable all around. The sensors are associated with the regulator. The regulator gets the worth and converts it into advanced structure and those qualities are refreshed in the webserver through a GSM modem. The default esteems are as of now put away in the webserver. The current information will be contrasted with the default esteems with dissect the outcome. The contamination status will be transferred to the webserver. Along these lines, the client can see it anyplace through the web. When there is contamination that happens this shows the aggregate sum of gases which is available in the specific area model CFC (chlorofluorocarbon) carbon-monoxide and numerous harmful gases can be recognized by the measure of rate which is available on it. The super working standard behind this is IOT which gathers data from the cloud which comprises of data about the contamination status which is available in our current circumstance. The microcontroller which is utilized in this gadget is the Adreno microcontroller which comprises of 6 yields and 6inputs with the goal that numerous sensors can be clubbed together which thoroughly summarizes all together identifier and checking utilizing an IoT gadget.[1]

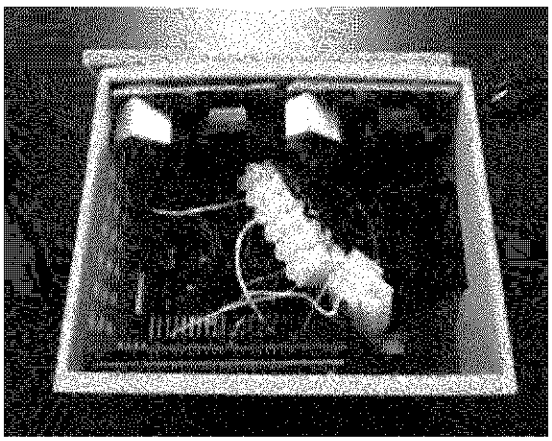

Fig3: Air Pollution Detector and Monitoring Overview

III. Processing of Sensors

The fundamental course of the sensors is that numerous sensors are being clubbed all together gadget where numerous sensors has been utilized, for example, mugginess sensor temperature sensor gas sensor smoke sensor are generally together clubbed as a solitary gadget by utilizing the IoT in the cloud which gets the measure of contamination which is being existed in the territory.[1]

IV. IOT Functions With the Cloud

Cloud to IOT gives a completely oversaw administration for overseeing gadgets. This incorporates Enlistment Verification, and approval inside the cloud stage asset order just as

gadget metadata put away in cloud and the capacity to send gadget arrangement from the help to the gadget.[1]

V. Benefits of Proposed Project Portability

It is a conservative gadget which comprises of numerous sensors including cloud which are completely joined by utilizing the web of things (IoT) SAFETY One can abstain from going to a specific area by diverting themselves or by avoiding potential risk like wearing a veil and can lessen over unloaded wastages in a specific territory region Compared to others it's proficient and minimal expense in light of the fact that numerous sensors are clubbed by utilizing IoT and Adreno microcontroller SIMPLE MAINTENANCE As the Project manages the product implanted C, so support will be simple and this can likewise be introduced in GSM android mobiles. [5]

1. **Information Availability-** The information used to help the discoveries of this review are accessible from the comparing creator upon demand. [3]
2. **Exposure-**This examination didn't get a particular awards from financing offices in general society, business, or not-revenue driven areas.

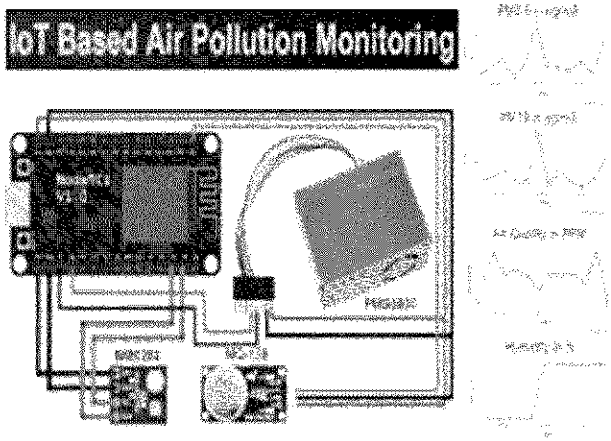

Fig 4: Air Pollution Detector and Monitoring Overview

VI. Results

The objective of the investigation was to play out an underlying execution of the stage to screen indoor air quality. Savvy Air remotely communicated the recognized information to the web server, which effectively arranged the state of indoor air quality and showed it through both the web and the application. Likewise, the information were saved in the data set of the web server as planned to such an extent that further investigations can be performed on patterns of air quality. The investigation showed helpless conditions in doorways of the structure since it is presented to outside air more than different areas. Nonetheless, the stage

effectively alarmed and envisioned helpless air quality. The gadget changed the LED light tone to coordinate with the current condition and alarmed the supervisor by means of a spring up message. Additionally, LED lights introduced in the gadget were effectively shown.

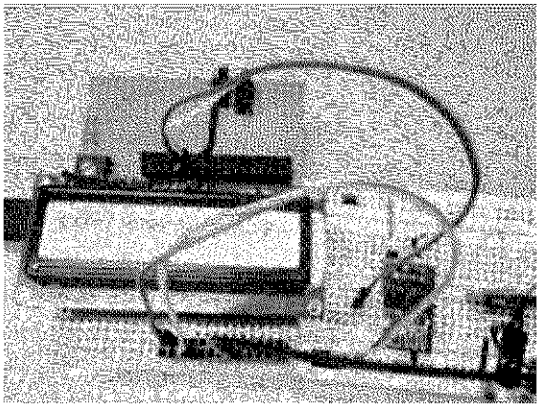

Fig 5: Air Pollution Detector and Monitoring Overview

Considering the idea of the stage, perform subjective investigation dependent on client experience. In the investigation, interviews were directed with building administrators who utilized the stage to oversee air quality. Interviewees were exceptionally happy with its capacity to screen air quality. At the point when air quality was moderate or poor, supervisors were made aware of the condition and ready to respond promptly to further develop air quality. Positive remarks were gotten from the supervisors in regards to information accuracy and data assortment progressively.

During the investigation, it was demonstrated that the stage gave exact information as well as significant data continuously to save energy. The stage additionally screens temperature and dampness to give the ideal climate to the space. By working the ventilation framework when it is essential alongside the warming and cooling framework, individuals in the space were happy with the further developed condition and saved energy. [1,5]

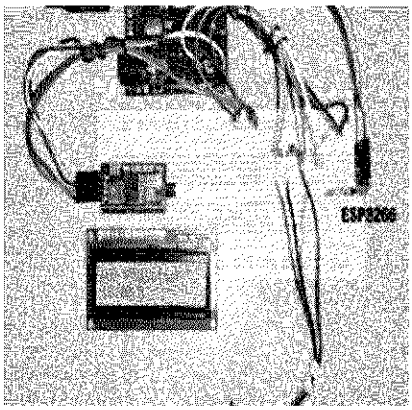

Fig 6: Air Pollution Detector and Monitoring Overview

VII. Conclusion

Ends In this paper, the improvement of an IoT-based indoor air quality checking stage is introduced. Investigations were performed to confirm the air quality estimation gadget utilized in the stage dependent on a technique proposed by the Ministry of Environment, Korea. We checked the precision of indoor air quality observing and the ideal execution of the gadget. Likewise, tests utilizing the stage were directed and exhibited appropriate execution and comfort of the air quality observing stage. A few accomplishments of the stage were cultivated, including the accompanying:

1. Indoor air quality can be proficiently checked anyplace and progressively by utilizing IoT and distributed computing advancements;
2. The stage utilizing Amazon Web Services as a confirmed web server for the security of the stage.
3. The Smart-Air gadget has an expandable interface, and the webserver is likewise effectively extendable, permitting simple application to different conditions through the expansion of proper sensors to the gadget or introducing more Smart-Air gadgets to fittings observing areas.Ease of Uses. [1,5]

References

1. P. Liu, D. Zhou, and N. wu, D. Birant and A, kut A. A. L. Kama, H. Hammadou, B. Meurisse
2. TNAIRSAQS and Brimblecombe, Kim, S. & Paulos
3. Website:https://www.instructables.com/id/Air Pollution-Detector/
4. www.instructables.com/id/Air-Pollution monitoring /.
5. N Alhakbani, "Air Pollution Measures in Riyadh City and Personal Exposure Level", IEEE Journal, pp. 1-3, 2015.
6. L. Morawska et al and J. J. Caubel, T. E. Cados and T. W. Kirchstetter, "A new black carbon sensor for dense air quality monitoring networks", Sensors, vol. 18, no. 3, pp. 738, 2018.

11. E-Waste Management and Route Management using IoT

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Abstract

Productive electronic waste (e-waste) charge is one of the vital programs to save paraphernalia, including critical minerals and precious substance with limited global reserves. Thee-waste collection issue has gained adding attention in recent days, especially in developing countries,. due to low collection rates. This study aims to search for progressive answers in thee-waste collectionsphere with close-to-zero transport and configuration expenditures and the minimization of consumers'sweats towards an enhancede-waste direction effectiveness and collection rate. Along these lines, the present paper develops a smart rear system ofe-waste from end-of- life electronics holders to endemic recycling armatures predicated on hyperintelligent information technology (IT) tools involving endemic delivery services to collecte-waste and connecting with interactive online maps of dopers' requests. This system considers the vehicles of endemic delivery services as potential mobile collection points that collect and delivere-waste to a endemic recycling enterprise with a lowest detour from the planned routes. Besidese-waste transport and cadre costs minimization, the proposed smart .e-waste rearward system supports the reduction of CO2 through the optimal deployment ofe-waste assemblage vehicles. The present study also advances a solid argument for involving originale-waste drivers as crucial stakeholders of the smarte waste rearward system. stationing the business model Oil(BMC) toolkit, a business model of the forward system has been erected for the case of Sumy . megacity, Ukraine, and batted in light of recent studies.

Introduction

It's sensitive to imagine new-fashioned life without electrical and electronic bias — extended family gadgets, information technology (IT) outfit, and means of communication that are continually being enhanced. With the development of hierarchically advanced

technologies, new occasions and areas for the use of electronic tools appear, which leads to the appearance of new products and, as a result, their diversity is verily more significant (1). With the appearance of another advanced appliances, especially those that double quick streamline, their analog counterparts lose value to addicts verily with full functionality remaining (). Over time, electrical and electronic outfit (EEE) becomes obsolete or reaches end-of- life (EoL) and is finally considered and discarded as electronic waste (e-waste). Althoughe-waste accounts for only 1 – 3 of solid ménage waste, it's among the utmost jeopardizing consumption wastes (). They contain further than 1000 different substances, representing up to 60 rudiments from the periodic table (6), numerous of which aretoxic, particularly fundamentals similar as lead, mercury, cadmium, chromium. (7). Recent examinations conducted by American experts show that 70 of mercury and cadmium in the United States tips come from electronic waste (8). Also, waste electrical . and electronic products contain precious potential, including gold, silverware, bobby, platinum, .and precaution, having an important ecological and money-spinning cost (9 – 11).

In some countries, especially in developing bones, the demerits of being legislation one waste operation leads to the development of the informal recycling sector (), where the liquid and utmost dear members are removed, while the rest is thrown hence, impacting the climate and natural health (14). To support the proper and timely return of EoL extended family outfit by the client, it's necessary to design Accessible and make sufficient architectures, as well as to bring on lucrative encouragements. still and all, despite the fact that a formale-waste collection system with suitable channels has been set up, and deductions on new paraphernalia are supplied upon return of used bones. In some countries, the informal system remains possible (15). One of the reasons for the low competitiveness of the formal system is due to high transportation and frame costs. With the development of new technologies, including smart bones, new occasions arise to reduce these costs (). This study is rested on the presupposition that thee-wastecollection with close-to-zero transport and frame costs and the minimization of consumers' sale costs, could be supplied due to the involvement of endemic delivery service companies in this process. In particular, the vehicles of delivery service companies could be considered as possible mobile collection points that, without a significant departure from the planned routes, could collect EoL or obsolete extended family outfit from the end- addict and deliver thesee-wastes to a original recycling enterprise.

Thus, the composition aims at developing a smart rear system ofe-waste from end-of life electronics holders to regional recycling architectures predicated on IT tools involving original delivery services to collecte-waste and of the use of interactive online charts to

collect and track addicts' requests. The study is organized as follows The literature review section includes three subsections. The first one provides a synthesized analysis of globale-waste generation and collection rates, examining thee-waste challenges across multicolored countries and considering the reality of waste operation in Ukraine, as the country chosen for the case study.

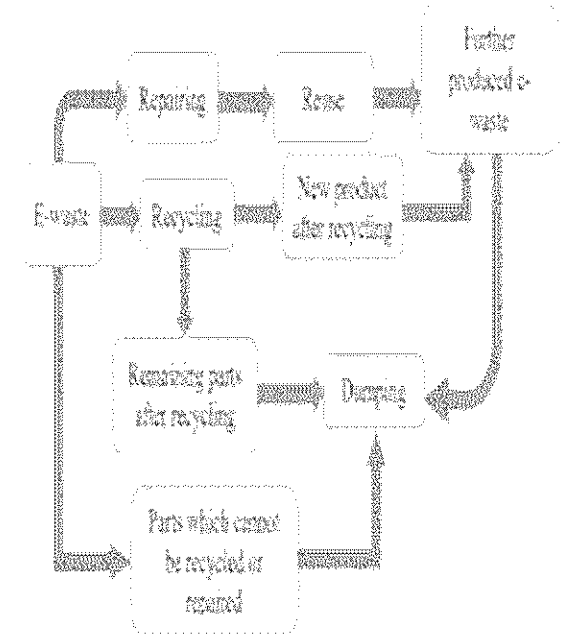
The alternatesub-section outlines crucial perceptivity and ideas from the conversations on smart e-waste administration. The thirdsub-section clarifies the EoL EEE holder's part in the operationalization of extended patron responsibility (EPR) with a focus one-waste. The Results section focuses on developing the smarte-waste rearward system rested on the launch of interactive online charts of addicts' requests for collection and the involvement of delivery services to collect this waste at a megacity- position. The discussion section expounds on the findings in the light of recent studies. Eventually, the conclusions outline the main examination donation and the remaining challenges to be addressed in unborn inquiries.

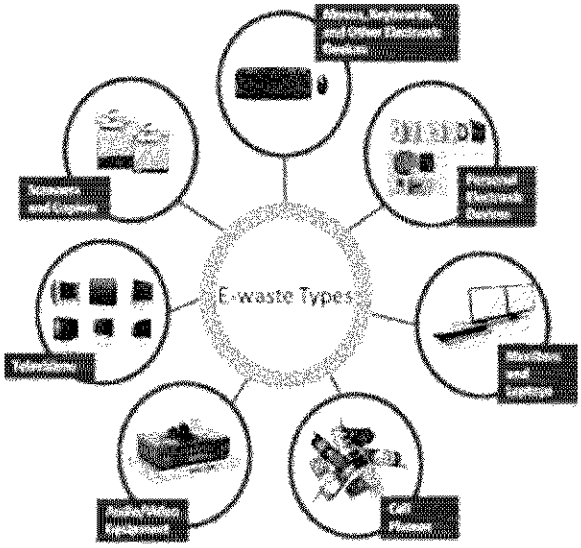
Literature Review

In order to come up with a holistic vision for an increasede-waste collection rate enabled by smart technologies, this study employs a literature review as a background to achieve the aforesaid ambitions. To conduct a comprehensive and sound literature review, examination papers were cherry-picked from scientific peer- review journals. Search motors and databases corresponding as Elsevier's Scopus, Thomson Reuters' Web of Science, and Google Scholar, were used for the selection of literature with the combination of the following keywords‘ smart waste handling',‘e-waste collection',‘ hardscrabble electrical and electronic outfit',‘ smarte-waste collection',‘ rearward logistics',‘ roundabout husbandry', and‘ roundabout business models '. In addition, some studies were correlated as germane in the references of. The firstly namedpapers.About 50 million tonnes of electronic waste are generated annually in the world, utmost of which is accumulated in the surroundings (18). The volume of their generation grows by 3 – 5 per time (19), due to the growing demand for electronic outfit and the . short term of its use. According to the Balde etal. (14), in 2016 only8.9 million tonnes of e-waste were officially collected and disposed of (from a generated44.7 million tonnes) on a global scale, which corresponds to 20, while the remaining 80 (35.8 million tonnes) were not proved. Electronic waste is anticipated to rise to52.2 million tonnes in 2021, showing an increase of 3 – 4 per time. Herewith, different product orders have different rates of monthly growth. The uppermost growth rates are hoped for EoL thermal-regulation outfit, as well as for small-and large-sized outfit (14). According to the pointers of 2016, Asia accounts for the largest quantum of electronic waste —18.2 million tonnes (4.2 kg

per capita), Europe —12.3 million tonnes (16.6 kg/ person), North and South .America — 11.3 million tons (11.6 kg/ person), Africa —2.2 million tons (1.9 kg/ person), Oceania —0.7 million tons (17.3 kg/ person). The largest quantum ofe-waste generation per person is in Oceania; still, the share of officially collected and reclaimed waste was only .6 there. Europe had the topmoste-waste collection rate as of 2016 — 35, followed by .North and South America — 17, Asia — 15 and Oceania — 6 (). According to Eurostat data (21), the most progressive European Union (EU) countries ine-waste collection,. with the incessantly loftiest collection rates over the last multifold times, are Scandinavian . countries, Liechtenstein, and Switzerland. By 2016, utmost EU countries achieved the target 45 collection rates of the average volume of EEE placed on the request, including, . for exemplification, Sweden, Norway, Ireland, Slovakia, Portugal, Hungary, Luxemburg, and the .Czech Republic2.1.2. E-Waste Challenges across Countries The countries of Oceania, Asia, and South America, due to failings of being . legislation one-waste treatment, contribute to the development of informale waste sectors. The collection of waste electrical and electronic outfit in all orders under informal channels is frequently seen as unavailable to proper monitoring and operation, where there's an unbounded junking of the most high factors. The emergence and development of the informal sectors varies across these countries. For case, in China, the« waste as value» intelligence of citizens leads to informale waste recycling, . where 94 of homes dispose theire-waste through informal collection channels (22). In some domains, this type of waste is collected door-to- door using push-bikes and wagons, .where EoL or obsolete electronic bias are bought by collectors and also resold to recyclers (). In India, the informale-waste sector is also a common practice, with 95 . ofe-waste volume going through informal channels (12). Consumers are paid for endof- life or outdated ménage outfit, which can be seen as an money-spinning incitement to exclude nonessential particulars through informal collection channels. Significant damage to the terrain and mortal health is caused by electronic prodigality recycling in Nigeria,. where there are no underlying legal morals for its operation. EoL products are reclaimed using coarse styles, and undesirable members are disposed of into original tips or . face water (). indeed with the operation of a formale-waste collection system, the informal system can still remain significant (). According to exploration (), the lack of impulses is the main reason for homes to return electronic waste through the formal sector, although further than half of the repliers are sensible of the significance of environmentally safe disposal. In Romania, as a recent EU member state, the informal system remains . feasible, despite the fact that a formale-waste collection system with reachable collection channels has been set up, and abatements on new paraphernalia are

handed upon the return of accustomed bones. According to a check conducted in Romania,42.29 of repliers said they were discarding old electricity and electronics using external waste managementsystems, while29.25 of answerers were disposing of old stuff through an informal collection system (15).





Conclusion

According to antecedent examinations (47), there's an available unused transport implicit fore-waste collection in any cosmopolis which has autochthonous delivery service enterprises. As correspondent, we can argue that the vehicles of any indigenous delivery service company or becoming service division at trading enterprises can be considered as

implicit mobile collection points which, without a significant divagation from the planned routes, could collect and deliver EoL or obsolete EEE to the autochthonous technicale-waste processing enterprise. The involvement of delivery service enterprises to EoL EEE collection is possible if applicable money spinning impulses are handed over by endemic authorities. Using the transport capability of delivery services is economically and environmentally doable since this allowsminimizing transport and framework costs, as well as reducing CO2 and other contaminants . caused by the creation and deployment of targete-waste collection vehicles. The structural and logical scheme of a smarte-waste rearward system predicated on involving native delivery services and using interactive online charts is presented in the Figure 1. We believe that interactive online charts fore-waste collection, as a support tool, will enable involving the vehicles of any indigenous delivery service in the interests ofe-waste direction at a asphalt jungle place, since online charts are a reachable tool for tracking EoL EEE holders' requests for this type of waste to be collected. alike online charts can cover addict's requests for 10 orders of EEE in agreement with the EU Directive, as well as for movable waste batteries. The end- stoner makes a request for e-waste collection, thereby filling the interactive online- chart with the required information. In order to launch and technically maintain the smarte-waste rear system, it is . desirable to produce a borne waste rear driver at the technical processing enterprise. The original driver will play a commanding part in the system of reversing EoL/ obsolete EEE since it becomes the connecting link between (1) the EoL EEE holder (end- addict) and the delivery service vehicle as possiblee-waste collector, (2) the indigenous authority and the original delivery service enterprises involved ine waste collection, and (3) the original delivery service enterprises and the technicale-waste processing enterprise. The involvement of delivery services of the megalopolis ine-waste direction is possible in the case of the creation of mutually beneficent terms. The question is also who'll pay for these benignant terms, i.e., creating the profitable incitations for original delivery services enterprises to be interested in participation ine-waste collection. Still, the profitable impulses aren't only the task for the technical enterprise but also primarily for the megacity, as it has to produce the conditions fore-waste collection according to the EU Directive. In the case of smarte-waste rear system perpetration, the original authority could exempt from levies the delivery enterprises which share ine wastecollection.In this specific case of the smarte-waste rear system perpetration, there's no need to effect a particular collection configuration analogous to that of one being through a trading network or special collection points. The delivery service vehicle could serve not only as ane waste elation motorist but also as a mobile collection point. For developing countries

where there's no targeted configuration fore-waste collection, the proposed system can allow to significantly save on configuration creation and its conservation. Note that the proposed smarte waste rear system includes the involvement of non-specialized vehicles of delivery enterprises. Thus, the safety conditions for the transportation of some sensitive orders ofe-waste must be considered with supernumerary care to avoid adulterant of the delivered goods with waste paraphernalia similar as fluids from EoL outfit. For case, EoL or damaged lithium-ion or chief acid batteries should be . transported in special individualmini-boxes for safety reasons.The theme develops a new smart rearward system fore-waste from the dopehead to recovering enterprise predicated on the launch of interactive online charts of consumers' requests for collection and involvement of cosmopolis delivery services ine-waste collection. In the proposed and illustrated smarte-waste posterior system, vehicles of delivery services can be considered as possible mobile collection points, which could collecte-waste and deliver it to the technical enterprise much without divergence from the planned route. Besidese-waste collection costs minimization, the smarte waste posterior system can guarantee the reduction of CO2 emigration due to the optimization of transport routes of vehicles. In the case of the smarte-waste rear system commission, there's no need to produce a special collection structure analogous to one that exists through a trading network or special collection points. Hence the delivery service vehicle could serve not only as ane-waste transport driver but also as a mobile collection point. also, the study highlights that it .is estimable to produce a indigenouse-waste rear driver at the technical enterprise to launch and technically maintain the interactive online charts. asunder from that, the autochthonous driver can serve as a connecting link between the consumer and the delivery service vehicles as possiblee-waste collectors. The integration of an online stoner's requests into the online delivery service system could enable the hunt for an becoming (e.g., in terms of point, size and capacity) and available vehicle of a delivery service which is connected . to a smart system. In addition, the proposed collection system allows the collection of old . and/ or obsolete products with minimum deal costs for consumers, which motivate .them to discard EoL products duly. It's noteworthy that for as fulle-waste collection as possible through a formal channel rather than an informal bone, it's judicious to produce. money-spinningimpulses for consumers to compensate for the residual value of EoL EEE. initially, applying the business model oil toolkit, an inaugural business model for a snappye-waste after system was erected and bandied. A promising line for unborn examination would be to Trial with such a smarte-waste retrograde system on a real life case study and quantify the benefits associated with it for the critical stakeholders involved and the clime.

Acknowledgement

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References

1. Cox, J.; Griffith, S.; Giorgi, S.; King, G. Consumer understanding of product lifetimes. Resour. Conserv. Recycl. 2013, 79, 21–29. [CrossRef]
2. Bovea, M.; Ibanez Fores, V.; Perez-Belis, V.; Juan, P. A survey on consumers' attitude towards storing and end of life strategies of small information and communication technology devices in Spain. Waste Manag. 2018, 71, 589–602. [CrossRef] [PubMed]
3. Ylä-Mella, J.; Keiski, R.L.; Pongracz, E. Electronic waste recovery in Finland: Consumers' perceptions towards recycling and re-use of mobile phones. Waste Manag. 2015, 45, 374–384. [CrossRef]
4. Widmer, R.; Oswald-Krapf, H.; Sinha-Khetriwal, D.; Schnellmann, M.; Böni, H. Global perspectives on e-waste. Environ. Impact Assess. Rev. 2005, 25, 436–458. [CrossRef]
5. Kumar, A.; Holuszko, M.; Espinosa, D.C.R. E-waste: An overview on generation, collection, legislation and recycling practices. Resour. Conserv. Recycl. 2017, 122, 32–42. [CrossRef]
6. Kuehr, R. Global e-waste initiatives. In Waste Electrical and Electronic Equipment (WEEE) Handbook; Woodhead Publishing Limited: Cambridge, UK, 2012; pp. 3–16.
7. Mudgal, S.; Sales, K.; Guilcher, S.; Lockwood, S.; Morgan, V. Equivalent conditions for waste electrical and electronic equipment (WEEE) recycling operations taking place outside the European Union, Final Report, European Commission–DG Environment, 15 October 2013. Available online: http://ec.europa. eu/environment/ waste/weee/ pdf/Final%20report_E%20C%20S.pdf (accessed on 15 November 2020).
8. Tanskanen, P. Management and recycling of electronic waste. Acta Mater. 2013, 61, 1001–1011. [CrossRef]
9. Hagelüken, C.; Lee-Shin, J.U.; Carpentier, A.; Heron, C. The EU Circular Economy and Its Relevance to Metal Recycling. Recycling 2016, 1, 242–253. [CrossRef]
10. Ueberschaar, M.; Schlummer, M.; Jalalpoor, D.; Kaup, N.; Rotter, V.S. Potential and Recycling Strategies for LCD Panels from WEEE. Recycling 2017, 2, 7. [CrossRef]

11. Saidani, M.; Kendall, A.; Yannou, B.; Leroy, Y.; Cluzel, F. Closing the loop on platinum from catalytic converters: Contributions from material flow analysis and circularity indicators. J. Ind. Ecol. 2019, 23, 1143–1158. [CrossRef]
12. Borthakur, A.; Govind, M. Emerging trends in consumers' E-waste disposal behaviour andawareness: A worldwide overview with special focus on India. Resour. Conserv. Recycl. 2017, 117, 102–113. [CrossRef]
13. Nduneseokwu, C.; Qu, Y.; Appolloni, A. Factors influencing consumers' intentions to participate in a formal e-waste collection system: A case study of Onitsha, Nigeria. Sustainability 2017, 9, 881. [CrossRef]
14. Balde, C.; Forti, V.; Gray, V.; Kuehr, R.; Stegmann, P. The Global E-waste Monitor–2017, United Nations University, International Telecommunication Union & International Solid Waste Association, Bonn/Geneva/Vienna. 2017. Available online: https: //www.itu.int/en/ITU D/Climate Change/Documents/ GEM% 202017/ Global E-waste%20Monitor%202017%20.pdf (accessed on 15 November 2020).

12. Smart Electric Heating Control System Based on IoT

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Abstract

This document presents the game plan and consummation of an IOT- grounded dapper electric heating controller system for homes, services, seminaries, community centers, and the suchlike. The armature proposed provides a gateway to the IOT pall for the control network through a Data Transfer Unit which sends the detector data to an IOT center via a TCP garçon over a GPRS/ WiFi wireless interface and receives energy Tele commands for the regulators, which therefore switch off, on or acclimate electric heating operation. The tackle and software descriptions set out then are from a small airman system which was successfully designed and enforced. Keywords — Internet of Effects Electric Heating Control System; Data Transfer Unit Smart Home; Hadoop

Keywords: Internet of Things (IoT); Electric Heating Control System; Data Transfer Unit (DTU); Smart Home; Hadoop

Introduction

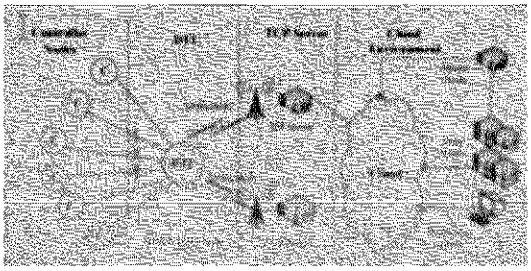
China is an illustration of a homeland where the authority is laboriously furthering a move from coal- blazing heating to electric heating. The drive has arisen because of the significant donation to state impurity of coal-burning, especially of airborne ash patches and sulfur dioxide pollution, [1]. The extent of the pollution helps to make out the heavy need to shift to electric heating, and therefore also the significance of calculating for husbandry and edge from the morning in this transfiguration. In Beijing, the impulses are good to make the switch,e.g. for homes or seminaries, the Government covers electric heating outfit and induction costs completely [2]. In addition, the bounce charge to the stoner is simply0.1 Yuan per kilowatt-hour .The government's thing is to reduce the Air Quality Index (AQI) value in Beijing to lower than 100 in the downtime. In the west, and worldwide, forming the electric

heating systems smarter is an ongoing field of R&D. Intel and Real Value have developed a Smart Electric Thermal Storage Systems (3, 4), as part of a15.5 M European energy storehouse design, the Real Value, funded by the EU Horizon 2020 exploration program [5]. The field trial includes 800 smart electric thermal storehouse networks to be initiated in Irish dwellings. Each of these complexes will be completely controlled by the proprietor of the house, grounded on a timekeeper.

There's no Internet of Effects measure to this design. Still, an IOT terrain has implicit to adjoin value, and more elastic and smart results.

This paper reports on the growth of such a smart controller system operating as part of a central electric heating system, which is integrated into a generic IOT architecture conceived for smart cities. The

II. System Architecture



System architecture fig 1.1

The crucial knowledge needed for smart controller in any position is the present day temperature and sight of people/ applicable exertion in that position. For these, a temperature detector similar as the Maxim DS18B20 and a people sight sensor, similar as a HC-SR501 infrared detector, would serve,e.g. to support controller of a composition of electric heaters within a patented field, similar as four1.5 kW electric heaters within an academy classroom area of 60 square measures accommodating 40 scholars. The factual control may be by means of on-off relays and/ or silicon checked cures (SCR) [7]. The regulators communicate with a DTU. A diversity of results are possible for this, depending on the environment;e.g., wireless applying for case a Nordic Semi nRF24L01P a largely integrated, ultra low arm (ULP) 2 Mbps RF transceiver IC for the2.4 GHz ISM (Industrial, Scientific and Communication with a TCP server and, through it, with the cloud.

III. Design and Implementation

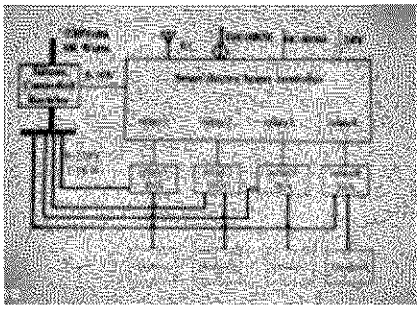
A. Smart Controller

The dapper regulator is the core unit in the electric heating controller complex. A picture of a normal regulator tackle system configuration for a 6kW heating complex, conforming of four electric heaters similar as might be installed in a house or a classroom, is shown in Figure 2, and the principle illustration is flashed on Figure 3.

Each heater can be switched on/ off by a SLA-24VDC-SL relay. When on, the input voltage position, and fro hotting position, is contained by an SCR. With the regulator directed by programs, programs or remote druggies, one can designate the heater as' dapper'. In account to seeking a low- charge game plan, this regulator's game plan is grounded on the 1 STMicroelectronics STM32F103 32- bit MCU, which has 48 legs, 128KB flash recollection, 72 MHz CPU, engine control, USB and CAN support. The software was designed with the Free Real Time Operating System. A brief summary of software facets is handed underneath, while full item of the key software factors will be described in a after paper

B. DTU

The DTU acts as a bridge between the Internet and the controller. It has a GPRS module to communicate with the TCP Garçon in a real moment. The STMicroelectronics STM32F103VCT6 was named for this game plan. Filmland of the DTU are shown in Figure 4. It substantially includes a3.5 TFT palpable screen, a RS 485 harborage, a Nordic Semi nRF24L01P, and a Wi-Fi and a GPRS wireless communication modules. The software flowing inside the DTU was evolved with the Free RTOS. The complex includes four tasks (i) the USART data task, whose main functions are Shoot admit Data To Deal and Data To Shoot GSM. The first function is applied for recycling the entered COMMAND dataset, and the alternate-for the RS485 harborage crystalline transmission; (ii) the little Messaging Service (SMS) task for controlling the dapper heater and streamlining parameters by transferring a SMS; (iii) the networking task, whose base is on the setting up TCP/ IP couplings between the DTU and the TCP garçon over GPRS using the GPRS AT functions; (iv) the heater data task for calming data from DTU input anchorages.



C Server Side and Cloud Platform

Two TCP waiters are used. The earliest one acts as a high garçon and the other as a backup. Each TCP garçon needs to jog in a firm mode and give data crystalline transmission. The Microsoft. NET frame lived used as a fast growth results platform for designing the two required multi-thread applications, combined into a DD server, viz., [1] a TCP/IP server, designed as a Windows service that automatically starts with the operation system; [2] a GUI, a screen capture example of which is shown in Figure 5 (the numbers 1127 and 1035 (bottom rows of the upper screen) are used for the smart heating DTUs. The distributed Apache Hadoop [8] framework was utilized for the design of the cloud as it provides an efficient Hadoop Distributed File System (HDFS) for data storing and a Hadoop Map Reduce for 'big data' processing [9].

In order to improve the performance of the cloud platform, a set of software components for providing efficient data services along with a highly efficient interface for the smart heating controlservice were developed.

IV. Conclusion

A new inexpensive, wireless-based, Internet of Things smart domestic electric heating control system has been presented in this paper. The system includes smart controllers, data transfer units Transmission Control Protocol servers, and a cloud platform. The system architecture, design and implementation have been outlined. A pilot test has been successfully trialed. The next phase is to roll out a fully scaled up version for a large-city deployment.

Acknowledgment

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References

1. Fei Wu, Yifei Fang, Xiaoxuan Li, Penghui Yang, "The air caliber indicator and uncleanness origin in Beijing-Tianjin-Hebei erea", Journal of Hebei North University (Natural Science Edition), Vol 32, No 3, 2016.
2. Guoqiang Wei, " grip expedients to advance the Beijing megacity coal pollution control work", Environmental Protection (Chinese), Volue 44, No 6, 2016.
3. http//www.realvalueproject.com/ne ws- events/ view/15.5m- design todeliver-realvalue-to- by-and-by energy- storehouse.
4. https//cleanenergysolutions.org/site s/ dereliction/ lines/ papers/2015-04- 22-transcript-formatted.pdf.
5. http//www.realvalueproject.com/ne ws-events/view/real-value fromeuropean-commission.
6. I. Ganchev,Z. Ji andM. O'Droma, "Designing a tropical- charge data transfer. unit for operation in IoT operations," 2016 8th International Congress on. Ultra Modern Telecommunications and Control Systems and Workshops (ICUMT), Lisbon, 2016,pp. 85-88.
7. R.C. Sun, Z. Wang, M. Klebanov, W. Liang, J.J. Liouand D.G. Liu, "Silicon-Controlled Rectifier for Electrostatic Discharge Protection. Results With Minimum Comeback and degraded Overshoot Voltage," in. IEEE Electron artifice Letters,vol. 36,no. 5,pp. 424-426, May 2015.
8. J. Shafer, S. Rixner, andA.L. Cox, "The hadoop allocated filesystem. leveling portability and interpretation", 2010.pp. 122-133.
9. Z. Ji,I. Ganchev,M. O'Droma, L.Zhao, X. Zhang, "A Pall Predicated Bus. Parking Middleware for IoT Predicated Smart Metropolises arrangement and Performance". Sensors,Vol. 14No. 12,Pp. 22372- 22393, 2014.

13. IoT Smart Farming and Automation

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Abstract

During this paper we've got a bent to show over into the conception of truth Agriculture. This paper describes the need for truth agriculture, associated technologies, the approach towards achieving it, the obstacles faced at intervals the tactic and accomplishable solutions which will contribute towards gaining actual momentum at intervals the sphere of truth agriculture. This paper takes into thought several analysis papers generated in last decade and summarizes a detailed understanding of the conception and future direction requiring a lot of analysis. It provides a begin line for anyone interested in understanding or researching truth agriculture.

Keyword : Agriculture, Decade, Analysis, Exactness, Inquistive.

I. Introduction

When we have a tendency to consider agriculture we expect of cultivation, plant life, soil fertility, kinds of crops, terrestrial atmosphere, etc. but in today's world we've got an inclination to escort agriculture terms like international temperature change, irrigation facilities, technological advancements, artificial seeds, advanced machinery etc. In short, we've got an inclination to own Associate in Nursing interest in but science of those days can facilitate U.S. inside the sector of agriculture. And so, comes into the image preciseness Agriculture (PA). The general definition is data and technology-based farm management system to identify, analyze and manage abstraction and temporal variability within fields for optimum productivity and profit, property and protection of the land resource by minimizing the assembly prices. Simply put, preciseness farming is Associate in Nursing approach where inputs ar employed in precise amounts to induce increased average yields compared to ancient cultivation techniques. thus it is a comprehensive system designed to optimize production with lowest adverse impact on our terrestrial system. the three major parts of preciseness agriculture ar data, technology and management. Preciseness farming is

information-intense. Preciseness Agriculture may be a management strategy that uses info technologies to gather valuable information from multiple sources that factors into the decision-making method. It depends on technologies like GPS (Global Positioning Systems), GIS (Geographic info Systems), yield monitors, remote mapping sensors and steering systems for application with variable rate that permits in-depth watching of field variations.

II. Need

The world organization world population report estimates that the world's population will reach 9.7 billion people, that's thirty four p.c on the far side what it's these days. a great deal of of this growth is expected from developing countries like China, India, Brazil, etc. that possess the biggest space within the world with regards to productive land for agriculture. to stay up with population explosion and constant rise in financial gain, international food production should witness a rise by seventy p.c so as to be able to feed the complete world population.The answer to the current discouraging challenge lies within the gathering of real time knowledge, analysis of the agricultural technique and additionally the unwavering pursuit towards improvement. Thus, researching but existing "precision agriculture" techniques and methodologies, whereas checking out new ones, can maximize food production, minimize environmental impact and cut back worth is crucial, presently quite ever. we have the possibility to create a distinction victimization science and technological innovation to handle very important issues that will have profound impact on the lives of billions of people," aforesaid Ulisses Mello associate IBM man of science and Distinguished Engineer.

III. Technologies

Concerned international Positioning System (GPS) GPS is also a network of orbiting satellites, inflicting precise purpose details from space back to earth. It's obtaining a birds-eye purpose of browse, but from space. The signals unit of measurement obtained by GPS receivers, to calculate the precise position and time. it's associate accuracy of between 100 and 0.01 m. It permits farmers to identify field information, like soil kind, gadfly prevalence, weed invasion, water holes, etc supported a particular location. This becomes considerably handy once farmers ought to build choices about seed plantation, herbicides, pesticides, fertilizers and irrigational desires. • Geographic system (GIS) it's a system designed to capture, store, manipulate, manage, analyze and gift spacial or geographic data. GIS contains of hardware, package and procedures for supporting the compilation, storage, retrieval and

analysis of geographical attributes and location data to provide maps. GIS binds data in one place so as that it's cipher once needed. processed GIS maps contain layers of data like yield, soil survey, crop type, nutrient levels and prone pests. A farming GIS data can provide data on field topography, soil types, surface remotion, submerged remotion, rainfall, irrigation, rates of chemical application and crop yield. Once analyzed, this data is utilized to understand the relationships between the numerous elements poignant a crop on a specific web site • Grid soil sampling and variable-rate chemical (VRT) application Grid sampling is associate unbiased, easy and relatively quick methodology for web site specific soil management. Variable-rate technologies (VRT) is additionally applied to varied farming operations. They set the speed of delivery of farm inputs supported the soil type. GIS cipher data can management processes, like crop determination, level of seeding, application of chemical, chemical and chemical at a variable rate among the correct place at the correct time. it's wide used in developed countries. Grid soil sampling, victimization constant principles, can increase the intensity of sampling. Samples collected in associate exceedingly systematic grid is mapped to specific locations so giving North yank country associate application map. Grid soil samples unit analyzed and brought to figure out crop nutrient desires. Then victimization this data, a chemical application map is plotted. every maps unit fed into a portable computer that generates a detailed and systematic schedule for plantation and chemical desires. • sensing elements Sensor technology is associate integral a district of truth agriculture technology and their application has been wide reportable to provide essential data on soil properties, plant fertility and water standing. Location Sensors unit the sensors that unit used to verify latitude, longitude, and altitude among feet. Optical Sensors use light-weight to measure soil propertiesElectrochemical Sensors provide key data like cation concentration and soil nutrient levels. Mechanical Sensors live soil compaction. They use a groundwork that penetrates the soil and records resistive forces through use of load cells or strain gauges. nonconductor Soil condition Sensors live the things constant among the soil to assess condition levels. air flow Sensors live soil-air consistency. Rate managementlers Rate managementlers control the delivery rate of chemical inputs like fertilizers and pesticides, either liquid or granular. It monitors the speed of the tractor/sprayer traveling across the arena, furthermore as a result of the speed of flow and pressure of the material, making changes in fundamental quantity to use a targeted rate. Rate controllers ar usually used as complete systems. Exactness placental farming (PLF) exactness placental farming (PLF) is

printed as a result of the applying of truth agriculture to the management of placental production. Processes of truth placental farming approach target animal growth, egg and milk production, detection and observance of diseases and aspects related to animal behavior. Systems embrace observance of milk to examine fat and microbial levels, serving to to identify potential infections, furthermore as new machine-controlled feeding and weighing systems. It in addition focuses on machine-controlled cleaners, feed pushers and various aids. Acoustic sensors realize an increase in coughing of pigs indicating infection. various sensors ar presently accustomed provide alerts and notifications concerning biological process and fertility. • Mobile apps With the growing use electronic devices like sensible phones, tablets, etc and handiness of internet property, it's very easy to share or get any information from anywhere. humanoid apps provide quick and economical utility to be mature with technology. among the sphere like PA farmers can get tons of edges from the apps developed for the agriculture observance and data exchange. Apps used for agriculture observance offer information like weather information, market rate and handiness etc. Similarly, apps will even provide sibylline weather analysis, sort of seedlings out there, fertilizers, pesticides and herbicides out there, etc.

IV. Approach

Precision agriculture are often classified into 2 broad classes, particularly 'soft' and 'hard' PA. 'Soft' PA primarily depends on visual observation of crop and soil and management call supported expertise and intuition. Whereas 'hard' PA utilizes all fashionable technologies like GPS, RS, VRT etc. looking forward to applied mathematics analysis of scientific knowledge. so as to realize best cultivation, farmers got to perceive the way to cultivate crops in a very explicit space, taking into thought a seed's resistance to weather and native infections and therefore the environmental impact of planting that seed. as an example, once planting in a very field close to a watercourse, it's best to use a seed that needs less fertiliser to assist cut back pollution, all the whereas selecting a crop that needs in depth irrigation. when the plantation, the selections created regarding fertilizing and maintaining the crops square measure time-sensitive and heavily influenced by the weather. If farmers anticipate significant rains ensuing day, they will decide to not use the fertiliser, since it'd get washed away. Knowing whether or not it's planning to rain or not conjointly factors into the decision-making method. With the assistance of prognostic weather analytics this will be achieved. seventy % of water worldwide is employed for agricultural functions therefore, is

economical utilization can have an enormous impact on the world's water provide. Weather not solely affects crop growth, however conjointly provision touching on harvest and transportation. harvest sugar cane, as an example, needs the soil to be dry enough to support the burden of the harvest instrumentation. Else, it might destroy the crop. By analyzing what the weather are going to be over many days, higher choices are often created before concerning employees readying. when harvest the provision of transporting food to the distribution centers becomes the first concern. as a result of inefficient delivery or choosing the incorrect market can even adversely have an effect on the farmers' success. loads of food is broken, wasted or spoils throughout distribution, thus it's necessary to move the food at the proper temperature and not hold it for a protracted time. Even by knowing wherever it'll rain and that routes could also be affected, farmers will create higher choices on transportation routes.

V. Obstacles

Lack of whole-farm focus, virtually ninetieth or additional of the preciseness agriculture studies according that preciseness Agriculture techniques are enforced totally on one field or on experimental basis or solely on business farms. this can be as a result of preciseness agriculture is nevertheless to become associate degree integral a part of the conventional farming method. Therefore, farmers hesitate to settle on fashionable agricultural techniques, that aren't far-famed to them. Lack of knowledge is additionally one the first reasons for restricted implementation of PA. Farmers would like decent data and timely steering to attain effective implementation of PA. this can be tough to attain with the absence of a recognized authority or organization facilitating the notice of PA techniques and providing the mandatory instrumentation. Farmers ought to be adjusted with the employment of those equipment's and may be unbroken frequently updated. property in rural areas and alternative remote locations across the planet (particularly within the developing countries) sturdy, reliable web property remains not out there. This, in turn, thwarts the tries to use good agriculture techniques at such locations. Unless the network performances and information measure speeds area unit improved considerably, implementation of preciseness farming can stay incomplete. Since several agro sensors/gateways area unit smitten by cloud services for information transmission/storage, cloud-based computing conjointly must become stronger, that conjointly needs sturdy interconnectivity. In farmlands that have tall, dense trees and/or mountainous terrains, reception of GPS signals becomes a giant issue.

VI. Possible Solutions and Current Applications

It is impractical for small-scale farmers to participate within the implementation of PA for the explanations explicit higher than. However, there's a potential answer. giant international firms will enter into agreement with small-scale farmers to supply money aids and technical equipment's needed for conducting PA. reciprocally the farmers will share AN specified share of their profits. This elevates the burden of the farmers, of being tuned in to the technical knowhow and receiving steering towards effective implementation. as an example, corporations like police detective Mahindra square measure conducting White Budget analysis on the subject.

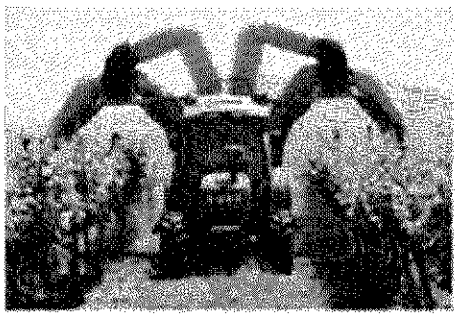

Figure 6 : Application of PA by Planation International in Punjab

VII. Future Prospects

Future prospects for PA embrace improvement within the handiness and performance of existing technologies. These embrace enhancements in web property, detector technology, higher and a lot of correct mobile applications, machinery equipment's, etc. However, the foremost promising prospect among the means forward for PA is that the applying of drones towards the implementation of PA. Drones eliminate the need for GPS and strong internet property it desires. With the drone technology we tend to ar ready to acceleration crop reconnaissance, characteristic pest or nutrient issues in crops and addressing them promptly, checking for weather injury, finding pivot breakdowns on irrigation systems, checking system performance, the list goes on

VIII. Conclusion

Technologies just like the GPS, GIS, mobile app and sensors is used for many innovative strategies concerned in preciseness Agriculture. However, preciseness Agriculture continues to be solely within the early stages of implementation in most developing

countries. The strategic support from the general public and personal sectors is additionally within the conception stage. Lack of knowledge, property issues Janus-faced in remote aras and lack of monetary support are hurdles within the path of preciseness Agriculture. productive adoption of PA contains of 3 phases together with exploration, analysis and execution. whereas exploration and analysis ar manner ahead execution is steady catching-up. preciseness agriculture addresses each economic and environmental problems that surround agriculture production nowadays. Coordination between famers and each the MNC's and therefore the government is gaining momentum. However, considerations concerning cost-effectiveness and therefore the simplest ways that to use the technological tools we tend to currently possess, still remains a work in-progress. within the light-weight of tomorrow's expected want and today's imperative demand, PA must become the sole alternative and not a alternative within the field of agriculture.

IX. References

1. https://en.wikipedia.org/wiki/PrecHYPERLINK "https://en.wikipedia.org/wiki/Precision _agriculture"ision_agriculture
2. http://www.thehindu.com/todays paper/What-precision-farming-is-and is not/article 15190199.ece
3. http://www.research.ibm.com/articles/pr ecision_agriculture.shtml
4. http://www.rkmp.co.in/content/precisio HYPERLINK "http://www. rkmp.co. in/ content/precisio n-agriculture-in-india"n-agriculture-in india opportunities-and-challenges
5. https://medium.com/@luv_kushwah/wh y-precision-agriculture-in-india will remain-a-failure-20a03f275b22
6. http://www.un.org/en/development/desa /news/ population/ 2015 -report. Html (Population Estimate)

14. Smart Home Systems

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Abstract

Smart home systems achieved great popularity in the last decades as they increase the comfort and quality of life. Most smart home systems are controlled by smartphones and microcontrollers.

Keywords: Smart home, IoT, Cloud Computing, event processing.

I. Introduction

Classic smart home, internet of effects, pall computing and rule- grounded event processing. Are the structure blocks of our proposed advanced smart home integrated emulsion. Each element appliances, incorporated with a variety of detectors.

Detectors may be fixed in to the home related appliances, similar as air- exertion, lights and other. Environmental bias and it embeds computer intelligence into home bias to give ways to measure home conditions and cover home. Appliances' functional ity. Pall computing provides scalable computing power, storehouse space and applications, for developing, maintaining. Running home services, and penetrating home bios anywhere at anytime

II. A. what's it?

A smart home refers to a accessible home setup where appliances and bias can be automatically controlled ever from anywhere with an internet connection using a mobile or other networked device. Bias in a smart home are connected through the internet, allowing the stoner to control functions similar as security access to the home, temperature, and a home theater ever.

Smart home technology provides homeowners with convenience and cost savings.

Security pitfalls and bugs continue to persecute makers and druggies of smart home technology. B. How does it work? A smart home's bios are connected with each other and can be penetrated through one central point a smartphone, tablet, laptop. Door cinches, boxes, thermostats, home observers, cameras, lights, and indeed appliances similar as the refrigerator

can be controlled through one home robotization system. The system is installed on a mobile or on another wireless devices device, and the stoner can produce time schedules for certain changes to take effect. Smart home appliances come with tone - literacy chops so they can learn the homeowner's schedules and make adaptations as demanded. Smart homes enabled with lighting control allow homeowners to reduce electricity use and benefit from energy-related cost savings. Some home robotization systems warn the homeowner if any fault is detected in the home when they are down, while others can call the authorities police or the fire department in case of imminent situations.

HOW THE Smart homes IS TAMPERPROOF Our homes are getting smarter as both individual appliances and larger domestic structure connectivity and processing power. These systems are being connected to each other and to the internet, as well as being integrated with voice interfaces similar as Amazon's Alexa, Apple's Siri, and Hey Google, to produce sophisticated home-automation schemes. Who would have allowed, ten times, that it would be possible to say " Movie night" and have your home's doors and windows locked, curtains drawn, lights off, room temperature set and Television turned on? But this is veritably attainable moment.

Smart - home technology promises numerous other ways to make our home lives easier and more accessible, from programmable lighting schedules to automated garage doors. What's lower remarked upon is the work that's demanded to enable this convenience while icing that smart homes keep residers and their data secure.

III. PROS, CONS AND Druthers

The Pros

1. Energy Savings

Home robotization systems have surely proven themselves in the arena of energy effectiveness. Automated thermostats allow you topre-program temperatures grounded on the time of day and the day of the week. And some indeed acclimate to your actions, learning and conforming to your temperature preferences without your ever inputting a preselected schedule. Traditional or geste- grounded robotization can also be applied to nearly every contrivance that can be ever controlled – from sprinkler systems to coffee makers

2. Convenience

In moment's presto- paced society, the less you have to worry about, the better. Right? Convenience is another primary selling point of home robotization bias, which nearly exclude

small hassles similar as turning the lights off before you go to bed or conforming the thermostat when you wake up in the morning.

The Cons

1. Installation

Depending on the complexity of the system, installing a home robotization device can be a significant burden on the homeowner. It can either bring you plutocrat if you hire an outside contractor or cost you time if you venture to do it yourself.

2. Complex Technology

Automating everything in life may sound extremely charming, but occasionally a good old-fashioned flip of the switch is a lot easier than reaching for your smart phone to turn lights on and out. Before you decide which system is right for you, suppose about how far you really want to take home robotization in your ménage. echnology is advancing with every passing day and retaining smart home is getting a necessity. In the history, smart homes were considered to be part of a luxurious life style but moment they've come an important part of our lives. In this composition, we're going to partake some of the introductory reasons that why you should turn your home into a smart home.

Effectiveness With one touch button or mobile phone operation, you can control multitudinous widgets or systems. With the help of the smart device, you would be suitable to operate your heating and cooling as well turn on and turn off lights with a single click from anywhere in your house. This isn't just an effective procedure but it'll also help you save electricity.

Convenience Having a smart home permits you to deal with numerous electronic widgets and systems from over the house or over the world. Draw the tones, turn on lights, and cover security. The listed features of the smart home are enough to move a person to turn their homes smart too.

Comfort Smart homes make your life comfortable; you don't have to move each over the house to perform colorful functions. With smart bias, you can perform all ménage operations through operations while sitting comfortably on the lounge or in bed.

Peace of Mind A smart home is also a major way to give peace of mind; you can use the smart device to check the doors, windows, water slip detectors etc. Also, you can also check that your garage door is duly shut through an operation. You don't have to worry about going out to check.

Customization Smart homes also allow you to have electronic effects the way you like to have them. You can have the tones drawn automatically at a certain time, acclimate the brilliance of inner as well as out-of-door lighting as per your choice. Also, you can customize every single electronic item as per your will and likewise you can also set timings for colorful choices to be enforced.

Other than these benefits, there are also some essential reasons that make it necessary for you to turn your home into a smart home

Security

Terrorism and other small crimes are now veritably common and in this period, everyone wants to make their home secure. Smart homes will allow you to make your home secure as well as it'll also allow you to cover the security veritably fluently through your smart phones.

Mileage Bills

The world is getting precious day by day and people are veritably concerned about their mileage bills. Smart home ensures you save electricity and reduce your power and water bills. Frequently it's observed that lights remain on due to the shiftlessness of standing up and turning them off. A smart home will allow you to turn off lights and other electronic particulars indeed when you're in bed and going to sleep. It'll save you a huge quantum of cash.

Life- Saving Home Admonitions

Fire and theft are only a couple of events that can annihilate your home or undermine the lives of musketeers and family. Smart home bias can make you apprehensive of similar events through admonitions and announcements which can be enough to save your life.

What are the Operation of Smart Home System

What Is Home Robotization?

Before talking about the advantages and benefits of home robotization systems, let's first bandy what home robotization is.

Home robotization is the act of converting a traditional home into a " smart" home. By adding advanced technologies — like detectors and communication modules — into everyday ménage appliances. These bias connect to a network that homeowners can pierce to see data about their home.

In simple terms, home robotization is the capability to control your home without trouble. And the operation of home robotization system is demanded to make this possible

Advantages of Home Robotization System

Internet-ready appliances are in high demand worldwide. That's why further and further stores offer smart appliances to people looking to upgrade their home. But as further smart bias come available, managing each smart device come time consuming.

That's where the operation of home robotization system comes in. With a home robotization system in place, you can have the following advantages. Full control of home operations Having full control of your home is the primary thing of home robotization, and having a home robotization system makes home operation easier and more accessible.

Operation of home robotization system collects data from all your smart bias. It acts as "the brain" of your smart home. This central mecca can be controlled through a smartphone device or by voice control. It can indeed act on its own handed it's given set rules and conditions to follow.

The home robotization system controls all connected bias in real- time, while listed tasks are executed across bias by the home robotization system.

Effective use of Electricity and other Ménage Coffers

Through the operation of home robotization system, smart bias sync with one another. As a result, they can contribute to the effective use of ménage coffers. Like water and electricity. Recording your preferred settings is an important task of a home robotization system. It can give instructions to other smart bias on how to operate by knowing what you like. This results in lower use of ménage coffers and lower cost on house conservation and yearly living charges.

How Will the Operation of Home Robotization System Benefit You?

Having a home robotization system won't only give you an advantage in house operation. It also has long- term benefits that you can enjoy More home security

Having a home robotization system increases your home'ssecurity.However, your home robotization system can pierce this, If you have a smart security system. It'll also give you realtime updates on what's passing around your home.

The system will give real- time announcement if your security cameras descry anything unusual or if someone activates the stir detectors while you're down. The operation of home robotization system may indeed go beyond notifying you and notify authorities in real- time.

Advanced Home Value

Smart homes are in demand moment. People are ready to pay further for homes equipped with smart bias and a home robotization system.

Operation of home robotization system can turn your home from a hundred- bone home to a million- bonehome.However, getting a home robotization system now would profit you in the future, If you plan to vend or rent your smart home in the future.

References

1. Stergioua C, Psannis KE, Kimb B-G, Gupta B. Secure Integration of IoT and Cloud Computing. Elsevier, Future Generation Computer Systems, Vol. 78. Part 3. January 2018. pp. 964-975
2. Al-Kuwari M, Ramadan A, Ismael Y, Al-Sughair L, Gastli A, Benammar M. Smart-Home Automation Using IoT-Based Sensing and Monitoring Platform, IEEE. 2018. Available from: ieeexplore.ieee.org
3. Datta T, Apthorpe N, Feamster N. Developer-friendly library for smart home IoT privacy-preserving traffic obfuscation, IoT S&P 18. In: Proceedings of the 2018 Workshop on IoT Security and Privacy. ACM; 2018. pp.

15. Analytics and Predictions

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Abstract

Although we've made progress over the last century, air quality and drinking water quality are getting worse. For health reasons, many countries recommend wearing a mask or not going outside if the air quality is poor. Due to the lack of real-time measurements and poor predictions of the fine dust concentration, accurate alarms and information are not provided to residentsMeasurement data is a new field which should be complemented with the national meteorological data in order to meet the demands of customers and the publicThe objective of this study is to build a system to predict PM (particulate matter), a type of dust that is produced by human activities such as the burning of fossil fuels in vehicles, power plants, and various industrial processes. As well as observing meteorological data from observatories, we use machine learning techniques to predict the density of (fine) PM based on weather variables such as temperature, rainfall humidity, and wind speeds. but spatial factors like pollutants, floating populations and traffic volumes of a certain location using LTE(Long Term Evolution) signals. This paper proposes a conceptual architecture of a system that analyzes the data coming from a mobile device, as well as spatial factors such as pollutant levels, population density, etc. There are results and discussions at a local level in the province.

Keywords: Jeju island, viscosity, FTPserver

I. Introduction

Fine dust is classified by the World Health Organization as a group 1 carcinogen, causing significant health risks, as well as affecting work performance, academic performance, and productivity. Due to the fine dust, the public has been vexing and anxious, whereas on the other hand, no adequate countermeasures are being taken against the fine dust, and the word isn't being spread/ accumulated about the pollution. The real time dimension data about air quality is the big data The changes in the frequency of dust generation, changes in power operation patterns, outbreaks of complaints, and the movement of human beings are all

elements within this new field that should be rounded up with public weather data in order to satisfy the needs of the public. People can pass on valuable information not only to the private sector like energy companies, electronics companies, medical institutions, and insurance companies, but also to the public sector like original governments and seminaries. We can improve air quality by dispatching and rerouting soddening vehicles to appropriate areas on predicting unborn air pollution. The study is to find out the correlation between the word and colorful conditioning of people (similar like health, wealth, etc.). With the air quality dimension data and colorful data in other fields, it is possible to create a new big data with high value using This design represents a new value* gained service through the integration and analysis of air quality dimension data and colorful data in other fields. Establishing a big data platform of the fine dust, which will provide public institutions and original governments with executive guidance/guideline, and inform the intertwined service of the public. The study covers both indoor air and outdoor air operation. Section 2 reviews related workshops of particular matters. Section 3 suggests a framework for discovering an enormous data logical system and a model for predicting particular matters. In Section 4, we discuss logical conclusions. In Section 5, we discuss new directions for exploratory exploration. Related work.

Literatures on predicting the density of particulates have several directions. Typically, these studies can be classified by prediction models and type of knowledge. Measuring and summarizing with specifications anticipates your paper as a part of the entire proceedings, rather than as an independent document. Machine learning is becoming increasingly popular for predicting PM (particulate matter). Land use regression (LUR), which was originally developed to assess exposures to traffic-related pollution, is the hottest approach for predicting PM (particulate matter). In order to represent PM density, artificial neural networks (ANN) may be a popular technique. A statistical analysis may also be a popular approach Using a template will help you format your paper and make the text appear elegant. Please don't make any changes to them. You'll notice certain oddities. For example, the top margin in this template is proportional, which is standard. This measurement and others are done on purpose, with specifications that anticipate your paper being included in the proceedings as a whole, rather than as a separate document. Please don't change any of the current names.

II. A Research Method

Figure 3 depicts the abstract armature of a massive data logical system for particulate. To investigate the viscosity of airborne particulate matter, As a design location, we chose Jeju Island. Jeju Island is the cleanest area in Korea and is isolated from other areas where data must be gathered from various sources such as the Korean government, Meteorological Agency, Internet of Things (IoT) detectors, mortal conditioning, and adulterants. Many data sets have spatiotemporal properties, such as values associated with a geological location and/or a time stamp. While certain data is automatically kept in databases, relayed through sensors, and delivered over LTE networks. We'll circulate the issues to the general public via open API (operation programming interface) after establishing a possible logical outcome. A vast and diverse body of knowledge should be preserved in a massive repository and made accessible via networks. The neural network model outperformed other models in terms of R2 and root mean squared error (RMSE), and it was recommended as a fine dust vaticination model. We propose that the crushup data be preprocessed and stored in the pall service, allowing for ubiquitous access to configurable system coffer pools. Data quality assurance, harmonization, and normalization are all part of the preprocessing process. the document. The neural network model outperformed other models in terms of R2 and root mean squared error (RMSE), and it was recommended as a fine dust vaticination model. We propose that the crushup data be preprocessed and stored in the pall service, allowing for ubiquitous access to configurable system coffer pools. Data quality assurance, harmonization, and normalization All of these steps are part of the preprocessing procedure. the text... Because target values are only valid in device locales, we'd like to estimate the target values of shadowed areas while taking into account spatial specifics of estimated locales such as distances from multiple conterminous bias, floating population, business volumes, and number of adulterants. Following the construction of a workable logical outcome, we will make the issues available to the general public via open API (operation programming interface). FTPserver. Currently, however, it has been replaced with another date value in the same time zone. As a design area, we chose Jeju Island. Jeju Island is the cleanest area in Korea and is isolated from other areas due to a limited number of bias and a lack of vaticination medium, resulting in wide shadowed areas. To estimate the viscosity of shadowed areas, we considered two models.

i. Naive model of prognosticating a mean viscosity value from nearest two bias values, and.

ii. Interpolation model of a weighted average value from n nearest bias' values. Weight are going to be the closeness between a shadowed spot and an IoT device.

III. A Case Study

A case study is a national plan to offer a new value added service based on the integration and analysis of data about particulate matter and the actions that can be taken in response to it. The government has installed dust monitoring equipment in 320 civil branches, which measures the average value of air quality every hour. New IoT air quality measuring tools, in combination with IoT technology, have just been launched into the request. The goal of the design is to provide public guidance/guidebooks by developing a fine dust big data platform, as well as to provide executive guidance/guidebooks to public institutions and local governments, and to educate the interlaced service of internal and external air operations. As a design location, we chose Jeju Island. Jeju Island is Korea's cleanest territory and is isolated from the rest of the country, making it the simplest place to monitor and regulate adulterants. As a design location, we chose Jeju Island. Jeju Island is Korea's cleanest place and is isolated from the rest of the country.

a. Gathering and Preprocessing Raw Data

As an input variable and a target variable, we employed the viscosity of (fine) PM (PM2.5, PM10). The consistency is monitored and communicated automatically by IoT bias coupled to the LTE network. Between the two variables, there is a one-hour gap. The two variables, viscosity measurement method and device position characteristics, were eliminated because they have no bearing on the objective variable. The meteorological data – temperature, precipitation amount, moisture content, and wind speed – were obtained from the government's website. FTPserver. FTPserver. If a date value is absent, it is replaced with a date value from the same time zone. In the event of missing data, the previous value is used. Using min maximum normalisation, the figures are converted to 10 – 100. The quantity of adulterants within 500 metres of the pollution source is measured. The number of persons and vehicles linked to mobile base stations is used to calculate fatal movements (floating population and projected traffic volume). Using min maximum normalisation, the figures are converted to 10 – 100. The amount of adulterants within 500 metres of the pollution source is measured.

IV. Building Model and Prognosticating

THE Data from viscosity 70 was used to build a vaticination model, while data from viscosity 30 was utilised to execute a performance test. The rigour of three competing models

was compared: neural network, multiple rectilinear retrogression, and decision tree. To predict 1 hour after particle viscosity, the simplest model is used. On a relational, hierarchical basis, the text heads organise the themes. For example, because all subsequent material relates and elaborates on this one content, the paper title is the primary textbook head. The neural network model outperformed other models in terms of R2 and root mean squared error (RMSE), and was recommended as a fine dust vaticination model. As a design location, we selected Jeju Island. Jeju Island is the cleanest part of Korea and is isolated from the rest of the country. Although the performance difference between the neural network and other models is small, it is thought that the neural network is better suited for development through continous data acquisition. However, as illustrated in Figure 7, some interpolations are still required to estimate the consistency of shadowed areas. We employ 5 conterminous measured consistency to estimate the viscosity of a shadowed region, taking into account data availability and stability.

V. Conclusion

For predicting PM viscosity, we suggested a logical system armature. To find the simplest model for PM vaticination, three data processing models are built and compared. We also advised that the shaded portions be hidden using an interpolation approach. We anticipate that this research will be broadened in order to do a civil verification and to recommend some realistic counter accusations following further investigation. a potential conflict of interest There were no known implied conflicts of interest that were relevant to the current makeup. As a design location, we chose Jeju Island. Jeju Island is the cleanest part of Korea, and it is isolated from the rest of the country. As a design location, we chose Jeju Island. Jeju Island is Korea's cleanest place and is isolated from the rest of the country. We also proposed using an interpolation approach to conceal the shadowy areas. Thank you for taking the time to read this. As a design location, we chose Jeju Island. Jeju Island is Korea's cleanest place and is isolated from the rest of the country. This paper drew on findings from a Ministry of Science and Information Technology-funded study. The Ministry of Education of the Republic of Korea, and hence the National Research Foundation of Korea, financed this work.

References

1. [1] M. D. Adams and P. S. Kanaroglou, “Mapping real-time air pollution health risk for environmental management: combining mobile and stationary air pollution

monitoring with neural network models," Journal of Environmental Management, vol. 168, pp. 133-141, 2016. https://doi.org/ 10.1016/j.jenvman.2015.12.012

2. [2] G. Grivas and A. Chaloulakou, "Artificial neural net-work models for prediction of PM10 hourly concentrations in the Greater Area of Athens, Greece," Atmo-
3. Spheric Environment, vol. 40, no. 7, pp. 1216-1229, 2006. http://dx.doi.org/10.1016/j.atmosenv.2005.10.036
4. [3] H. He, W. Z. Lu, and Y. Xue, "Prediction of particulate matter at street level using artificial neural networks cou247 Sung-Hyun Kim, Dae-Sung Son, Min-Ho Park, and Hyun Seok HwangZhttp://doi.org/10.5391/IJFIS.2019.19.4.242 pling with chaotic particle swarm optimization algorithm," Building and Environment, vol. 78, pp. 111-117, 2014. http://dx.doi.org/10.1016/j.buildenv.2014.04.011
5. [4] J. Hooyberghs, C. Mensink, G. Dumont, F. Fierens, and O. Brasseur, "A neural network forecast for daily aver-age PM10 concentrations in Belgium," Atmospheric Environment, vol. 39, no. 18, pp. 3279-3289, 2005. http://dx.doi.org/10. 1016/j. buildenv.2014.04.011
6. [5] X. Leng, J. Wang, H. Ji, H., Q. Wang, H. Li, X. Qian, F. Li, and M. Yang, "Prediction of size-fractionated airborne particle-bound metals using MLR, BP-ANN and SVM analyses," Chemosphere, vol. 180, pp. 513-522, 2017. https://doi.org/10.1016/j.chemosphere.2017.04.015
7. [8] [6] J. B. Ordieres, E. P. Vergara, R. S. Capuz, and R. E. Salazar, "Neural network prediction model for fine particulate matter (PM2.5) on the US–Mexico border in El Paso(Texas) and Ciudad Ju?rez (Chihuahua)," Environmental Modelling & Software, vol. 20, no. 5, pp.547-559,2005.http://dx. doi.org/10. 1016/j. envsoft. 2004.03.010
8. [7] P. Perez and J. Reyes, "Prediction of maximum of 24h average of PM10 concentrations 30 h in advance in Santiago, Chile," Atmospheric Environment, vol. 36, no. 28, pp. 4555-4561, 2002. http://dx.doi.org/10.1016/S13522310(02)004193

16. Block Chain and its Types

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Abstract

This research is based on blockchain and its types.It Gives you idea about what is coming next in blockchain and it adoptions .

Keywords : Blockchain, Hyperledger, Etherium, Bitcoin, Ripple.

I. Introduction

What is blockchain ? Basically it is system recording systemwhich makes it impossible to hack or change. Blockchain is one of the greatest buzzwords in technology right now. But what is it?Let's start from the beginning. The one of the major application of blockchain technology was bitcoin which was released in 2009. Bitcoin is a cryptocurrency and the blockchain is the technology which underpins it. A cryptocurrency devotes to a digital coin that runs on a blockchain. Understanding how the blockchain works with bitcoin will allow us to see how the technology can be transferred to many other real-world use cases. Bitcoin is the brainchild of a mysterious person or group known as Satoshi Nakamoto. Nobody knows the identity of Nakamoto, but their vision was laid out in a 2009 whitepaper called "Bitcoin: A Peer-to-Peer Electronic Cash System."

II. Pros, Cons and Alternatives [2]

It seems like an unnecessarily complicated process for moving money. But the blockchain has its advantages.With traditional methods of payment every transaction in the world is registered on privately-held databases owned by corporate and state entities. These databases are not accessible by the public and therefore closed. They are also usually owned by one entity. Because of this nature, they could be open to fraud or to being hit by an attack that could cripple a network, unlike bitcoin's blockchain. Think about the blockchain as a beefed up database. It records all transactions in bitcoin, doesn't allow repeat payments, and requires several parties to authenticate the movement of the digital coin.

Because the blockchain is not centralized, it means that if one part of it went down, the whole network would not collapse. There are many different parts of the bitcoin network that

require it to work. So even if one miner went out of action for example, transactions would still work.

A. Problem with Bitcoin's Blockchain [3]

- Bitcoin's blockchain was designed to be a decentralized network because it has its advantages. With that, however, has come a number of problems.
- One big issue is that transaction times and costs in bitcoin have soared as the network has become more congested. This has actually led to disagreements by a number of parties that uphold the network regarding how the technology should develop in the future in order to address these issues.
- For example, last year, a group of developers that didn't agree about the future of bitcoin, broke off and split the underlying blockchain. This led to the discovery of a bitcoin offshoot also known as bitcoin cash. Another so-called fork happened, resulting in bitcoin gold.
- A number of other issues have also been flagged up, including the presence of illicit material buried in the bitcoin blockchain. We know that a single block contains data required for a bitcoin transaction to go through. But within that data, researchers have found some instances of content such as child pornography. These standard image or video files would be encrypted alongside the legitimate bitcoin data and so are very difficult to find.
- One other weakness of bitcoin's blockchain is also the very thing that makes it attractive: rewards. As mentioned earlier, miners who maintain the network are rewarded in bitcoin. But mining costs a lot of money in the form of energy to run the purpose-built computers and specialist hardware. There are different estimates as to what price bitcoin has to be to be profitable. One of the most recent studies came from Wall Street analyst Thomas Lee of Fundstrat who said $8,038 for one bitcoin would be profitable for miners. But if bitcoin remains below that for a long period of time, many miners could theoretically walk away, causing transaction times to increase further and pushing users away. This can be result in a meltdown of the bitcoin network. So far, this has not happened.
- But this kind of volatility and infighting is clearly not fit for business. Therefore, many companies began looking at the principle of blockchain technology and adapting it to what would work for their business. The parts of blockchain technology that have so far attracted companies include the ability to have a shared ledger of activity to help to make transactions more efficient, a reduced number of intermediary parties

involved, and lower processing costs. When we delve into real-world examples of blockchain technology, it's clear that many of the things that have caused problems with the bitcoin blockchain have not been adopted.

B. Types of Blockchain ? [4]

The bitcoin blockchain is not really made for companies to build apps and processes on. But a number of other companies have created blockchain platforms to help firms interested in the technology build processes. Ethereum, Ripple, Hyperledger, IBM, R3, are just a few names that have developed such platforms.Ethereum is one of the important blockchain platform that specializes in smart contracts. It has a digital coin known as ether linked to it. Ether is the world's second-largest cryptocurrency by value. Like bitcoin's blockchain, Ethereum's is also public. Think of how companies like Apple and Google release software developer kits to allow people to build apps on their various platforms. Ethereum does something similar, allowing people to build "decentralized apps" on its platform, leveraging its blockchain and potentially using the digital coin ether to power their product. Smart contracts are the contracts that executes automatically when certain conditions are met from all interested parties. The automation can help to speed the process up, ensuring no mistakes along the way.

Meanwhile, Ripple is a blockchain specifically designed for cross-border currency transactions. The movement of money from one currency to another across the world, particularly for large businesses, is expensive and takes a long time. The process involves lots of different parties from banks to clearing houses. Ripple's blockchain system, known as xCurrent, helps to cut out some of the intermediaries, cutting down a cross-currency transaction to seconds. Ripple also has a cryptocurrency attached to it known as XRP, but it is not necessarily needed to power its xCurrent product.

III. The Bitcoin Blockchain

A. What is it? [1]

The blockchain behind bitcoin is nothing but a public ledger of every transaction that has taken place. It cannot be tampered with or changed retrospectively. Advocates of the technology says that this makes bitcoin transactions secure and safer than current systems.

So here are a few facts about bitcoin:

- It is not issued by a central authority
- There is a limit of 21 million. Currently just over 17 million are in circulation.

- The first transaction using the bitcoin is widely believed to be carried out by a programmer named Laszlo Hanyecz, who has spent 10,000 bitcoin on two Papa John's pizzas in 2010.
- Bitcoin creator Satoshi Nakamoto's identity remains a mystery.
- Bitcoin has often been used to purchase illicit products.

B. How does it work? [2]

The bitcoin blockchain is "decentralized," meaning it is not under the control of one central authority.While traditional currencies, bitcoin has no central authority. The bitcoin blockchain is maintained by a network of people known as miners. These "miners," also sometimes called "nodes" on the network, are the people running purpose built computers that are actually competing to solve the complex mathematical problems in order to make a transaction go through. For example, let say lots of people are doing bitcoin transactions. Each of the transaction originates from a wallet which has a "private key." This provides mathematical proof that the transaction has come from the owner of the wallet also known as digital signature. For example, lots of transactions are taking place across the world. These transactions are grouped together into a block, organized by strict cryptographic rules. The block is then sent out to the bitcoin network, made up of people running high-powered computers. These computers compete to validate the transactions by trying to solve complex mathematical puzzles. This validated block is then added onto previous blocks that creates a chain also known as blockchain.

How the Blockchain is Tamperproof

One of the advantages of blockchain is that it can't be tampered with. Each block that is added onto the chain carries a hard, cryptographic reference to the previous block. That reference is part of the mathematical problem that needs to be solved in order to bring the following block into the network and the chain. Part of solving the puzzle involves working out random number called the "nonce." The nonce, combined with the other data such as the transaction size, creates a digital fingerprint called a hash. This is encrypted, thus making it secure. Each hash is unique and must meet certain cryptographic conditions. After this a block is completed and added to the chain. To meet this condition, each earlier block, of which there are over half a million, would require the cryptographic puzzles to be re-mined, which is next to impossible.

IV. Banking on Blockchain [5]

The promises of the blockchain technology have been praised by the banking industry in particular. They see it as a way to reduce costs, make processes more efficient and

potentially underpin a lot of their operations. Banks often call blockchain "distributed ledger technology" or DLT to distinguish it from bitcoin's blockchain. Many major banks have begun carrying out blockchain experiments.Spanish bank BBVA carried out a pilot project in which it issued a 75 million euro ($89.7 million) loan using blockchain technology to a company called Indra. The current loan issuing process requires lots of back and forth between various parties, a number of different versions of one contract, and lots of time and effort. BBVA's solution, which was built-in house, is aiming to try to cut down the time and cost. It is based on smart contracts explained above. To execute this loan, BBVA and Indra were both using an app developed by the Spanish bank. In this, Indra would put all the details required to request the loan. BBVA would then put in changes. This back and forth would continue, but each step would be registered on the blockchain — so it created a ledger of activity. When all parties had agreed to all the parts of the loan agreement, the contract was executed. The final contract was recorded on the private, internal blockchain developed by BBVA.Only the people with permission would have access to this. But BBVA then also cryptographically secured the contract and hosted it on the Ethereum blockchain.

A. Who else adopted this? [5]

The simple answer is any entity hoping to make processes cheaper, faster and more traceable. Let's take a look at a handful of examples across different industries, not just the banks.Last year, stock exchange group Nasdaq partnered with Swedish bank SEB to trial a blockchain-based mutual fund trading platform for example. Nasdaq also trialed blockchain to allow shareholders of listed Estonian firms, who weren't physically present for meetings, to vote. Blockchain technology can also use for tracking products across a supply chain or route. For example, diamond producer De Beers recently announced that it had trialed the technology to trace the stones from the time they were mined to delivering them to a jeweler. The blockchain can also be used to track ownership of assets such as fine art of even property.

Elections are another field which blockchain technology could be applied to. In West Virginia's primary election in May, voters were able to vote via a mobile blockchain-based platform

V. What is Coming Next ? [1]

Despite the hype and promise of blockchain or DLT, it's not something that will be widespread in the next few months. The current state of play sees banks who are doing the experimenting with the technology, but not adopting it on a wide scale. It is being used for the singular processes, such as loans in case of BBVA or cross-border currency movement like

Santander is testing. But there are numbers of other use cases and even industries that the blockchain can touch. Insurance, health care and government agencies just to name a few.

Still, there are a number of stumbling blocks that the technology needs to overcome to be viable across major organizations and industries at large. One of the major ones is interoperability. Essentially, how will blockchains developed by one firm work with DLT run by another company? There's a number of companies as outlined before developing blockchain platforms. But there is no guarantee that the each one will be compatible with another. It can be likened to the early days of mobile operating systems, where there were several systems including iOS, BlackBerryOS, Android and Symbian. Now iOS and Android dominate the smartphone market.

References

1. (8 May 2016). "Here's Why Blockchains Will Change the World". Fortune. Archived from the original on 13 November 2016. Retrieved 16 November 2016.
2. Bheemaiah, Kariappa (January 2015). "Block Chain 2.0: The Renaissance of Money". Wired. Archived from the original on 14 November 2016. Retrieved 13 November 2016.
3. Chen, Huashan; Pendleton, Marcus; Njilla, Laurent; Xu, Shouhuai (12 June 2020). "A Survey on Ethereum Systems Security: Vulnerabilities, Attacks, and Defenses". ACM Computing Surveys. 53 (3): 3– 4. arXiv:1908.04507. doi:10.1145/3391195. ISSN 0360-0300. S2CID 199551841.
4. Jump up to:a b c d Bhaskar, Nirupama Devi; Chuen, David LEE Kuo (2015). "Bitcoin Mining Technology". Handbook of Digital Currency. pp. 45–65. doi:10.1016/B978-0-12-802117-0.00003- 5. ISBN 978-0-12-802117-0.
5. Knirsch, Unterweger & Engel 2019, p. 2.

17. Study Paper on Smart Farming and Automation Using Internet of Things

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Abstract

Internet of Things (IOT) plays a important role in smart agriculture. Smart farming is an rising idea as a result of IOT sensors capable of providing information about their agriculture fields. It aims making use of the evolving technology i.e. IOT and smart agriculture using automation. Monitoring environmental factors is the important factor to improve the yield of the efficient crops. The paper has monitoring temperature and humidity in agricultural field through sensors using CC3200 single chip. Camera is interfaced with CC3200 to capture images and send that pictures through MMS to farmers mobile using Wi-Fi.

Keywords: IOT Agriculture Environment Smart Farming

I. Introduction

The world population is growing rapidly, and now it has reached . Question that comes to mind is, what are all these people going to eat? The growing population is the only challenge facing modern farmers. What to do about labor shortages and consumers asking for eco-friendly sustenance?

Automated agriculture is a diverse sphere as of now, so we are going to cover latest innovations and the derived benefits. One of the best solution to many challenges: What is farm automation?

II. 1.Consumer Preferences

The extra of fast food and other unhealthy meals on the market has led to a demand for healthier food products. The impact that unhealthy food has had on our bodies has led to a bad approach: consumers all over the world are cwaiting for plant-based wholesome food.

III. 2. Labor Shortage

You will not find a teenager nowadays who dreams of being a farmer. The real truth is, the world population is seeking to live a more urban lifestyle, so the farming business has to deal with the labour shortage.

IV. 3. Ecology Responsibility

The public and local authorities expect agricultural companies to be eco-friendly and demonstrate a responsible approach to their work. Farmers should take a option for a reduced usage of chemical components, in particular, pesticides. Business owners in the agricultural sector are looking for a proper solution in response to this social and ecological demand, and they can find it in farm automation.

1. Smart farming is a variety of innovations in farming to optimize the food production process and improve quality. As of now, advanced farming technology can be an essential and important part of the farmer's daily work.

A. Robots and Drones

Smart farming is a very broad sphere, so its usage depends on the company's needs. Will the drones or robots suit your business better?

Robots and Autonomous Machines

Agriculture is a perfect niche for innovations in the sphere of robotics: farmers usually have to deal with repetitive tasks in the field, and this work is primarily labour-intensive. Now agricultural robots cope with tasks like harvesting, watering, seeding, etc.

Fig: 1 Automated Tractors

These types of tractors can be controlled remotely. It is necessary to help during the initial set-up and maintaining machines regularly.Smart tractors will become more and more independent with such technologies as vision systems, tools for light detection, GPS, etc.

Bear Flag Robotics specializes in building driverless tractors and allows us to make the labor cheaper for farmers. They are able to control several tractors remotely, plan the machine's route, get real-time reports and alerts – the work can be done without direct human intervention in the field

Seeding and Weeding Robotics

Robots for planting are focused on the field's specific area, and they work with better precision. This type of farming robot uses artificial intelligence and computer vision, which allows for a minimum use of pesticides in the field and, subsequently, the production of high-quality food.

Eco Robotics produces automatic robots that use solar power for their work. A small four wheel machine is moving across the field and spraying herbicides with a minimum damage to the crops and environment. Automatic irrigation Robot-assisted irrigation systems contain two big parts: a Subsurface Drip Irrigation (SDI) system plus special sensors.

2. SDI is well-known in the agriculture industry – it provides a precise means of controlling the amount of water that is used, and at what time the plants receive it. Even though these systems are more advanced than plant-by-plant watering, they are still not perfect as they require some human assistance.

More sophisticated IOT sensors can monitor the moisture levels by themselves and send actual-time analytics to a smart device. The combination of SDI and such sensors creates automated farming equipment that facilitates the precise work and saves water resources.

The RAPID project offers farmers a cost effective solution based on the work of adjustable irrigation emitters across the field. Harvest automation

Harvesting is not easy work for machines – they should be gentle enough not to damage fruits and vegetables, Harvest robots already exist and they cope with their tasks successfully.

For example, abundant is the first commercial company which has specialised apple harvesting. The latest trick is to use a vacuum instead of graspers or similar devices. Agrobots, in its turn, is closer to the ground – the company has build robots to harvest strawberries. This innovation gives us the fruit's ripeness via AI technology.

3. Drones

Drones have an important play role in agriculture's important changes. Earlier, to watch at a field was only possible with helicopters or satellites – things have been completely changed now. Using a drone is really cheaper than we think and does not require any special human skills Drones can take aerial photos and videos, and the files quality is better with time.

Monitoring and Analytics

The average field size makes it impossible to properly monitor the state of a harvest. Previously, the most reliable solution was satellite imagery, but it did not give enough guarantees to farmers: such images were inaccurate and did not provide real-time perfect information.

With drones, farming is brought to the next level. Drone can identify damaged crops using different types of light, including near infrared and many more. Farmers receive this information immediately and can quickly changes to the changing conditions.

Drones are useful when creating a planting scheme. They provide field maps with soil analysis and also helps farmers to make the right and perfect decisions at the very beginning of the farming

4. Planting

Automated farms can also use robots for seeding on the ground, but also allows planting from the air. The main goal of Drone Seed is to help reforest lands after wildfires. The drone carries a module that shoot seeds at the set place and specific distance from each other. To make it possible, developers use compressed air –by this way, seeds will not scatter around the field We might see air planting used very often as a part of agriculture automation. Irrigation And now, you can use drones to water the plants Thanks to the latest technology that such drones adapt to several location factors like altitude, objects in the field, weather conditions, etc.

Agras MG-1's drone created by DJI is powerful (it can carry up to 10 liters of liquid) and fast (it covers up to 6 000 m^2 in 10 minutes). It really saves lots of time and effort – manual watering is dozens of times slower.

If farming automation solutions work in conjunction, the watering drones can get the signals from other agrobots about the plants that need the help more than others. In other words, agrobots can communicate with each other and solve problems on the go.

Fig:2 Benefits of Agriculture Automation

One agrobot can change the future. Smart farm automation technology has a very great potential to be impactful. The best answer to numerous global problems and the creation of eco-friendly approaches lies in this field of technology.

The Agriculture Industry Meets Consumers' Demands

Consumer demands and their preferences are changing. We all want food to be fresh and be fast delivered to shops and markets. The fully equipped robots allow farmers to save time and money.

The labor shortage in the industry is decreasing.

Labor in some farming branches can take up to 50% of the overall cost.The labour shortage makes this situation even more worse. Using the robots for seeding, harvesting, watering, and monitoring decreases the need of human work

5. Agriculture is becoming more eco friendly

The usage of pesticides is more that why agriculture is gaining a bad reputation. Robots are trying to shift the angle towards an environmentally-friendly approach: they can add pesticides with great precision, which is impossible when done by an actual human

V. The IOt-Based Smart Farming Cycle

The core of IOT is the data that you can draw from things (—T||) and transmit over the Internet (—I||). To optimize the farming process, IOT devices installed on the farm should collect and process data in a repeated cycle that enables farmers to react quickly to the emerging issues and changes in ambient conditions. Smart farming do follow a cycle like this one:

1. Observation

Sensors records the observational data from the crops, livestock, soil, or atmosphere

2. Diagnostics

The sensor values are led fed to a cloud hosted IOT platform with a defined decision rules and models—also called —business logic||—that ascertain the condition of the examined object and identify are there any deficiencies or needs

3. Decisions

After issues are revealed, the user, and/or machine learning-driven components of the IOT platform checkswhether location specific treatment is necessary or not

4. Action

After the complete evaluation and action, the cycle just repeats from the beginning. IOT Solutions to Agricultural Problems

Many believe that IoT can really add value to all areas of farming with precision, from growing crops to forestry. In this article, we'll talk about two major and important areas of agriculture that IOT can revolutionize:

1. Precision Farming

2. Farming automation/robotization

1. Precision Farming

Precision farming is an umbrella concept for IOT-based approaches that make farming more controlled and accuracy is also high. In simple words, plants and cattle precisely get the treatment they need, determined by machines with human accuracy. The difference from the classical approach is that precision farming allows us decisions to be made per square meter or even per plant/animal rather than for a field.

2. Precision Livestock Farming

As in the case of precision agriculture, smart farming techniques allows farmers better to monitor the needs of individual animals and to adjust their nutrition accordingly, thereby preventing disease and enhancing herd health.

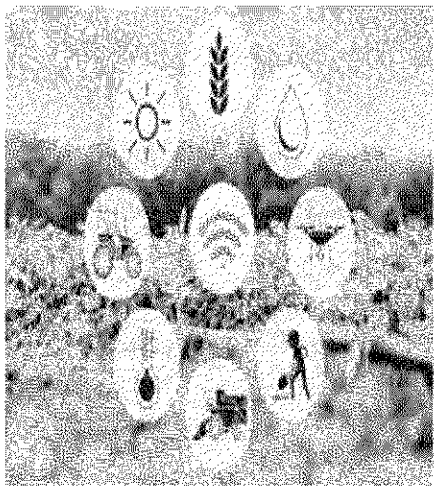

Fig: 3 Smart Farming

VI. Conclusion

Large farm owners can wisely use wireless IOT applications to monitor the perfect location, well-being, and health of their cattle. With this information, they can really identify sick animals, so that they can separated from the herd to prevent the dangerous disease from spreading We are only at the first stages of farm automation technology, but it will able to transform agriculture. It offers a path towards being more efficient agriculture by advancements of technologies, production and software. Every year, automation technology is becoming more sophisticated, and what was cutting-edge just a few years ago will become commonplace and cost-effective soon. The human element will always be a important aspect of managing a farm, but fully autonomous efficient vehicles and farm equipment are coming

VII. References

1. Kaewmard,N., & Saiyod,S. (2014). Sensor data collection and irrigation control on vegetable crop using smart phone and wireless sensor networks for smart farm. 2014 IEEE Conference on Wireless Sensors (ICWiSE). doi:10.1109/icwise.2014.7042670
2. Nakutis, Deksnys,V., Jaruevicius,I., Marcinkevicius,E., Ronkainen,A., Soumi,P., … Andersen,B. (2015). Remote Agriculture Automation Using Wireless Link and IoT Gateway Infrastructure. 2015 26th International Workshop on Database and Expert Systems Applications (DEXA). doi:10.1109/dexa.2015.37
3. Srisruthi,S., Swarna,N., Ros,G.M., & Elizabeth,E. (2016). Sustainable agriculture using eco-friendly and energy efficient sensor technology. 2016 IEEE International Conference on Recent Trends in Electronics, Information & Communication Technology (RTEICT). doi:10.1109/rteict.2016.7808070
4. Tan,L., Hou,H., & Zhang,Q. (2016). An Extensible Software Platform for Cloud Based Decision Support and Automation in Precision Agriculture. 2016 IEEE 17th International Conference on Information Reuse and Integration (IRI). doi:10.1109/iri.2016.35
5. Umamaheswari,S., & Preethi,A. (n.d.). Integrating Scheduled Hydroponic System. Paper presented at 2016 IEEE International Conference on Advances in Computer Applications (ICACA).

18. IoT Block Chain and Encryption

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Abstract

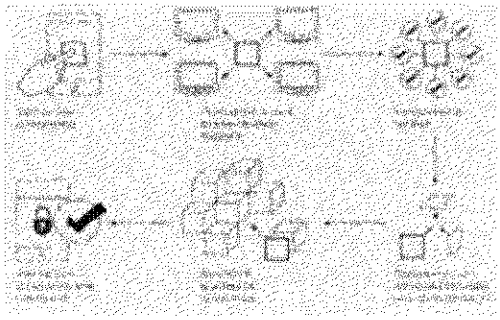
"Internet of Things" (IOT) sound like genuinely hardened and very elaborate entity however it's full opposite it is the substitute assiduity I individual you will probe and its actually lofty on urging. In unclothed figure Internet-Of Things is all-embracing tour for technology that ar competent to pass with one sensible tactical manoeuvre to a various. New age constant technology like phone, sensible Watch, Fitness huntsman "Smart", the IOT diligence has careful the tactical manoeuvre at purpose that your traditional house are another position sensible house with simply installation of IOT Device. There ar presently fitness collar band for canine, sensible microwave that indicates once your bread is ready, sensible mirror that expose you're going physiological condition statistics and on- requisition exercise.

Keyword : Internet Of Thing, Peer-To Peer Network, Statistics, Intelligence, New Era, Constant Developing Technonlogy

1. Introduction

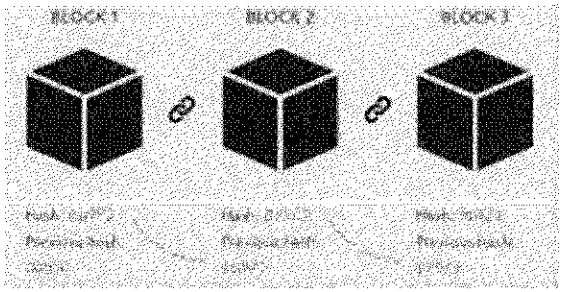
Block chain may live a network of work information in Associate in Nursing passing blood vessel that produces it guileful or unattainable to alter, hack, or fudge the network. A blockchain is considerably a digital invoice of trades that's reduplicated and allotted across the integral network of laptop networks on the blockchain. every poll inside the sequence contains diversity of trades, and every occasion a trademark substitute trade happens on the blockchain, a account of that trade is subjoined to every player's invoice. The suburbanised information self-addressed by multiplex partakers is all over as Distributed Ledger Technology (DLT)2. How does the Blockchain Work?

A Block chain might survive a allotted, peer-to- peer information that hosts a unceasingly promoting composition of trades. Each trade, brought out as a " block," is roofed through cryptography, timestamped, and incontestable by each certified building block of the information applying concurrency algorithms (i.e., a assemblage of regulations).



(Fig1: Flow of Blockchain)

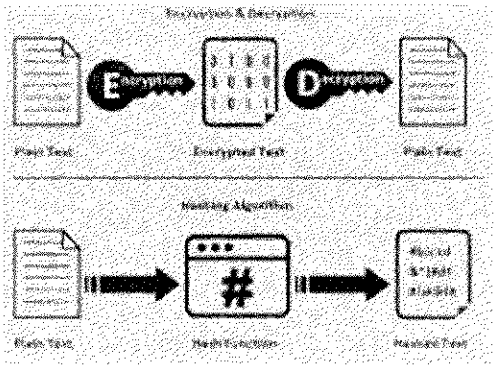
A group action that is not valid by all members of the information is not accessorial to the information. each group action is connected to the previous group action in consecutive order, making a series of transactions (or blocks). A group action can't be deleted or emended, thereby making Associate in Nursing immutable audit trial. A group action will solely be modified by adding another group action to the chain.



(Fig2: Hash System)

3. Use of Encryption (Cryptography) in Blockchain

Blockchains build use of 2 forms of science algorithms, asymmetric-key algorithms, and hash functions. Hash functions square measure accustomed offer the practicality of 1 read of blockchain to every participant. Blockchains usually use the SHA-256 hashing algorithmic program as their hash operate.



(Fig3: Encryption and Decryption)

4. Cryptographic Hash Functions Provide the Following Benefits to the Blockchain

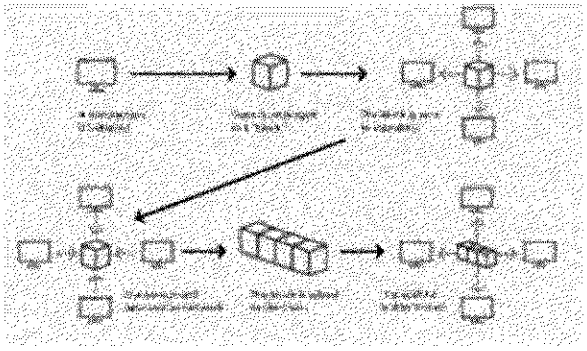
- Avalanche effect – A slight change in the data can result in a significantly different output.
- Uniqueness – Every input has a unique output.
- Deterministic – Any input will always have the same output if passed through the hash function.
- Quickness – The output can be generated in a very small amount of time.

Reverse engineering is not doable, i.e., we have a tendency to cannot generate the input by having the output and thus the hash perform.

Hash functions have a major role in linking the blocks to one another and conjointly to stay up the integrity of the knowledge keep within every block. Any alteration inside the block information may end up in inconsistency and break the blockchain, creating it invalid. This demand is achieved by the property of the hash functions, referred to as the 'avalanche impact.

5. Industry Starting from Blockchain

While several of the other industries mentioned involve public records, non-public blockchain networks provide their own potentialities



(Fig4: Industry flow of Blockchain)

e.g.: Trucking

The Blockchain in Transport Alliance (BiTA) has been fashioned to develop trade standards and educate its network of members. It's the largest business Blockchain alliance alive, and its nearly five hundred members square measure developing the frameworks that will modification the transport and transport industries. Blockchain will improve transactions, cargo chase, and fleet management, in addition as shield assets and increase fleet potency. It will facilitate track contamination in food, as AN example, by chase a truck that carries ingredients and noting if safe storage conditions were maintained throughout any

delays. in addition, it will facilitate optimize routes by matching truckers ANd things to be delivered with trucks in an extremely sure region.

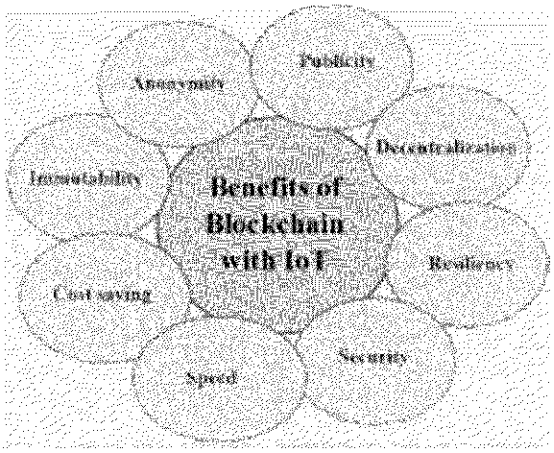
6. Benefit of Block Chain

One of the fascinating and also the engaging issue concerning block chain trade is associate its ability to secure information and thwart cyber-attack. Blockchain could be a "distributed ledger industry" that's clear however it's utterly encrypted

Block Chain is comprised of touch of knowledge that's bolted down with encoding. once these "blocks" area unit "chained" along, members or nodes of specific Blockchain will simply read all information

e.g.: an organization will store the information of fifty of its customers in one block. the information is in chains along to supply the only real store a bigger-picture examine purchases. instead of potential hacking of the knowledge of millions from a central information, Blockchain suburbanised chain facilitate of keep the protection risk to associate degree absolute minimum by parcelling off data.

Any changes of Blockchain square measure created clear. every range of chains is given a singular code that in person identifies them, however the name behind the code isn't free. However, the entire node is in a position to visualize any new addition to the chain and pinpoint malicious behavior by a selected code to quickly thwart cyber-attack.



(Fig5: Benefit of Blockchain IOT)

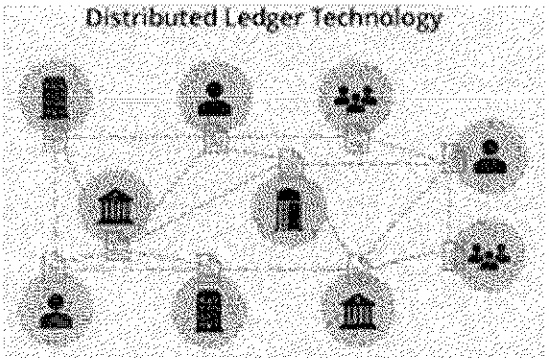
The main security advantage of suburbanized ledger is that if any hacker somehow enters a sequence, there square measure able to receive solely a wrong quantity of information before the opposite nodes on a sequence understand there has been breach. Combining this suburbanized Security system with clear ledger provides a Blockchain the upper-hand in security.

Block-Chain conjointly makes IOT business quicker. With Peer-To-Peer Model, creating payment and death penalty contracts square measure easier. Blockchain-based good contracts save the requirement of third party associate degreed approves or disapprove of an agreement conjointly at once, saving unnumberable hours and a lot of bucks every year.

Distributed ledger Technology has the potential to offer the IOT business from fitness huntsman to sensible cities the boost it has to become a trillion-dollar business.

7. What Is Distributed Ledger Technology (DLT)?

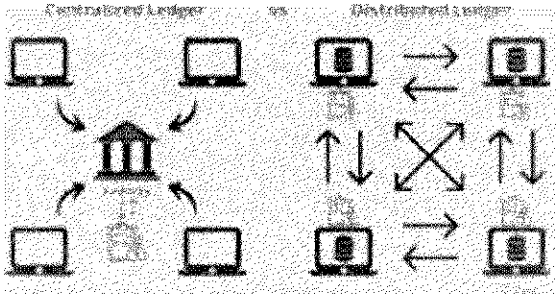
Distributed Ledger Technology (DLT) refers to the technological infrastructure and protocols that permits coincident access, validation, Associate in Nursingd record change in an immutable manner across a network that is unfold across multiple entities or locations. DLT, additional usually referred to as the Blockchain technology, was introduced by Bit coin and is currently a hokum within the technology world, given its potential across industries and sectors. In easy words, the DLT is all regarding the thought of a "decentralized" network against the traditional "centralized" mechanism, and it's deemed to possess comprehensive implications on sectors and entities that have long relied upon a sure third-party.



(Fig6: Distributed Ledger Technology)

8. Distributed Ledger Technology (DLT) Explained

Distributed Ledger Technology (DLT) can be a protocol that enables the secure functioning of a redistributed digital information. Distributed networks eliminate the necessity for a central authority to remain a check against manipulation. DLT permits for storage of all data in associate passing secure and correct manner victimisation cryptography. identical are accessed victimisation "keys" and cryptologic signatures. Once the information is hold on, it becomes associate changeless information and is ruled by the foundations of the network.



(Fig7: Centralized Ledger vs. Distributed Ledger)

The idea of a distributed ledger is not whole new, and many of organizations do maintain information at completely different locations. However, every location is commonly on a connected central system, that updates all of them sporadically. This makes the central info in danger of cyber crime and in danger of delays since a protoplasm must update every distantly placed note. The terribly nature of a suburbanised ledger makes them proof against a cyber-crime, as all the copies hold on across the network need to be compelled to be attacked at the same time for the attack to realize success. to boot, the synchronic (peer-to-peer) sharing and change of records build the whole method abundant quicker, additional sensible, and cheaper.

« Back

9. Disadvantage of Blockchain

Slower Process

Blockchain can slow down when there are too many users on the networks

High Energy Consumption

Some solution consumes too much energy

Inefficient

Blockchain are sometimes inefficient due to how they operate

High Cost

Blockchain implementation is costly process

Interoperability

Blockchain doesn't offer interoperability as of now

Harder To Scale

Blockchain are harder to scale due to their consensus method

Data Is immutable

Blockchain cannot go back as data is Immutable

Self-Maintenance

User have to maintain their own wallet or else they can lose access

Still Not mature

Is Still a long way to go before it mature and get standardized?

Integration

It's hard to integrate into legacy system

10. Cybersecurity Concerns in Blockchain As the Internet-of-Things expands, thus too do the considerations for information integrity and individual privacy. many logical vulnerabilities in IoT devices will figuratively, and typically virtually, open doors for cybercriminals. Hackers square measure ready to benefit of straightforward passwords, exposed science addresses and public serial numbers that enable a criminal to require full advantage of any device. There are dozens of many cases rumored because of the present lack IoT cyber security protocols. In one instance, hackers gained access to the camera of a baby monitor and were ready to see and hear everything happening inside vary. Another cyber security mishap occurred once a casino's high-roller info was compromised through the hacking of a sensible measuring system within the hotel's vivarium. With quite eight.4 billion connected devices worldwide, the IoT business might use a heavy cyber security overhaul. Blockchain may be the solution to the present dire would like.

11. Not Completely Secure

Blockchain technology is safer than alternative platforms. However, this doesn't mean that it is not utterly secure. There area unit alternative ways that the Blockchain network are going to be compromised. Let's bear them below one by one to make a lot of sense out of it.

1. fifty one attack: within the fifty one attack, if AN entity will management fifty one or a lot of of the network nodes, then it may result up to the mark of the network. By doing thus, they'll modify the info within the ledger and additionally do double spending. this is often potential on networks wherever the management of miners or nodes square measure potential. this suggests that non public networks square measure a lot of probably to be safe from fifty one attacks, whereas public ones square measure a lot of liable to this.
2. Double-spending: Double-spending is yet one more drawback with this Blockchain technology. to stop double-spending the Blockchain network deploys totally different accord algorithms as well as Proof of-Stake, Proof-of-Work, and so on. Double disbursement is just attainable on networks with a vulnerability to the fifty one attack
3. DDoS's attack: in an exceedingly DDoS attack, the nodes square measure bombarded with similar requests, congesting the network and transportation it down.

4. cryptological cracking: in an exceedingly totally different method the Blockchain technology is not secure is that the cryptological answer that it utilizes. Quantum algorithms or computing square measure over capable of breaking cryptological cracking. However, Blockchain solutions square measure currently implementing quantum proof cryptological algorithms

12. Some Blockchain Solutions Consume Too Much Energy

Blockchain technology got introduced with Bitcoin. It uses the Proof-of-Work accord rule that relied on the miners to do and do the labor. The miners square measure incentivized to resolve advanced mathematical issues. The high energy consumption is what makes these advanced mathematical issues not therefore ideal for the real-world. on every occasion the ledger is updated with a spick-and-span dealing, the miners got to be compelled to resolve the problems which suggests disbursement lots of energy. However, not all blockchain solutions add an analogous manner. There square measure alternative accord algorithms that have resolved the matter. as an example, permissioned or non-public networks do not have these issues as a result of the amount of nodes inside the network is forbidden. Also, as there isn't any would like for international accord, they use economical accord strategies to attain accord. But, if you are taking the foremost well-liked Blockchain network, Bitcoin, the matter still persists that must be resolved. In short, permissioned networks square measure economical once it involves energy consumption whereas public networks will consume lots of energy to remain operational.

13. What does it mean for the Profession?

Block chain technology proposes another accounting system that mitigates the challenges faced by this double-entry system and transforms the technological ability set and focus of the profession. It guarantees to supply higher information quality, increase monetary coverage transparency, and supply time period coverage in AN setting that will increase trust and lessens the chance for fraud. CPAs can ought to acquire a operating data of the Blockchain and good contracts to navigate this throughout the new triple-entry accounting setting. This rising and troubled technology conjointly guarantees to change the accounting professional's perspective, from transaction-focused to analytical.

14. Conclusion

Blockchain is undoubtedly important to our society. It's an impact on the current industries. It is unparalleled. With the growth are try to improvements, it is the only time when most of the industry will start adopting Blockchain. Blockchain technology has been in the key focus areas of development for all the multinational companies and also a huge

number of startups are emerging in this technology from the past few years. Blockchain is yet to witness its mainstream usage in society, yet there are numerous opportunities for professionals to explore and develop their careers in this field; one of which is cryptography in block chain for sure.

15. References

1. Angraal, S. et al., (2017). Blockchain Technology: Applications in Health Care. Circulation. vas quality and outcomes. 10, 9 (Sep. 2017), e003800.
2. Bahga, A., Madisetti, V., (2016). Blockchain Platform for Industrial Internet of Things, Journal of code Engineering and Applications, No. 9
3. Bahga, A., Madisetti, V., (2014). web of Things: A active Approach, Atlanta.
4. Beck R., Stenum Czepluch, J., Nikolaj Lollike, N., & Malone, S., (2016).
5. 101blockchain.blog, author Gwyneth Iredable
6. Upgrad.blog. coding of blockchain, author Mayank Sahu

19. Cybersecurity

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Abstract

The Internet of Things (IoT) connects different IoT smart objects around people to make their life easier by connecting them with the internet, which leads IoT environments vulnerable to many attacks

Keywords : 6LoWPAN, Bluetooth Low Energy (BLE), LoRa and LoRaWAN, WiFi, Ethernet, Cellular, ZigBee, RF and Thread)

I. Introduction

Nowadays technology changing rapidly day by day and affect our lives in many ways. Internet connectivity easily available everywhere. Some devices like computers, laptops, network devices, smartphones etc. connected with internet around us

There are number of ways of communication technologies and ways to connect anything (IoT bias) similar as radio frequence identification (RFID), ZigBee, Bluetooth, Bluetooth low energy (BLE), wireless dedication (Wi-Fi), worldwide interoperability for fryer access (WiMAX), wireless particular area network (WPAN), near field communication (NFC), Ethernet lines, coextensive string, mobile communication technology (1G/ 2G/ 3G/ 4G/ 5G/ GSM/ CDMA) and numerous further that depends on being structure whether wired or wireless.

IoT Architecture

Different people describe IoT Architecture with different layers. Different experimenters proposed different IoT Reference Models (RM) like Three- position model (Abdul Ghani & Konstantas, 2019), A Four- position model (AbdulGhan etal., 2018), a Five-position model (Atzori, Iera, & Morabito, 2010) and a Seven- position model (Cisco, 2014). Figure 17 shows many well- known IoT infrastructures layers as below Each subcaste provides some functionalities to upper and lower subcaste. Bandied each subcaste from seven layers armature veritably well

1. [3]Physical Bias This subcaste is'T' (Effects in IoT), alternately called edge bias. It contains detectors, selectors, bedded systems, microcontrollers, cameras, RFID, Communication bias, tackle, power inventories, etc. Utmost of these physical bias has constrained coffers (i.e., power source, processing, storehouse and communication interface) and use battery as the power source. Still, grounded on the

2. Connectivity This subcaste provides an interface between physical subcaste and upper layers. It substantially consists communication related interface and protocols like (i.e., 6LoWPAN, Bluetooth Low Energy (BLE), LoRa and LoRaWAN, WiFi, Ethernet, Cellular, ZigBee, RF and Thread) which are used for the in- network communication. Utmost of them are open technologies, whereas a number of Figure 17. IoT Reference Models 3/ 4/5/7 layers armature 218 IoT and Cyber Security them are (e.g., ZigBee, LoRa, Cellular) personal. These communication technologies give varied knowledge rates and transmission ranges reciprocally of colorful power consumptions and prices. Hence, depending on the several design constraints, the bumps in the Perception Layer can form IoT networks with different characteristics. Among these technologies, BLE, Wi-Fi, LoRa and Cellular offer star-grounded topologies. Still, 6LoWPAN, ZigBee and Thread support mesh topologies, where rudiments of the network can further others' packets. Some of them are projected for specific operation areas (i.e., Thread was projected for smart- home surroundings). Utmost of these technologies bear a gateway or border router, which used to connect the bumps in IoT network to the Internet (Arış, Oktuğ, & Voigt, 2018). 3. Edge Computing The main ideal of this subcaste is to perform simple data processing, which in turn decreases the calculation cargo in the advanced layers and offers a quick response. It's wise for real- time operations to reuse data closer to the edge of the network, rather than to reuse data in the pall. Numerous factors (e.g., service providers and calculating bumps) can be used to define the quantum of data processing at this subcaste (Abdul-Ghani & Konstantas, 2019). 4. Data Accumulation This subcaste given the Haste, Volume and Variety that IoT systems can give it's essential to give incoming data storehouse for posterior processing, normalization, integration, and medication for upstream operations. While a part of the general " data lake" design, this subcaste of the design serves the intermediate storehouse of incoming storehouse and gregarious business queued for delivery to lower layers. This subcaste may be enforced in simple SQL or may bear further sophisticated Hadoop & Hadoop Train System, Mongo, Cassandra, Spark or other NoSQL results. 5. Data Abstraction in this subcaste we've a tendency to " make sense" of the

data, assembling " like" data from multiple IoT detectors or measures, expedite high precedence business or admonitions, and organize incoming data from the information lake into respectable schema and flows for upstream process. Also, operation information Destined for downstream layers is reformatted rightly for device commerce and queued for process. A crucial design part for larger high- performance deployments could be a publish/ subscribe or data distribution service (DDS) software package to modify data movement between Edge Computing, Data Accumulation, Application Layer, and Stoner Processes (Lee, 2016). In general, this subcaste provides several functions similar as normalization/ renormalization, indexing, and access control to different data centers. 6. Operation In this subcaste, people see operations in colorful deployment areas, which make use of the meaningful information attained from lower Layers. Operations of IoT can be in home, structure, assiduity, civic or pastoral terrain Monitoring, process optimization, alarm operation, statistical analysis, control sense, logistics, consumer patterns, are just a many exemplifications of IoT operations (Arış, Oktuğ, & Voigt, 2018) (Lee, 2016). 7. Collaboration and Processes At this subcaste, operation processing is presented to druggies, and data reused at lower layers is integrated into business operations. This subcaste is concerning mortal commerce with all of the layers of the IoT system and wherever volume is delivered. The challenge at this subcaste is to effectively work the worth of IoT and also the layers of structure and services below and influence this into profitable process, business enhancement and/ or social good.

IoT Operations

IoT has several operations. In Figure.19 Operation divided sphere wise. IoT operations connects billions of smart objects every day in different sphere. Many crucial operations from every sphere as below In Consumer sphere Smart Home, Smart Metropolises, Smart structure, Elder care, Wearables, Smart Gym & Museum type of operations are there. Indeed Smart Home contains lot of small operation in it, which includes smart lighting, smart heating and air exertion, smart media and smart security systems. Thus, by enforcing Smart Home we can make our life easy, secure and most important we can save precious energy by dashingly controlling it. Still, if it can introduce significant threat to security and sequestration. Due to the lack of sufficient protection, bushwhackers can fluently gain sensitive information of druggies. Also, numerous of the being. It also include Smart Parking, Smart lighting, Smart Traffic monitoring, Smart Road, Structural Health Monitoring etc. In Serviceability sphere, also IoT has numerous operations like Smart Metering, smart grid, pool Tracking, Asset and

force operation etc. Smart Grid integrated with electrical energy field. It collect electricity generation, Consumption, Storage & outfit's health status data.

Tracking asset and pool for better operation of it. In Transportation & logistics sphere IoT applied in Supported Driving, Mobile Ticketing, Fleet Management & goods Tracking, Smart Traffic control, Smart parking, Electronic Risk Collection System, Remote Vehicle Control etc. Using IoT authorized person can track their asset as well as vehicle. Indeed in case of theft case they can control vehicle functionalities. In case of business system can find alternate route and suggest it for on time delivery in force chain operation system. In risk both there are RFID anthology connected with software which descry smart label (RFID label) on vehicle and automatically disbenefit plutocrat from account.

Possible Attacks [2]

The Internet of effects operations are used by numerous druggies but at the same time can expose the druggies to unknown security pitfalls and challenges. Utmost of the IoT Bias directly connected with internet and partake its data with some position of trust without performing any security tests. So utmost of attacks which are there in cyber space are also possible in IoT. IoT use Wireless Sensor Network as base so attacks of WSN are also there in IoT terrain. Below are many attacks possible at different layers of IoT armature bandy by (Abdul-Ghani & Konstantas, 2019) and (Chen etal., 2018). Many of below attacks describe below to understand nature of attacks, which do damage at different layers of IoT terrain

Likewise, upon appearance of packets at a replica, it may not only loose the packets. It's also able of repealing authorized bumps, since it can carry out an object cancellation protocol (Parno, Perrig, & Gligor, 2005). • Denial of Service (DoS) Attacks DoS attacks in calculating bumps can be classified into three orders sleep privation, outage, and battery draining attacks at edge subcaste. In sleep privation, battery- operated knot may admit a huge number of requests, which look like licit bones, transferred by an bushwhacker. Some IoT device work on battery. Outage attacks takes place when an IoT object stops carrying out its essential functions. This might have happed due to uninvited error in the manufacturing phase, sleep privation, and law injection (Chaubey, Akshai Aggarwal, & Jani, 2015) (Chaubey, 2016). • Physical Attack In some IoT Application objects stationed in hostile surroundings, similar objects are vulnerable to physical access, which may lead to tackle/ firmware attacks. With physical access to an object, an attacker can decide precious cryptographic information, alter operating

Vicious Knot In IoT terrain, some knot carrying unauthorized access of an IoT network and other objects, and disturb functionalities and security of terrain (Aggarwal, Chaubey, & Jani, 2013), (Chaubey, Aggarwal, Gandhi, &
Jani, 2015).

Side Channel Attacks It's a strong attack against encryption ways, which may affect their security and trustability. In Side- channel attack at edge knot position objects perform their normal operations, there's a possibility that similar objects might expose critical information, side channel attacks at communication position aren't invasive, since they only evoke designedly blurted information.

[3] One way is by adding noise in communication channel, which lead to retransmission of packets and drainage of limited power coffers.

Fragmentation Attacks Although 6LoWPAN lacks any security mechanisms, its security is offered by underpinning layers (e.g., an IEEE802.15.4). The IEEE802.15.4 has Maximum Transmission Unit (MTU) of 127 bytes, whereas IPv6 has a minimal MTU of 1280 bytes. Being.

Conclusion

In this chapter, author discuss about IoT, which is fastest growing technology now days and much research is going on in this domain. To do this task most of IoT objects use internet so they are directly vulnerable with internet threats. Therefore, to make IoT environment secure all IoT stakeholders have to do collaborative efforts by following standards and have to work towards improvement of standards and security for IoT environment.

References

1. Abdul-Ghani, H. A., & Konstantas, D. (2019). An IoT Perspective. Journal of Sensor and Actuator Networks, 8(2), 22. doi:10.3390/jsan8020022
2. Abdul-Ghani, H. A., Konstantas, D., & Mahyoub, M. (2018
3. Aggarwal, A., Chaubey, N., & Jani, K. A. (2013In Proceedings of the 2013 International Mutli-Conference on Automation, Computing, Communication, Control and Compressed Sensing (iMac4s) (pp. 827-834). IEEE

20. Study Paper of Cyber Security and Cloud-IoT

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Abstract

Internet has become a significant a part of this generation. The quantity of connected devices of Internet are increasing on a daily simple and approximately there'll be 36 billion IoT devices by till date. Current devices use standards that are easy to implement and works for many kinds of a minimum of 43 percent communications and storage. The Internet of Things (IOT); first will discuss the IoT evolution, and its great applications in industries. Further, classify and examine privacy threats, including survey, and citing out the challenges .

Keywords: IOT, Internet of Things, Cybersecurity, Cloud, Security, challenges.

Introduction

The Internet of things (IoT) period have begun from 2001 and onwards.. Things are going to be interconnected and talent to work out everything during this life would be possible in with just few clicks. Cloud computing will be a major part of that, especially by making all of the connected devices work together .In cybersecurity if there are loopholes in the security, then malicious actors in society can see, access and misuse the same information too, for example Smart TV with camera, and there are cases that one's TV camera are hacked. Rrealizing the importance of IoT, investors are making huge investment in it but they are investing on the things that can be marketed and they can get quick return. As there is not that investment in cybersecurity more things will add into IoT, concern about the thing's security will increase too. Many tech such as Amazon, Alibaba, Google and Oracle are building great machine learning tools with the help of cloud technology to offer a wide range of solutions to businesses worldwide.

I. Cybersecurity in the IOT

In IoT speedy growth, new security threats and challenges are rising in all industries. IoT is going the to be the change in businesses and customer interaction with the world.

Sharing information with everything is an enormous cybersecurity challenges. These days, customers have realized their choices can be analyse by their information and they have started to think about who has access to their data and who is responsible to secure it. Malicious actors can access this sensitive data. GPS are also used to track your position and your availability at a certain position. . This information does not seem that important but it is very enough for criminal to misuse it against any user . Nowadays several companies are collecting social data i.e. Google, Yahoo, Instagram and Facebook etc. and this data can be hacked by hackers. IOT has now started to understand that these data need to be in protection.

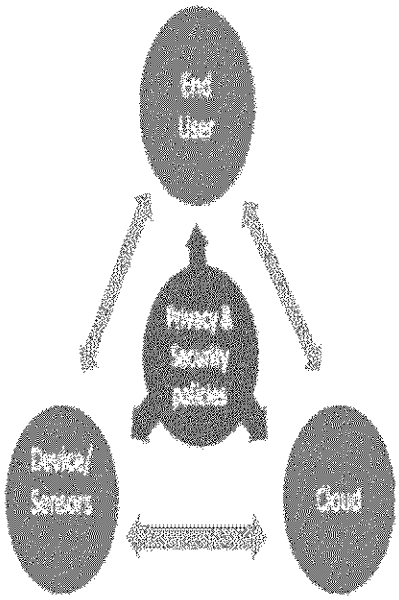

Fig 1 IOT Cyber Security and Privacy Policies

II. Role of Cloud Computing in IOT

Cloud computing and Internet Of Things (IOT) are working towards increasing the precision of everyday tasks and both have are different in their ways. Cloud hosting as a service adds value to IoT start-ups by providing economies of scale to reduce their overall cost structure.

Cloud computing also enables the collaboration for developers, which is the order of the day in the IoT area . Cloud allows developers to implement projects without delay. Storing data in the cloud, IoT companies can access a big amount of Big Data.

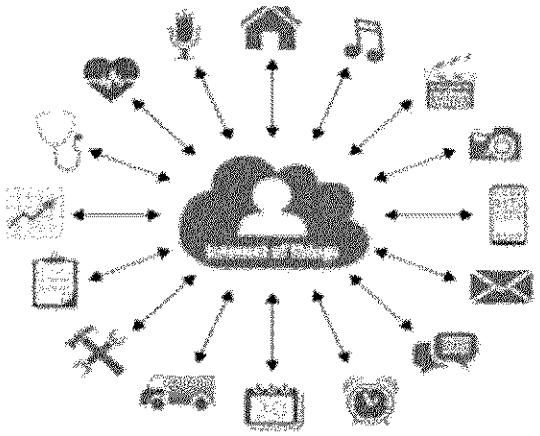

Fig 2 . IOT in Different Environment

Burdens big amount of energy and is costly at the same time. In a bad situation like this , data can be passed to the cloud from these sensors and processed there in total .It can be said that the cloud .

III. IOT Architecture

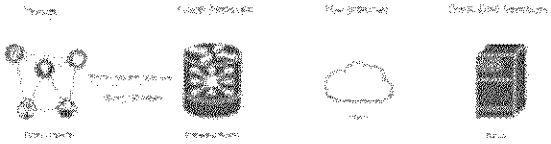

Fig 3 .IoT Standard Architecture

These are the IoT architectures purposed by leading IT companies in the world.

There are three major areas in it

- Device connectivity
- Data processing, analytics, and management
- Presentation and business connectivity

Using the gateway, devices can connect directly or indirectly. This architecture is designed for large-scale IoT environments.

Fig 4 IoT Architecture by Microsoft

This architecture has 3 components.

- Things
- Network
- Cloud

Intel also has released various IoT products along with the ecosystem. This architecture provides data and device security.

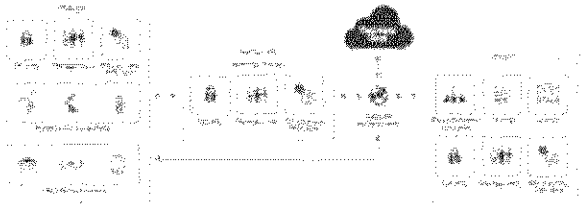

Fig 5 IoT Architecture by Intel

Devices can communicate with other devices and these are Internet connected indirectly or directly. Devices, which don't have Internet connection, can be accessed by gateway Cloud Platform is used to store, process and analyse data from all devices.

Google architecture is based on three main components.

- Device
- Gateway
- Cloud

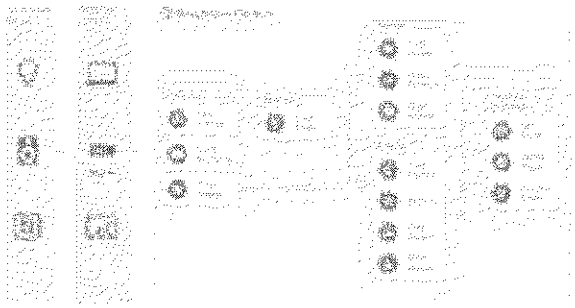

Fig .6 IoT Architecture by Google

IV. IOT and Cloud Computing for Future

In future, the combination of IoT and Cloud Computing will inevitably boost the growth of the IoT systems and cloud-based services. Most of these organizations have started line up the two technologies and are really benefiting from it. In cloud infrastructure we can deploy the applications to process and analyze data fast and make precise decisions as soon as

possible. Using Cloud platform Internet Of Things (IoT) developers can store the data remotely and access easily.

Fig 7 IOT Cloud Computing

1. Increased Scalability : IoT devices need a lot of storage to share information for valuable purposes. Iot in cloud, like Cloud Connect to Microsoft Azure can provide customers with greater space which is only increasing as per the users demand. Helping to resolve the storage needs of customers.

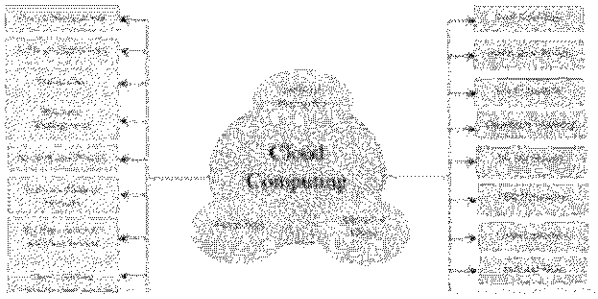

Fig 8 IOT Cloud Computing Future

Pay-as-you-go

Internet Cloud Computing infrastructures help IoT to give meaning to the greater of amount of data are generated. Users have no tension of buying less or more storage. They can smoothly scale the storage as the data generated increases and pay for the amount of storage they consume with the Internet Cloud Computing..

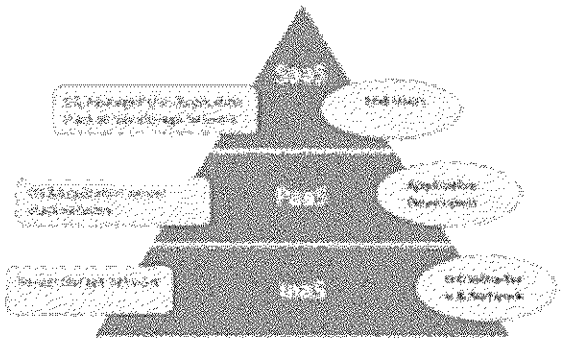

Fig .9 IOT pass as you go

V. Leading Sources of Cyber Threats

Malicious outsiders and accidental loss were the biggest sources of data breaches cited 34% and 18.2% .Malicious insiders were the next so most common source of breaches, accounting for 15.8%. Hacktivists and state sponsored attacks were cited 13.3%.

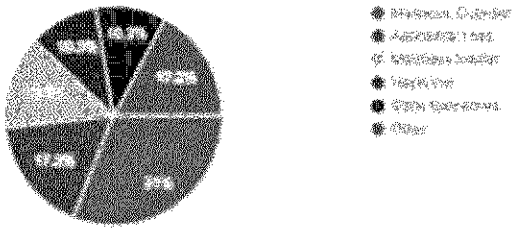

Fig 11. Sources of Cybersecurity Threats

VI. Discussion and Future Work

Cybersecurity professional is already making strategies for IoT challenges. 90.7% survey respondents, think IoT will create ease in life and business. In current year's cyber security attacks has been increased on the Internet connected medical devices. Smart phone, iPad and laptops are the popular devices while , kitchen appliances and wearable are not that much popular among users in 2018. . More than 80% feel IoT devices are easily soft targeted for hackers and 75% users indicate they will not purchase a device that have cybersecurity concerns. Organizations should review their cybersecurity infrastructure that where they are lacking in our security.

VII. III. Need of Cloud For IOT

Networks

With cloud provides a new opportunity in collects sensor data it also hinders the progress because of security and privacy issues. Sensor networks have amplified the benefits of IoT. Processing a big amount of this sensor data has been a major challenge.

VIII. Conclusion

The Internet of Things is a broad field and includes an incredible variety of applications. The cloud infrastructure is a good architectural fit for IoT , . IoT can benefit from the unlimited capabilities and resources of cloud computing, as cloud has the scalable capacities. There is no one-size-fits all solution so IoT companies need to consider their specific application when deciding whether the cloud makes sense for them. Moreover, the cloud infrastructure can be accessed anytime and anywhere, and has lower capital expenditure

and operational expenditure. Finally we conclude that Internet of things, big data and cloud computing leverage a new horizon of decision support system. And also the combination of the IoT, big data and cloud computing can provide new opportunities and applications in all the sectors.

References

1. K. Zheng, Z. Yang, K. Zhang, P. Chatzimisios, W. Xiang and K. Yang, "Big data driven optimization for mobile networks towards 5G," IEEE Netw., vol. 30, no. 1, pp. 44-51, Jan. 2016.
2. J. Swetina, G. Lu, P. Jacobs, F. Ennesser and J. Song, "Toward a standardized common M2M service layer platform: introduction to oneM2M," IEEE Wireless Commun., vol. 21, no. 3, pp. 20-26, Jun. 2016.
3. L. Lei, Y. Kuang, N. Cheng, X. Shen, Z. Zhong and C. Lin, "Delay optimal dynamic mode selection and resource allocation in device todevice communications - part II: Practical algorithm," IEEE Trans. Veh. Technol., vol. 65, no. 5, pp. 3491-3505, Jun. 2015.
4. M. Aazam, "Cloud of Things: Integrating Internet of Things and cloud computing and the issues involved", Applied Sciences and Technology (IBCAST), 2014 11th International Bhurban Conference on IEEE, (2014).
5. H. Z. Wang, "Management of Big Data in the Internet of Things in Agriculture Based on Cloud Computing", Applied Mechanics and Materials, vol. 548, (2014).
6. H. J. Ding, "Traffic Flow Data Collection and Signal Control System Based on Internet of Things and Cloud Computing", Advanced Materials Research, vol. 846, (2014), pp. 1608- 1611.
7. N. Kumar et al., "Performance Analysis of Bayesian Coalition Game Based Energy-Aware Virtual Machine Migration in Vehicular Mobile Cloud", IEEE Network, vol. 29, no. 2, pp. 62-69, Apr. 2015. [8]. T.Taleb, A. Kunz, "Machine Type Communications in 3GPP Networks: Potential Challenges and Solutions", IEEE Commun. Mag., vol. 50, no. 3, pp. 178-84, Mar. 2012.
8. L. Atzori, A. tera, G. Morabito, "The Internet of Things: A Survey", Comput. Net., vol. 54, no. 15, pp. 2787-805, Oct. 2010. [10]. Y. Mao, "Applied Mathematics and Algorithms for Cloud Computing and.

21. Cyber Security and Cloud

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Abstract

Advances in information technology, and online data transfer leading to risk and providing an online threat. Security and privacy are important issues in cloud storage and communication fields. Cloud computing has created an online environment for objects. Cloud computing technology includes servers, applications, and other storage tools, depending on the visual connection. The information stored in the clouds can be used without the need for many physical activities. The Internet of Things devices that provide information and services through information and communication technology, these end-node IoT devices are not very smart and are compressed by resources and are therefore at risk of Internet threats. It has created a problem of insecurity as cruel people learn ways to access these systems and cause mental and physical harm.

Keywords: Artificial Intelligence, Ransomware, Supply Chain Attack., Cloud., Malicious emails, Internet of Things (IoT), Darkweb

Introduction

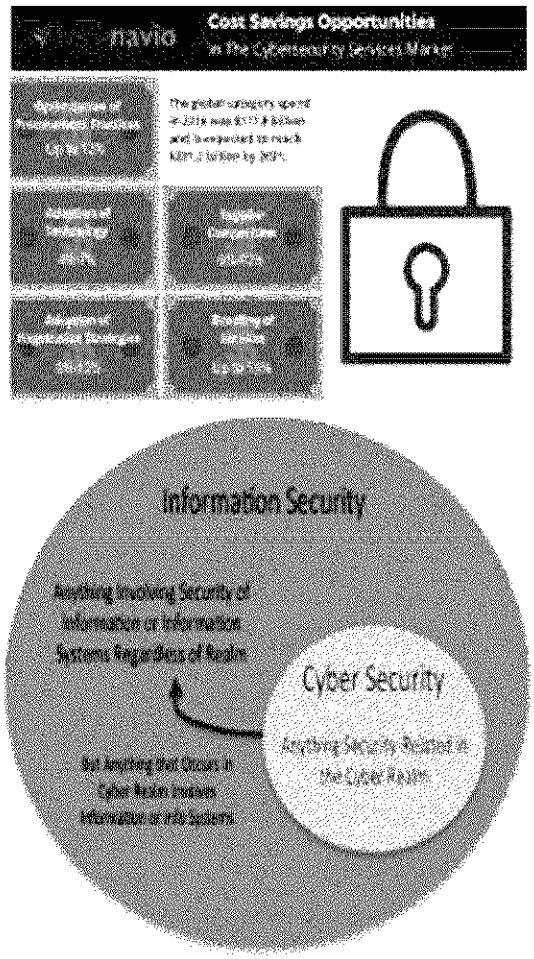
The Internet of Things (IoT) is at an all-time high as a prominent 21st-century archetype. The original concept of the word may indicate that it means to connect with the Internet. This technology was developed on the basis of cloud computing (CC); CC devices provide the platform needed to develop and expand IoT globally However, some security concerns continue to hamper the expansion of CC

IoT systems across all aspects of human life, this concern remains a cybersecurity area with questions such as privacy. entry goes up. No matter how amazing the technology continues to be in matters of application intelligence and data analysis, the question of how to protect information adequately arises many times.

I. Ease of Use [10]

1. Cost Savings

A. Once you are in the cloud, easy access to your company's data will save you time and money at the start of the project. Also, for those who are concerned that they will end up paying for features they do not need or do not want, many cloud-computing services are paid for as you go.



2. Security

A. Many organizations have security concerns when it comes to adopting cloud-computing solutions. After all, if files, programs, and other data can be stored securely in a location, how can you know if they are safe? If you can access your data remotely, then what prevents an cyber criminal from doing the same thing? Well, just a little bit.

B. Many organizations have security concerns when it comes to adopting cloud-computing solutions. After all, if files, programs, and other data can be stored securely in a

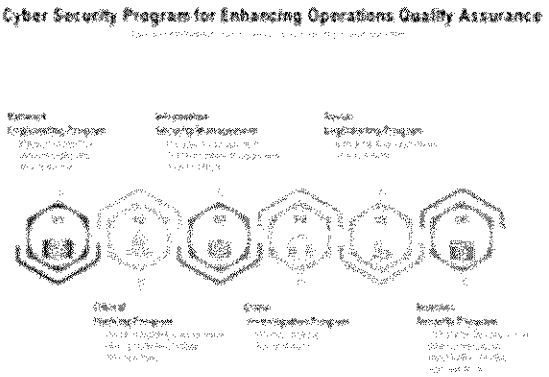
location, how can you know if they are safe? If you can access your data remotely, then what prevents an cyber criminal from doing the same thing? Well, just a little bit.

C. First, the full-time job of cloud hosting is to carefully monitor security, which is more efficient than conventional indoor systems, where an organization has to divide its efforts into a host of IT concerns, security alone. And while many businesses are reluctant to consider the possibility of internal data theft, the fact is that a surprisingly high percentage of data theft occurs internally and is perpetrated by employees.

If this is the case, it may be best to keep sensitive information out of the reach. Of course, all of this is very abstract, so let's consider solid statistics.The key to this improved security is encrypting data transmitted over networks and stored on a website. Through encryption, information is less accessible to cyber criminals or anyone else who is not authorized to view your data. While 20% of cloud users want disaster recovery in four hours or less, only 9% of cloud users can demand the same.

3. Quality Control

There are a few things that damage a business success like low quality and consistent reporting. Conversely, managing information on monsters can lead to employees accidentally storing different versions of documents, leading to confusion with refined data.



4. Insight

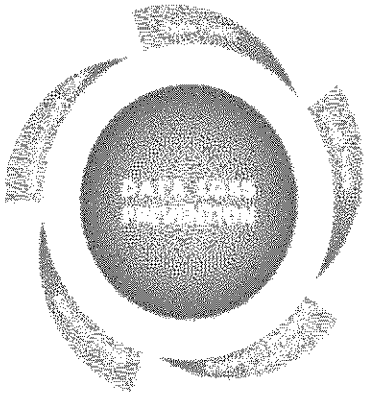
A. As we move into the digital age, it is becoming clearer and clearer that the old adage "knowledge is power" has come to be regarded as modern and accurate: "Data is money." Hidden between the millions of pieces of data surrounding your customer transactions and the business process are critical, tangible information waiting to be identified and processed. Of course, filtering that data to find these characters can be very difficult, unless you have access to the right cloud computing solution.

B. Many cloud-based storage solutions provide integrated cloud analysis to visualize your data. With your cloud based information, you can easily use tracking methods and create customized reports to analyze organizational information in general. From that information, you can increase efficiency and build applications to meet organizational goals.

5. Loss Prevention

If your organization is not investing in a cloud-computing solution, then all your important data is seamlessly tied to the office computers it resides in.

If your organization is not investing in a cloud-computing solution, then all your important data is seamlessly tied to the office computers it resides in.but the fact is that if your local hardware encounters a problem, you may end up losing your data permanently. This is a much more common problem than you might think computers can malfunction for many reasons, from viral infections, to age-related hardware malware, to a simple user error.



If you are not in the cloud, you are in danger of losing all the information stored on the site.

6. Flooding Attacks

The fourth issue is Flooding Attack. Attacker attacks the cloud system openly. The most significant feature of cloud system is to make available of vigorously scalable recourses Flooding attack is basically distributing a great amount of non-sense requests to a certain service. Once the attacker throw a great amount of requests, by providing more recourses cloud system will attempt to work against the requests, ultimately system consume all recourses and not capable to supply service to normal requests from user. Then attacker attacks the service server. DOS attacks cost extra fees to the consumer for usage of recourses. In an unexpected situation the owner of the service has to compensate additional money. Counter measure for this attack is it's not easy to stop Dos Attacks. To stop from attacking the server, Intrusion detection system will filter the malicious requests, installing firewall. Occasionally intrusion detection system provides fake alerts and could mislead administrator.

Purpose and Motivation of Attack

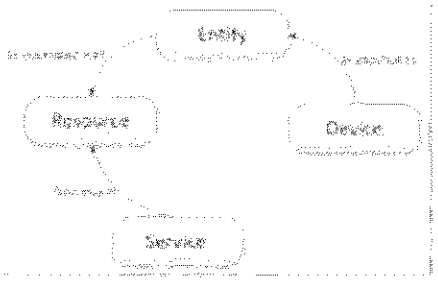
Government websites, financial systems, news and media websites, military networks, as well as public infrastructure systems are the main targets for cyber attacks. The value of these targets is difficult to estimate, and estimation often varies between attacker and defender. Attack motives range from identity theft, intellectual property theft, and financial fraud, to critical infrastructure attacks. . For instance, stealing credit card information has become a hackers hobby nowadays, and electronic terrorism organizations attack government systems in order to make politics, religion interest.

Classification of Possible Intruders

A Dolev-Yao (DY) type of intruder shall generally be assumed [3, 4]. That is, an intruder which is in effect the network and which may intercept all or any message ever transmitted between IoT devices and hubs. The DY intruder is extremely capable but its capabilities are slightly unrealistic. Thus, safety will be much stronger if our IoT infrastructure is designed to be DY intruder resilient. However, the DY intruder lacks one capability that ordinary intruders may have, namely, physical compromise. Thus, tamper-proof devices are also greatly desirable. This goal is of course unattainable, but physical tamper resistance is nevertheless a very important goal, which, together with tamper detection capabilities (tamper evident) may be a sufficient first-line defense.

In the literature intruders are classified into two main types: internal and external. Internal intruders are users with privileges or authorized access to a system with either an account on a server or physical access to the network [6, 7]. External intruders are people who do not belong to the network domain. All intruders, whether internal or external, can be

organized in many ways and involve individual attackers to spy agencies working for a country. The impact of an intrusion depends on the goals to be achieved. An individual attacker could have small objectives while spy agencies could have larger motives [5]. The various types of intruders will be discussed hereby based on their numbers, motives and objectives .



Privacy Goals

Privacy is an entitys right to determine the degree to which it will interact with its environment and to what extent the entity is willing to share information about itself with others. The main privacy goals in IoT are:

Privacy in devices – depends on physical and commutation privacy. Sensitive information may be leaked out of the device in cases of device theft or loss and resilience to side channel attacks.

Privacy during communication – depends on the availability of a device, and device integrity and reliability. IoT devices should communicate only when there is need, to derogate the disclosure of data privacy during communication.

1. Privacy in storage – to protect the privacy of data stored in devices, the following two things should be considered:
2. Possible amounts of data needed should be stored in devices.
3. Regulation must be extended to provide protection of user data after end-of-device life (deletion of the device data (Wipe) if the device is stolen, lost or not in use).
4. Privacy in processing – depends on device and communication integrity [8]. Data should be disclosed to or retained from third parties without the knowledge of the data owner.
5. Identity privacy – the identity of any device should only discovered by authorized entity (human/device). location privacy – the geographical position of relevant .(human/device) [9].

Discussion

The exponential growth of the IoT has led to greater security and privacy risks. Many such risks are attributable to device vulnerabilities that arise from cybercrime by hackers and improper use of system resources. The IoT needs to be built in such a way as to ensure easy and safe usage control. Consumers need confidence to fully embrace the IoT in order to enjoy its benefits and avoid security and privacy risks.

The majority of IoT devices and services are exposed to a number of common threats as discussed earlier, like viruses and denial-of-service attacks. Taking simple steps to avoid such threats and dealing with system vulnerabilities is not sufficient; thus, ensuring a smooth policy implementation process supported by strong procedures is needed.

The security development process requires thorough understanding of a systems assets, followed by identifying different vulnerabilities and threats that can exist. It is necessary to identify what the system assets are and what the assets should be protected against. In this paper, assets were defined as all valuable things in the system, tangible and intangible, which require protection. Some general, IoT assets include system hardware, software, data and information, as well as assets related to services, e.g. service reputation. It has been shown that it is crucial to comprehend the threats and system weaknesses in order to allocate better system mitigation. In addition, understanding potential attacks allows system developers to better determine where funds should be spent. Most commonly known threats have been described as DoS, physical attacks and attacks on privacy.

Three different types of intruders were discussed in this paper, namely individual attacks, organized groups, and intelligence agencies. Each attacker type has different skill levels, funding resources, motivation, and risk tolerance. It is very important to study the various types of attack actors and determine which are most likely to attack a system. Upon describing and documenting all threats and respective actors, it is easier to perceive which threat could exploit what weakness in the system. Generally, it is assumed that IoT intruder has full DY intruder capabilities in addition to some limited physical compromise power. We will presume that physical compromise attacks do not scale, and they will therefore only at-worst affect a limited population of the total number of IoT devices. IoT architecture must consequently be designed to cope with compromised devices and be competent in detecting such incidents. It is concluded that attackers employ various methods, tools, and techniques to exploit vulnerabilities in a system to achieve their goals or objectives. Understanding attackers

motives and capabilities is important for an organization to prevent potential damage. To reduce both potential threats and their consequences, more research is needed to fill the gaps in knowledge regarding threats and cybercrime and provide the necessary steps to mitigate probable attacks.

Conclusions

6. Cloud computing refers to a technology used for the storage of virtual information, while the Internet of Things is an asset in the Internet of Things. This technology is essential to modern business. The IoT platform emerged from the cloud computing capabilities base; both technologies lead to improved business and personal performance. However, the same technology suffers from insecurity; their existing cyberspace design makes them vulnerable to hacking and other privacy issues. Opportunities for complete confidentiality do not exist. Companies need to invest in better digital systems and constantly improve in order

7. to prevent weakness. Cloud computing improves peer-to-peer communication and is ready for worldwide use. These same network systems are accessible to people with malicious intent. As a result, information security continues to grow as an urgent and necessary element of modern technology.

8. Future work can be expanded by accessing the documents of government agencies and the organization as well as business documents in order to conduct more accurate and more detailed research. Artificial Intelligence is a fast-growing area in the current century and proves to be the solution to many of the world's problems, especially in the areas of security and manufacturing.

References

1. P. N. Mahalle, N. R. Prasad, and R. Prasad, "Object classification based context management for identity management in internet of things," International Journal of Computer Applications, vol. 63, no. 12, pp. 1–6, 2013.
2. D. Miorandi, S. Sicari, F. De Pellegrini, and I. Chlamtac, "Internet of things: Vision, applications and research challenges," Ad Hoc Networks, vol. 10, no. 7, pp. 1497–1516, 2012.
3. D. Dolev and A. C. Yao, "On the security of public key protocols," Information Theory, IEEE Transactions on, vol. 29, no. 2, pp. 198–208, 1983.
4. I. Cervesato, "The dolev-yao intruder is the most powerful attacker," in 16th Annual Symposium on Logic in Computer ScienceLICS, vol. 1. Citeseer, 2001.

5. J. Sheldon, "State of the art: Attackers and targets in cyberspace," Journal of Military and Strategic Studies, vol. 14, no. 2, 2012.
6. M. Rudner, "Cyber-threats to critical national. infrastructure: An intelligence challenge," International Journal of Intelligence and CounterIntelligence, vol. 26, no. 3, pp. 4[3]–481, 2013.
7. A. J. Duncan, S. Creese, and M. Goldsmith, "Insider attacks in cloud computing," in Trust, Security and Privacy in Computing and Communications (TrustCom), 2012 IEEE 11th International Conference on. IEEE, 2012, pp. 857– 862
8. C. P. Mayer, "Security and privacy challenges in the internet of things," Electronic Communications of the EASST, vol. 17, 2009.
9. A. R. Beresford, "Location privacy in ubiquitous computing," Computer Laboratory, University of Cambridge, Tech. Rep, vol. 612, 2005.
10. www.salesforce.com/ in/ products/ platform/ best practices/ benefits-of-cloud-computing/

22. Air Pollution Meter

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Abstract

Good quality of air is needed to maintain good health conditions among the living terrain. Dangerous feasts and air pollution can be detected in girding areas. Parameter like IAQI is measured from the proposed system gives an effective way of discovery of air quality. Proposed system has ESP8266 for connecting with IOT platform to pass the information regarding the adulterants to the help. Tone care is bettered by the way of detecting the adulterants of the terrain.

Keywords : Air pollution, IOT, Monitoring system, Air quality, Gas detectors.

1. Introduction

Respiratory problems are very common among many people due to air pollution and toxic substance of air. Carbon monoxide, Carbon dioxide, Sulfur dioxide, Nitrogen dioxide, Lead are certain air pollutants commonly known as Criteria pollutants. Microbes, moulds, Animal skins, pets, insects are common among the biological pollutants. Air pollution is a major drawback of the current environment and it is a hindrance for public health. Air pollution causes many adverse health effects in human beings, other organisms, for environment, variations in climatic conditions and changes in life cycle of everything. Harmful gases in the air is the reason for all the effects mentioned above by which the entire world suffers a lot. IOT and artificial intelligence based systems will be much helpful for the monitoring of environment. Algorithms like ANN, CNN, KNN, SVM, Random Forest are pre dominantly used for the environment monitoring. The monitored data or measured data is connected with Think Speak. The environment data obtained can be monitored from anywhere. Here Indoor Air Quality Check(IAQC) is considered for making a smart home with pollution free or pollution less. Air quality grounded on adulterants position which has the parameters like Carbon dioxide, Nitrogendioxide, Sulfur dioxide etc. Temperature also has rear effect on terrain. Colorful detector bumps integrated along with IAQC monitoring will have a better effect on air quality. This paper gives the comparison of colorful styles involved and better

effect grounded on the proposed fashion. Modified Navie bayes algorithm is proposed then to dissect and give the data. The proposed system has a microcontroller ESP8266 and colorful detector bumps for dimension of colorful parameters. DHT22 is a moisture and temperature detector for measuring the temperature and moisture of the terrain. The data measured from DHT22 is connived with the regulator. MQ2 is a gas detector used then. MQ2 is sensitive to LPG, Hydrogen, and propane. The crucial conception of this paper is to give the exigency alert when the air quality isn't respectable by people are in assiduity as well as home locales. The paper ordered follows covers Air Quality covering system for its living system. Section III covers the given system and argument of the tests achieved to show the performance of the colorful blocks of the AMS. Section IV has the conclusion of proposed system

2. Air Quality Monitoring System

Certain fashions like AQ prognosticating grounded models gives the impurities attention grounded on the average data of the colorful styles. The result was attained grounded on the mean values. Statistical styles and ML grounded manners for assaying the air quality are bandied further. As mentioned byS.Ali in [1] low cost bias are used to measure the colorful engrossment s of feasts like CO, NO2. LORAWAN is used then for transmission of detector data. It gives good vaticination of data grounded on the detector values. The Mean Absolute Chance error of the fashion is about38.89 grounded on artificial neural network computation.J.Huang et al [2] has proposed a system in which the vehicular data is taken and position of adulterants attention is checked for the girding terrain. About 500 vehicle data are compared and it's being anatomized for air quality aqueducts grounded on IOT cloud platform. Carlos Santos [3] proposed a system in which in which the transmission time between detector bumps and power consumption of detector bumps are taken the issues faced is anatomized. The International Journal of Modern Agriculture, Volume 10,No. 2, 2021 ISSN2305-72463086 event grounded seeing gives suitable power consumption reduction. Then 50 of the battery power can be saved. Kan zheng et al [4] has proposed a system in which the Low power wide area technology LPWA is used. Due to small area content this LPWA fashion is preferred. This LPWA can give about 20kn for pastoral and 5 km for civic area for air quality monitoring. LPWA has lower conservation and deployment costs which is grounded on IOT. Liang Zhao et al [5] has proposed a system where Inner Air Quality Sensor is used for measuring the parameters like like temperature, pressure, CO2 etc. This Inner air quality sensor is integrated along wit the GPRS, LORA, WIFI etc from wired to wireless and also for pall transmission. Then an office girding is considered for the dimension and monitoring. Shifeng Fang [6] proposed a system in which a intertwined system is given where Internet of effects is combined

with numerous effects like Pall computing, Remote seeing information, data from GPS, Civilians from multiple detectors. This fashion gives the future for colorful terrain covering ways. Mario Molinara et al [7] has given a thin layered Multi subcaste perception along eith the CNN and LSTM for attesting the MLP data. About 75 delicacy is attained for IOT grounded air quality monitoring. An Sensiplus API used for getting the detector data, Preprocessing is done using a EMA filtering and normalization and also classified using MLP, CNN, LSTM. Baowei Wang [8] has proposed a double subcaste Intermittent neural network. This network is a superior model of LSTM. It has three layers 1. Operation subcaste, 2. Network subcaste, 3. Perceptron subcaste. The third layers gets the detector data. Alternate subcaste is to transfer information from perceptron subcaste to internet to reach the operation subcaste. Operation subcaste is for real time monitoring of data and for early warning of measured data. AhmadF. Subahi et al [9] proposed a system for veritably high temperature terrain where Petri Nets is used to cover the terrain for countries like Saudi Arabia. Energy effective system for handling the IOT data has been developed for covering crop growth rate,etc. his systems measures temperature, energy consumption and the data are representedgraphically.Saba Ameer et al [10] has given comparison between different ways involved. Quadruple layers involved are as follows similarly for collection of data, Air adulterants data are gathered from different sources with multitudinous preprocessing and filtration of data. Next the collected data are transferred or communicated to the layers with communication technologies. The real time data can be reused with this layers; calculating styles like FOG is important helpful in reduction of quiescence. The collected data are stored and anatomized with vaticination analysis and pattern analysis. The factual bias are connected with this final operation subcaste to get data in the form of maps and reports along with statistics. Decision tree algorithm, Random timber algorithm, Retrogression grounded algorithms are used then for bracket. Mean Absolute Error MAE and Root Mean Square Error RMSE are estimated for metropolises of Beijing, Shanghai, Shenyang, Guangzhou, and Chengdu. Decision Tree Regression is simple to apply. Random Forest retrogression lowers the befitting problem like overfitting.E.Gambi et al [11] has given a paper which exhibits the plausibility of the acknowledgment of day by day life exercises in AAL, helped out through a frame grounded on the characterization cycle of the information produced by a bunch of financial gas detectors. The model considers acknowledgment of 4 distinct situations ordinary circumstance, feast readiness, bank presence, cleaning. A k-NN AI computation is applied to nonstop dataset to anticipate current circumstance on the premise of recorded information (classificatory information). Framework fineness is over 96, in this way permitting to

distinguish with high delicacy every one of the study about exercises, including a implicit dangerous circumstance. The proposed frame is flexible and, posterior to having meetly prepared the classifier, it tends to be applied to any climate, on account of the joined application of air detectors also, AI computations. Unborn work ought to ameliorate frame capacity to distinguish a analogous action anyhow of whether it's performed in an alternate manner or in an alternate room, still this infers the application of a bigger preparing set. A farther exertion should be possible to essay to prevision at least two circumstances that are acted in commodity analogous room contemporaneously. Action acknowledgment should insure individualities protection by plan, by exercising verification and secure correspondence between detectors, IoT stage and end customer contrivance. In the conventional system, further number of detectors is incorporated in the room or assiduity area which monitors the air quality position. In this system pollution/ poisonous situations are increases the system automatically will give the exigency alarm. This system isn't suitable for all regions and there's no remedial action accepted by the system by itself. International Journal of Modern Agriculture, Volume 10,No. 2, 2021 ISSN 2305-7246

3. Proposed Method

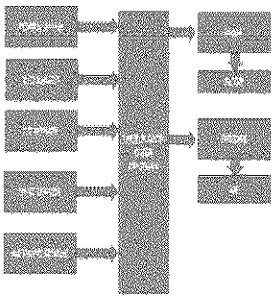
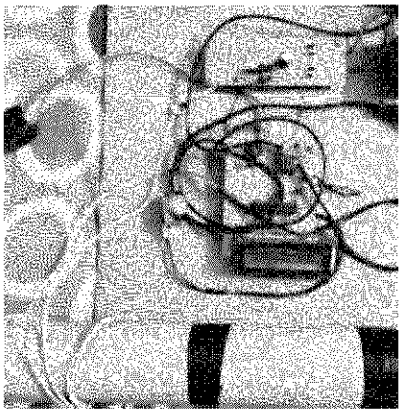


Fig1.1 Block Diagram of the Prosed Method

In this method, System is monitoring the carbon dioxide, dust and Methane gases. If these sensors crossing the threshold level human will face the central nervous system damage and respiratory deterioration in humans and other breathing creatures and also these gases will create heart damages and etc. In this technology world, air monitoring plays a vital role in the industrial sector as well as home. Developed model system uses the Sensors to detect the gas level of the environment. Sensed signals from the sensors are fed into the microcontroller and for the each gas, threshold levels are fixed and sensed data are stored in the cloud. When the gas level crossing the threshold level, the alarm will provide to the concern person to alert the employees. Gas sensors play a role which detects the gas level in the atmosphere. The sensor generates a corresponding potential difference based on the gas concentration by adjusting the

resistance of the material within the sensor, which can be calculated as output voltage. The form and concentration of the gas can be calculated using this voltage value. By finding this voltage value, system can monitor and estimate gas level in the environment. If Methane levels above a certain threshold will reduce the amount of oxygen available for breathing. Mood swings, slurred speech, vision disturbances, memory loss, nausea, vomiting, facial flushing, and headaches are all possible side effects. Changes in breathing and heart rate, as well as balance issues, numbness, and unconsciousness, can occur in serious cases. For methane, 50,000ppm ie.5% of mixing in air is dangerous level and it makes very immediate effect to life and death. The level of gas in the air is sensed by the sensors; Alert can send in case of any abnormality when sensed value are crossed the threshold level. The system continuously monitors the environment using the gas sensors and sensed value fed into the microcontroller.ESP8266 can fetch data and loaded into the Internet of things. In case of any abnormality find in the location, Alert message will reach the person through the module. The prototype module monitors the carbon monoxide, Methane Sensor and Dust of the location.

Fig1.2 Prototype Module



4. Results and Conclusion

We developed, installed, and tested a low-cost, high-fidelity air quality monitoring system. For the each moment, System will gather the data and it will be transmit through Wi-Fi and notification will reach the staff while the threshold level is exceeded. The system will fulfill a significant humanitarian need by tracking the quality of air that kids breathe near schools and playgrounds, in factories or high-traffic areas where emissions are not adaptable level and impact a large number of human, in developing countries and in places where air quality is poor and poses a health risk by alerting people to Unhealthy levels of these sensed pollutants. This prototype can implement in hospitals and research lab air concentration control

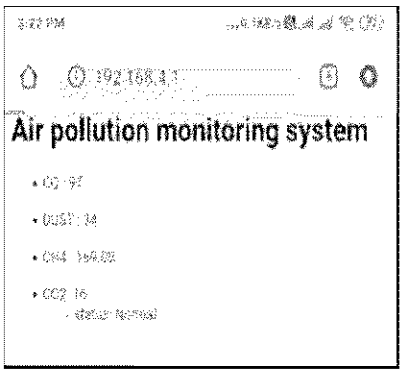


Fig 1.3 Results of Air pollution Report

5. Acknowledgment

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6. References

1. S. Ali,T. Glass,B. Parr,J. Potgieter andF. Alam," Low Cost Sensor With IoT LoRaWAN Connectivity and Machine Learning- Grounded Estimation for Air Pollution Monitoring,"in IEEE Deals on Instrumentation and Measurement,vol. 70,pp. 1-11, 2021, Artno. 5500511, doi10.1109/ TIM.2020.3034109.
2. J. Huang etal.,"A Crowdsource- Grounded Seeing System for Monitoring Fine-Grained Air Quality in Urban Surroundings,"in IEEE Internet of Effects Journal,vol. 6,no. 2,pp. 3240-3247, April 2019, doi10.1109/ JIOT.2018.2881240.
3. C. Santos,J.A. Jiménez andF. Espinosa," Effect of Event- Grounded Seeing on IoT Node Power Efficiency. Case Study Air Quality Monitoring in Smart Metropolises,"in IEEE Access,vol. 7,pp. 132577-132586, 2019, doi10.1109/ ACCESS.2019.2941371.
4. K. Zheng,S. Zhao,Z. Yang,X. Xiong andW. Xiang," Design and Perpetration of LPWA-Based Air Quality Monitoring System,"in IEEE Access,vol. 4,pp.
5. L. Zhao,W. Wu andS. Li," Design and Perpetration of an IoT- Grounded Inner Air Quality Sensor With Multiple Communication Interfaces,"in IEEE Internet of Effects Journal,vol. 6,no. 6,pp. 96219632,Dec. 2019, doi10.1109/ JIOT.2019.2930191.
6. S. Fang etal.,"An Integrated System for Regional Environmental Monitoring and Management Grounded on Internet of Effects,"in IEEE Deals on Industrial Informatics,vol. 10,no. 2,pp. 1596-1605,.
7. M. Molinara,M. Ferdinandi,G. Cerro,L. Ferrigno andE. Massera,"An End to End Inner Air Monitoring System Grounded on Machine Literacy and SENSIPLUS

Platform,"in IEEE Access,vol. 8,pp. 72204-72215, 2020, doi10.1109/ ACCESS.2020.2987756.

8. B. Wang,W. Kong,H. Guan andN.N. Xiong," Air Quality Vaticinating Grounded on Gated Intermittent Long Short Term Memory Model in Internet
9. F. Subahi andK.E. Bouazza,"An Intelligent IoT- Grounded System Design for Controlling and Monitoring Greenhouse Temperature,"in IEEE Access,vol. 8,pp. 125488-125500, 2020, doi
10. 1109/ ACCESS.2020.3007955. 10.S. Ameer etal.," Relative Analysis of Machine Learning Ways for Predicting Air Quality in Smart Metropolises,"in IEEE Access,vol. 7,pp. 128325-128338, 2019, doi10.1109/ ACCESS.2019.2925082. International Journal of Modern Agriculture, Volume 10,No. 2, 2021 ISSN2305-72463089
11. E. Gambi, G. Temperini,R. Galassi, L. Senigagliesi andA. De Santis,"ADL Recognition Through Machine Learning Algorithms on IoT Air Quality Sensor Dataset,"in IEEE Sensors Journal,vol. 20,no. 22,pp. 13562-13570, 15Nov. 15, 2020, doi10.1109/ JSEN.2020.3005642.
12. Meivel,S., Maheswari,S. Remote Seeing Analysis of Agricultural Drone. J Indian Soc Remote Sens 49, 689 – 701 (2021). https//doi.org/10.1007/s12524-020-01244-y.
13. Meivel,S., & Maheswari,S. (2020). Optimization of Agricultural Smart System using Remote Sensible NDVI and NIR Thermal Image Analysis Ways. 2020 International Conference for Emerging Technology (INCET). doi10.1109/ incet49848.2020.9154185
14. S. Meivel,S. Maheswari, Standard Agricultural Drone Data Analytics using KNN Algorithm, Volume 82, Runner Number 206-215 Publication Issue January-February 2020.
15. Mariselvam,V., Meivel,S., Sivadharsini,M. Micro machined multilayered miniaturized sludge, International Journal of Recent Technology and Engineering, 2019, 7 (6),pp. 546 – 547
16. Sridevi Annathurai,., Chidambaram,S., Baskaran,B., & Prasanna Venkatesan,G.K.D. (2018). Green Synthesis and Electrical Parcels of p-CuO/ n-ZnO Heterojunction Diodes. Journal of Inorganic and Organometallic Polymers and Accoutrements. doi10.1007/ s10904-018-1026-1

23. InLife: Combining Real Life with Serious Games using IoT

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Abstract

In the past years, gaming has increased the attention, targeting a variety and category of people including children, students, youngsters and employers and even people above the age group of 40 years. In addition, great progress has been observed in the Internet-of-Things (IoT) triggering various researchers' interest. here in this paper, we present the CORE integrational architecture and a game used in cases that are both implemented by the InLife project to drive new learning or simulations. InLife is European funded project that focuses on an innovative gaming frame network aiming for typical and additionally as special educational well as social inclusion activities based on the title Serious Games. Its core concept leverages on the potential of the IoT paradigm as it links closely actions, decisions and events happening with respect to real-life with in-game educational progress and modern gaming technologies. This bridge strengthens its infusion of gaming into non-leisure contexts, boosting at the same time the creation of new educational method as well as a new business opportunity

Keywords: Gaming, Sensors, Serious Games

I. Introduction

Games are changing the way people learn, helping them suppose else, and stimulating new ways within which people of all ages can use their minds. From empirical studies, Serious Games have proved to be effective in changing dopehead actions models in real life (1). Research is showing that games constitute a more interactive and participatory way to enable people of all ages more understand nearly anything – from a assignment to the dramatic change a alluvion can have on a particular community. They're crescively used whether in formal education or event, and also for vocational education. One can use a " virtual world" as a safe terrain to try out certain geste and train respectively that geste until the stylish approach to reach a certain ideal has been learned. Simulation serious games have been extensively used in

multitudinous different fields, indeed in military or medical environments in order to train the geste of learners in specific situations (2).

The realisation of the implicit benefits of serious gaming when used as educational tools in a sound pedagogical or social inclusion framework has recently started to be appreciated by the traditional computer gaming diligence, now eager to fan out into new request parts (3). Clearly, there has been a significant increase in exertion within the exploration community but also within the enterprise sectors, with a large number of companies starting to crop in serious game request.

Indicatively, the serious games assiduity was valued at slightly further than$2.5 billion in 2015, and is anticipated to more than double, reaching nearly$5.5 billion by 2020 (4). Still, any company targeting the development of non-leisure games faces significant practical and pedagogical challenges. The most critical issue is that the modular tools presently available to the gaming assiduity are nearly simply grounded around rest- grounded gaming and don't support, or can't be fluently integrated, into educational surrounds. Simultaneously, acclimatizing serious games to specific literacy objects poses a challenge for preceptors, as being serious games generally don't allow easy adaption of the content to the educators' enjoy purposes.

In the frame of InLife, the focus is to grease the integration of real- world information into the game world and validate how this approach helps towards creating immersive, pervasive serious games which will have a big impact in their intended educational character effectiveness. This will be examined on the base of the achievement of a gamification platform and the accompanied development of serious games, in which druggies can progress by completing specific tasks in real life, similar as switching off a lightweight when leaving a space or cooperate with other persons in simple conduct, granted monitoring structure by sensitive bias enforcing the Internet-of- Effects (IoT) paradigm. InLife defines a hierarchical, multidisciplinary design approach (Fig. 1), bringing together research and applied moxie from several scientific fields, including gamification, pedagogical and sociological approaches, multimedia, computer graphics, mortal computer interaction for furnishing a comprehensive pervasive gamification development and integration atmosphere.

InLife plans to develop, pilot, analyze, and illustrate an innovative, event-driven serious gaming architecture for educational and social inclusion objectives that directly relates in-game success and user experience to educational and social inclusion objectives. InLife aims to create, prototype, verify, and showcase a revolutionary, event-driven serious gaming architecture for educational and social inclusion goals that directly relates in-game success and

user experience to educational and social inclusiveness goals. Genuine activities and decisions which can be monitored via a Network ecosystem. Serious gaming will be linked directly to the real world, which is the primary originality of the emerging phenomenon. Real-life actions will be identified by analysing data from smart surroundings (smart metering and smart sensor installations), trying to bridge the gap between the emerging IoT world and gamified virtual worlds on only one hand, and enabling a wide range of educational, motivational, and social integration applications on another.

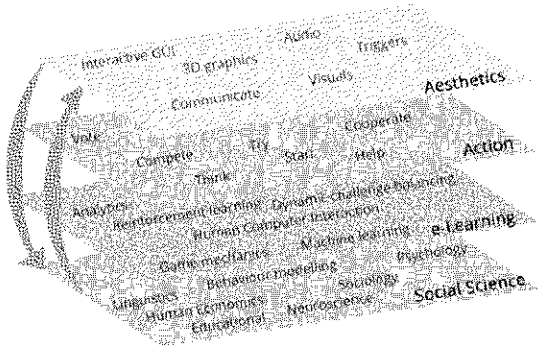


Fig. 1. InLife in a Nutshell

It is critical to underscore that the InLife architecture will be open and reusable, permitting other parties to develop and/or configure their own "in-life" serious games without having to start from scratch. As a by-product of its achievements, the project will enable an ecosystem of InLife-based serious games and solutions, ultimately compounding the initial equity investment effectiveness.

The next sections provide us with a high-level understanding of the system components, even though a detailed description of the technical components is well beyond the scope of this project. The remaining parts of this document are organised as follows: The associated work is reviewed in Section II. We analyse the structure of the proposed in Section III, and we offer a use case Serious Game that was developed in Section IV. Finally, Section V draws the paper to a conclusion.

II. State of the Art

The Future Network and the Internet - Of - things, sensor networks, particularly leveraging secure networks, networking sites, gaming, and serious game production are just a several of the areas in which the InLife system intersects with research and industrial applications. We go over these topics in more depth in the sub-sections that follows.

A. Social Media and Gamification in the context of INLIFE

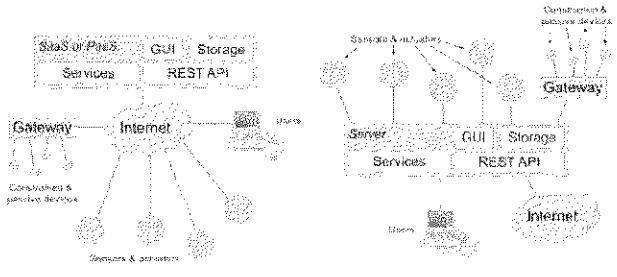
Social media, especially online social networks, does have a tremendous impact on people's lives. The most popular social media platforms are Facebook [5] and Twitter [6], but other types of social media are getting popular, concentrating on a variety of subjects such like reviews and ratings, blog and conversation, geolocation, DIY, forums, and professional networking. This enhances the playing experience of users and contributes to the overall success of a game.

Taking into consideration the player's amount of engagement in a social network (such as counting shares, likes, friends, contributions, and so on) and enabling progress only if a checkpoint has been reached is an example of integrating social media in a serious game. In an educational serious game, for illustration, the player might be prompted to complete a task and then upload a video to YouTube, where it can be viewed by other players. The game engine could check that the user has uploaded a video to their account and that it has gotten enough views to consider the mission accomplished and award the proper reward.

In the perspective of InLife, social media is playing a far greater role. InLife enables for a stronger integration of social media into gaming, considering it as something more than a way of broadcasting game results, but also a source of information and a big component determining the game's progress. This theory is based on the concept that social networks are inherently collaborative and can thus play a significant function in games that prioritize user involvement. The InLife framework will make it simple to create games that are closely linked to social media, allowing these concepts to be fully implemented.

B. Internet of Things (IoT) Management and Control

One of the major design decisions that impacts usability and management when constructing an Implementation framework is whether the platform should be regional or cloud-enabled. Figure 2 [7] illustrates these two ways.



(a) Cloud-based platform (b) Local platform

Fig. 2. Typical IoT Platform Architectures [7]

Wireless sensor networks act as a foundation for the IoT layer in the InLife concept. Because sensors are such a vital part of the overall system, it's essential that sensor measurements be transmitted utilizing flexible, tried-and-true techniques. Zigbee [8] and Bluetooth Low Energy [9] are two of the most commonly used wireless connectivity technologies in this environment.

Sensors provide the necessary inputs to the system, that can be used to detect or confirm events that users having manually entered by the user, guaranteeing that users are treated with respect. This definition suggests a complete connection of subscriber data and sensor-based data. A simple example would be a preschool where the teacher requests that the children do not make noise disturbance. Wireless sensors placed all through the facility might analyze the children's sound levels as well as provide constructive feedback to them and the teacher in a game-like manner. . This technique of enforcing desirable action would be not only effective, but also entertaining for children who might come together to produce a common goal. The current state of IoT research and technology provides a strong basis for InLife to develop on, allowing us to create significant value-added service for IoT platforms

C. Using Serious Game Concepts to Influence behaviour Change

Gaming started as a form of children's programming. Children's games have been extensively considered an important part of the development of one's temperament, social skills, knowledge, and other characteristics throughout antiquity. Playing games, on either hand, has not always been considered an education program, and then was mainly aimed at kids rather than grownups or adults. This has changed recently, with the emergence of the concept of "serious games." Serious games started as a philosophy concentrated on [10] education by research and study, with entertainment serving as a secondary objective. Board games and boardgames are two examples of serious games that preceded the development of videogames.

Finding the right proportions among efficacy and pleasure is among the most difficult challenges in serious developing games. A game of this type should be effective in developing players' skills, knowledge, and competencies while also providing an acceptable but not excessive quantity of reward. The effectiveness of such games has been established [11] in the realms of industrial and military role-playing training matches, and they have only recently established the educational realm. Serious games' instructional performance depends on a set of fundamental and inherent attributes, they are quite well, highly stimulating, have a well set of rules that all members embrace, among other characteristics. Of course, the gameplay is one of the most important aspects of serious games, since it is what keeps the players interested. As

a consequence, it should be able to adjust to each game's interest and time spent playing the game, supplying the sufficient incentives, much like a proper game. The relevance of game design is addressed more below.

Applied behaviour analysis (ABA), often known as behaviour modification, refers to experimentally derived approaches for influencing the incidence or frequency of certain behaviours. The study of behaviour modification dates back to 1911, when E. Thorndike's article Provisional Laws of Acquired Behaviour referenced "changing behaviour" several times. J. Wolpe [12] coined this phrase to define psychotherapy procedures gained from empirical study in the 1940s and 1950s. Increasing behavioural responses through reinforcement and suppressing inappropriate behaviours through methods such as extinction, punishment, or satiation are common methods employed in behavioral interventions, with reinforcement measures given precedence.

In contrast to behavioral interventions, typically involves enforcing or eliminating stimuli to change behavior, gamification aims to achieve the same goal by generating an entertaining and engaging experience using game or contest features [13]. According to [14], gamification has four primary attributes that contribute to its acceptance: increasing client satisfaction, optimism, social interaction facilitation, and meaning providing. In this manner, gamification connects behavioral or habit change to pleasant feelings input, as opposed to the traditional behaviour modification techniques (such as penalty). InLife utilizes gaming as a "technology" to create enjoyable experiences while accomplishing deep personal, social, or companies face today. To create entertaining and pleasant experience, gamification commonly involves game elements such as a leader board, rankings, and points system. Additionally, InLife communicator artificial intelligence algorithms based on ant-colony optimization to adjust the rewards for players based on their actions.

III. Generic Concept Architecture

InLife introduces a comprehensive integration and development framework that incorporates all of the ICT tools and services needed to create, mimic, and evaluate interactive serious games and formal learning systems. InLife aspires to have an event-driven framework in which serious game development is intimately correlated to operating performance and conditions. To achieve this, it presses in the following steps:

- Utilizing IoT technology, depend on a reliable, modular, and flexible IoT platform that can provide bi-directional connection among gameplay operations and the immediate real-space.

- Integrate data analytics, artificial intelligence and automation mechanisms, able to closely follow and analyse behavioural improvement and learning progress for each individual player and make decisions about triggering special learning actions when necessary.
- Realize – Creating a reconfigurable, flexible, and open architectural style that really can I integrate Important Games into the a variety of educational, learning, and social integration contexts with without or relatively low external intervention, and ii) operate under several different logics by adjusting critical serious game parameters, such as those on audio/visual assistance, recording and analysing players' communication trails, and forming on-the-fly finalisation groupings of gamers for special uses.

The IoT-based Data Structural Element, that also establishes interaction with smart devices and takes around data acquisition and adjustment, and the Gamified Layer, which includes InLife's service delivery and gamification regulate, are the two major layer upon layer of a InLife architecture, as seen in Fig. 3. After being identified by the IoT platform, trainees may access and enjoy Serious Games through their portable smart devices, including such mobile phones and tablets, in InLife.

The two major levels of InLife's open framework are thoroughly described in the following two subsections, both in level of technical and operational characteristics.

A. IoT-based and Data-Adaptation Layer

InLife's data aggregation is based on an open and adaptable IoT Platform that allows for registration, communication, data flow, and smart device administration while also providing the fundamental IoT infrastructure and services. To support Gamification Layer applications, the IoT platform integrates both vertical and horizontal operations. InLife's IoT platform allows for the secure connecting of a wide range of heterogeneous sensing and actuating devices with varying restrictions and capabilities. This involves interactions with hardware infrastructure, such as smart metre, smart plug, and sensor control. The acquired data will track people's or objects' mobility, lighting, temperature, room occupancy, pressure applied to items/surfaces, location/acceleration measures, and interactions with smart objects, among other things. The IoT platform's distributed message queue-based design provides the essential scalability for connecting and collecting metering data from a large number of deployed metres. It also uses cloudification, service discovery, and advanced data chain technologies to design reliable data adaption and flexible data management mechanisms that allow subsystems of the Gamification Layer to use powerful administrative tools. InLife's

design is also built to accommodate a variety of communication protocols (mainly IEEEbased such as WiFi and ZigBee, etc.).

B. Gamification Layer

Gamification Layer is in charge of monitoring and controlling Serious Game evolution and player progress timelines by integrating the InLife open framework's developed ICT-enabled automation and modelling components and services in a smooth and interoperable manner. It is designed in a modular format, with the following core blocks and their respective roles and functionalities:

Context Information Modelling: The first step in demonstrating a successful Serious Game is to create a thorough context design that encompasses all features of the (IoT-enabled) smart environment in which the educational or social inclusion activity takes place. Context information modelling (CIM) tries to identify the stable and important entities in the educational/social inclusion ecosystem, as well as how each one contributes to the broader educational goals. It also outlines the specific variations and degrees of freedom allowed for each entity or portion, as well as the qualitative and quantitative relationships between them *Game logic engine*: In Serious Games, this engine is responsible for the development and integration of modules that aren't normally connected with computer gaming but are critical in non-leisure gaming scenarios. Modules that allow linking the physical and digital worlds, interactive instructional narratives, neurostimulation to enhance learning, and the incorporation of haptic feedback into the learning experience, among other things, are included. The game logic engine's ultimate goal is to define a variety of different game structure and logic possibilities.

Serious Game Analytics combines artificial intelligence and advanced analytics techniques to better understand in-game player behaviour and assess overall Serious Game commercial success. The major purpose is to deliver advanced game analytics while maintaining functional consistency, data transparency, and concealing any issues with heterogeneity. By using successful classification, feature extraction, clustering, and time-series analysis to the obtained data and uncovering hidden correlations and inherent interdependencies, the framework is able to develop and integrate comprehensive behavioural models for (group of) trainees. The goal is to provide a better and more effective gaming environment for (group of) players by recommending both in-game adjustments and real-life actions based on the player's skills, response level in set challenges/goals, and learning process style, using these models and regression and extrapolation techniques. Apart from player-centric analytics, Serious Games Analytics will provide (actionable) insights on critical KPIs

and well-defined metrics that define Serious Game success, as a useful tool for all stakeholders to drive specific strategies/policies that improve their effectiveness, and to (re)train or remediate playlearners for performance improvement.

Game Rewards Fine-tuning satisfies two primary needs: first, the serious game's requirement to optimise its reward scheme in order to maximise its effectiveness, and second, the player's demand for information to help him or her orient, achieve goals, and solve difficulties. Individualized (per player) input about a player's progress, evolution, and state is provided via Serious Game Analytics and three separate feedback techniques. The trainee will receive reflections on what has been learned so far during game play through intermittent and immediate feedback during the learning process. It is an important part of engagement that drives player motivation as well as providing guidance and aid when needed. Text and texture objects, which are based on serious games' Graphical User Interfaces (GUIs), are easy techniques for providing this form of feedback. Another type of feedback is the evaluation and measurement of overall progress, which tells players about their overall level of performance and allows them to compare it to that of other (groups of) players, for example by displaying score tables, leaderboards, and so on. Finally, competitions and awards will be used in the third mechanism to boost learner motivation and replayability.

Multi-language support, which allows users to change languages quickly and simply, as well as add additional languages to the user interface, in order to increase the range of possible customers from other nations (also especially useful when addressing children of small ages).

The push notifications module is in charge of sending out asynchronous push messages to trainees, marking the arrival of new milestones or the completion of existing milestones. In the serious game, it may also be feasible to display the achievements of peers / competitors.

The Social Media module is in charge of enabling interaction between the Serious Game world and social media. As a result, this module creates a link that allows information from the Serious Game to be uploaded to social media (e.g. leaderboards, reports, or rewards), with the possibility of making this link bidirectional in the future (after the project is completed) and transferring actions captured from players' profiles in social media, public profiles, or local news aggregators into the Serious Game in a context-aware manner.

The InLife Native Plugins module defines Unity code libraries that are executed during the construction of Serious Games, allowing developers to incorporate specialised platform middleware libraries or have access to context-specific features and properties.

It's worth noting that InLife's open APIs allow third-party developers to construct and/or configure their own 'in-life based' serious games without having to start from the ground up.

IV. Use Case - Serious Game

The ICEBERG serious game, which was created as a first use case scenario in InLife, is shown in this section. ICEBERG is a blend of an online RPG and a strategic game that takes place on Earth, but in the vanished land of ice. Yetis are the most common animals found there, however there are also penguins, polar bears, albatrosses, and whales. Each player has their own Yeti to interact with in the ice world, as well as a "ICEBERG," which is the Yeti's home. In ICEBERG, there are many different types of resources. The ice blocks created by penguins are the most important of them. This manufacturing rate per penguin will be adjustable. It will also be possible to gain access to numerous technologies and materials in order to construct structures on the "ICEBERG's" available space. The graphical user interface of ICEBERG is depicted in the screenshot below.

Fig. 4 ICEBERG Game Interface

When you behave in an environmentally friendly and energy-efficient manner, as suggested by the ICEBERG game, the size of your ICEBERG expands in the virtual world, and you gain more friends, such as penguins, polar bears, albatrosses, and whales, who visit your ICEBERG and are willing to assist you. Penguins, for example, can make ice blocks, polar bears can build bridges and structures, and so on. When you fulfil a specified assignment or meet a deadline, a polar bear may become your friend. Other animal buddies will have similar settings as well. On the other hand, if the user's behaviour is the polar opposite of what is expected, this can be portrayed in the virtual environment as well, for example, the ICEBERG may begin to melt, some penguins may become dissatisfied and depart, and so on.

ICEBERGs can also be joined if a series of guidelines are followed. Individual players, rooms (offices), floors, and buildings will all be supported in a hierarchical classification of the ICEBERGs; for example, a room-level ICEBERG indicates the joining of all participants in the

same office room. It is only possible to join ICEBERGs of the same level. The formation of such groupings, i.e. local communities, is believed to be a particularly useful element for maintaining high levels of interest in the game among those who are involved. Furthermore, because in the virtual world, etc., linking ICEBERGs at the floor level might be done for faraway buildings as well, , distance isn't an issue. In order to build a bridge, joining will be implemented as a gaming technique that requires time and resources, such as ice blocks. This can be used to keep players focused on a target for at least a short length of time, which is vital because new behaviour requires time (usually a minimum of three (3) weeks) and repetition to become established.

The concept of a gameplay that is directly linked to the real world is central to ICEBERG. Specific acts in real life will be the primary means of obtaining the necessary resources (animal pals, ice blocks, greater "ICEBERG" surface, and so on) for growth within the game.

The following is a longer list of user behaviours that are of interest to InLife and can be rewarded, either adversely or positively:

- Turn off the lights when leaving an empty room behind.
- Shut down the computer and other devices when they are not necessary.
- Use the stairs instead of the elevator, especially when going down.
- Close the windows when leaving the office, especially when heating or air-conditioning is required.
- Misuse the window shutters or blinds, by having them closed in a sunny winter day or open in a hot summer day, making the heating or cooling of the room more difficult.
- Select a room temperature as close to the external one as possible for heating or air-conditioning.
- Excessively use paper for printing.
- Throw paper, glass or plastic material to the regular bin instead of the recycle bin.
- Use of optical disks instead of a network to transfer data or instead of a cloud service to store data.
- Leaving the coffee machine always on, even if there is very little quantity of coffee inside.
- Borrow an e-book and not a paper book.

The ICEBERG game has been released as a beta version on Google Play (Fig. 4), which is only available to registered testers [15]. Following the completion of the planned trials, the final version will be made available to all users via Google Play.

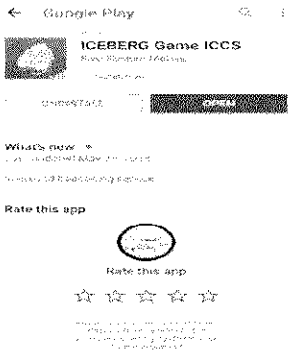


Fig. 4 ICEBERG game in Google Play

V. Conclusions

To recapitulate, the work discussed in this paper was done as part of the InLife project, which focuses on combining IoT technologies with Serious Games. A serious game use case was shown, as well as the core architecture. The implementation of the InLife vision will pave the way for the proliferation of new innovative IoT-based serious games, including those made by third parties, with increased gameplay and educational efficacy, resulting in new business opportunities for all stakeholders involved.

VI. Acknowledgment

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VII. References

1. R. Z. Enciso, "Simulation games a learning tool", Proc. Int. Simulation and Gaming Assoc. Conf., 2001-Sep , pp. 1-13.
2. D. Schmorrow, and D. Nicholson D, "Advances in Cross-Cultural Decision Making," CRC Press, 2010, pp. 77–86.
3. J. Stewart, et. al. "The potential of digital games for empowerment and social inclusion of groups at risk of social and economic exclusion: evidence and opportunity for policy," European Commission, Joint Research Centre, Institute for prospective Technological Studies, 2013.
4. Rohan, "Serious Game Market worth $5,448.82 Million by 2020,"
5. MarketsAndMarkets, Available online:

6. http://www.marketsandmarkets.com/PressReleases/serious-game.asp (accessed April 2016).
7. Facebook: https://www.facebook.com
8. Twitter: https://twitter.com
9. J. Mineraud, O. Mazhelis, X. Su, and S. Tarkoma, "A gap analysis of Internet-of-Things platforms," Computer Communications, vol. 89, pp. 5-16, 2016.
10. ZigBee Alliance. Available online: http://www.zigbee.org/ (accessed April 2016).
11. Bluetooth Low Energy. Available online: https://www.bluetooth.com/what-is-bluetoothtechnology/ bluetoothtechnology-basics/low-energy (accessed April 2016).
12. C. Abt, Serious Games. New York: The Viking Press, 1970.
13. P. Pivec , "Game-based learning or game-based teaching?," Technical report, BECTA UK, 2009.
14. J. Wolpe, "Psychotherapy by reciprocal inhibition," Integratice Physiological and Behavioral Science, vol. 3(4), 1968, pp. 234-240.
15. M. Petkov, and G.E. Rogers, "Using Gaming to Motivate Today's Technology-Dependent Students," Journal of STEM Teacher Education, vol. 48(1), 2011, pp. 7-12.
16. Blohm, and J.M. Leimeister, "Design of IT-based enhancing services for motivational support and behavioral change," Business & Information Systems Engineering, 2013, pp. 275-278.

24. Small Anti Theft System using IoT

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Abstract

The proposed research methodology aims to design a generally implementable structure for furnishing a house owner/ member with the immediate notice of an ongoing theft (Unauthorized access to their premises). For this purpose, a rigorous analysis of existing systems. Was accepted to identify exploration gaps. The problems start with being systems were that they can only identify the intruder after the theft, or cannot distinguish between human and non-human. objects. Wireless Sensors Networks (WSNs) combined with the application of Internet of Things (IoT) and Cognitive Internet of Things are expanding smart home concepts and results, and them operations. This exploration proposes a fully unique smart home Anti-theft system which will descry an intruder, albeit they need incompletely/ completely hidden their face using clothing, leather, fiber, or plastic materials. The proposed system also can determine an intruder within the dark employing a CCTV camera without night vision capability. The fundamental idea was to term an economical and efficient system for an individual to be ready to detect any relatively theft in real- time and force moment announcement of the theft to the house proprietor. The system also promises to apply home security with large videotape.

Keywords- smart anti-theft system; intruder detection; unsupervised activity monitoring; smart home; partially/fully covered faces

I. Introduction

In the era, security and surveillance are important issues. Recent acts of theft have pointed the dire need for efficient videotape surveillance and on-the- spot notice of ongoing thefts to deal with holders and other household members. A number of surveillance solutions are presently available on the request, like CCTV cameras and digital videotape reporters (DVRs) that. can record the unauthorized conditioning of a trespasser, but cannot distinguish between mortal and. non-human objects. In recent times, the rate of theft has increased highly

due to a lack of . awareness and low vacancy of smart- gadgets. The task of face detection and thus the recognition of an intruder become very difficult when the intruder hides their face incompletely or completely using some kind of material, such as plastic, leather, or fabric. The work is presented as follows. The original section provides an intro on inheritance systems, potential issues, and their impact on society. Section 2 describes the need of this research. It also describes the intelligent features of the system which will detect obscured faces using visual and planning and experimental setup of the system. It also describes two critical features (i) the detection of obscured faces and (ii) spotting of an intruder within the dark. Section 4 presents the methodologies in three different phases with graphical analysis and statistical results. the ultimate section (Section 5) discusses the research outcomes.

Figure 1 - Image of a smart building where a smart home monitoring and anti-theft system has been installed.

II. Review of Literature

Nowadays, intruders became more technologically apprehensive and have administered burglaries using smart gadgets like gas- knives, smart anti-lock systems, and lots of more. For such intruders, it's straightforward to break up CCTV camera surveillance, which has an circular connection to the digital videotape recorder and a database server residing reception. Therefore, there is a requirement to switch being systems and propose an intelligent approach which won't only provide unsupervised act monitoring but also can stop an ongoing theft by notifying the house

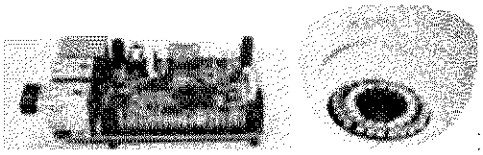

Figure 2 - CCTV / Installer

Owner at the foremost opportunity. All inheritance systems work on the premise of object detection, object movement detection, and tracking. Such systems are susceptible to false alarms or announcements, which could end in transmitting false emergency announcements to the house owner/ member, the escape of the intruder after the theft, and

unnecessary disruptions to the residents. To resolve these issues, a unknown human activity covering detection, recognition, and home security approach are presented in the remaining sections.

The overall arrangement of the sensing units is as follows. The smart home monitoring and control framework is applied on two unique levels outfit and programming. The outfit frame contains the sensor arrangements. This equipment framework is further classified into four areas body sensor setup (BSS), ambient sensor setup (ASS), crisis sensor setup (CSS), and other sensors setup (OSS). The BSS is enabled with an print sensor. A remote BSS provides observations of occupants in several physiological countries. The BSS frame incorporates physiological checking gadgets that are capable of recording the daily activities of the smart home residents without disturbing their daily routine.

The alternate outfit system, ASS, contains a temperature sensing unit, motion sensing unit, and pressure sensing unit. The CSS is provided with numerous manual drive buttons, for example, there's a fear drive- button for emergency situations like a house fire which activates security and alarm systems. The final setup, OSS, offers the employment checking and control of electrical home devices through the electrical and electronic sensing unit.

OSS also incorporates the contact sensing unit. The OSS framework is responsible of data accumulation, mining, and storage into the database server. Eventually, the server information is collected and handled by machine literacy and information mining models to deliver helpful data for website and affair action. The arrangement of the wireless seeing units is reported within the following section.

The smart home monitoring and control framework has been persistently run since May 2015 during a old-time house, constructed-in 1945.

III. Design and Experimental Setup

Nowadays, intruders became more technologically apprehensive and have administered burglaries using smart gadgets like gas- knives, smart anti-lock systems, and lots more. For such intruders, it's straightforward to break up CCTV camera surveillance, which has a circular connection to the digital videotape recorder and a database server residing in reception. Therefore, there is a requirement to switch being systems and propose an intelligent approach that won't only provide unsupervised act monitoring but also can stop an ongoing theft by notifying the house owner at the foremost opportunity. All inheritance systems work on the premise of object detection, object movement detection, and tracking. Such systems are susceptible to false alarms or announcements, which could end in transmitting false emergency announcements to the house owner/ member, the escape of the intruder after the

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The smart home monitoring and control framework has been persistently run since May 2015 during an old-time house, constructed-in 1945. The following sections detail the technical properties of the proposed system's modules.

I. Operating Module: Captures the presence of an intruder in the monitoring area at a rate of 15 frames a second, as The functioning module sends the captured frames to the identification module (M) for detection and intruder identifying after detecting the intruder.

Module 2: Identification: The identification module is engaged when an intruder enters the effective tool. (M) detects the presence of an intruder and decides whether it is human or non-human by examining several parts of the captured intruder's face with the eye and facial detection module (Me). the four submodules of a identification module (M). a. Eye and Face Detection Module: By discriminating between human and non-human items, the intruder's face is captured. If an intruder has partially covered their face, the pixel processing module identifies the brightest portion of the intruder's face or the region of interest (Mp). The

recorded pictures are sent off to the pixel processing node for further processing by the eye and face detection module. c. Motion Detection Module: If an intruder is discovered, the motion detection module identifies intruder motion by capturing an opening frame of an intruder from video at a rate of 15 frames per second and the subsequent frames at a rate of 45 frames per second. The main purpose for increasing the captured frame speed from 15 to 45 is to allow the house owner to see the captured video sequences even if the internet speed is poor. To reduce the chances of false alarms, the video is delivered to the comparison module (Mc).

d. Comparison Unit: The comparison module (Mc) separates between human and non-human things to decrease the odds of false alarms.

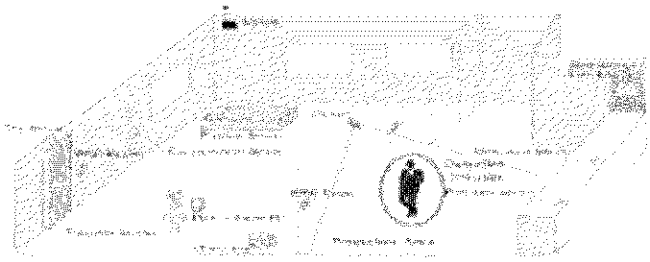

Figure: 3- Projection area of the smart home anti-theft system.

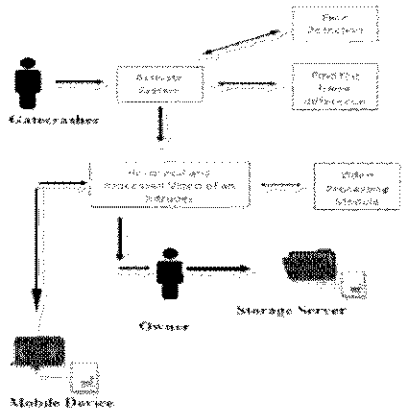

Figure 2 : Detailed workflow of the system

IV. Methodologies and Results Analysis

According to our rigorous and detailed literature survey (3 – 40), we've identified that to date, no possible solutions are available which can detect intruders with partially or completely covered faces and provide immediate announcement to the house owner to stop the ongoing theft. Furthermore, it had been also identified that the most reason why similar methodologies have not been introduced within the market is thanks to the complexity, efficiency, accuracy, and thus the time duration required to develop technical methodologies for intrusion detection with incompletely or completely covered faces. To overcome the

below challenges we have proposed a hunt methodology that aims to term a generally implementable fabric for furnishing a house owner/ member with the immediate announcement of an ongoing theft (unauthorized access to their premises). The exploration methodology was classified into three stages with corresponding results (a) primary phase; (b) secondary phase; and (c) final phase

V. Conclusion

This research paper presents an innovative system to stop smart home theft by furnishing robotic announcement of ongoing intrusion. The exploration has handed a fully unique wireless seeing system for the surveillance and discovery of a person's meddler also as instant announcement of the intrusion to stop theft. It eliminates the application of DVR for recording also because the use of huge quantities of memory for storehouse.

The system can effectively identify a person's meddler and stop false admonitions when the meddler may be anon-human, by distinguishing between human andnon human objects. All of those processes cause the moment announcement of intrusion by furnishing real- time announcement about the potential theft. The performance evaluation parameters of the Smart Home Antitheft System for meddler discovery are recorded for the four different scenarios (a) face not obscured, (b) face partially covered, (c) face fully covered, and (d) captured within the dark by an analog camera. The comparison stated that the achieved correct face discovery delicacy in scripts where a detected meddler hadn't hidden his/ her face, hidden his/ her face incompletely, completely, and was detected within the dark were97.01,84.13,78.19, and66.5, independently. the most advantage of the proposed system is that it requires only 50 costs of the DVR and other surveillance- grounded results available on the request.

The information for the caregiver also as authorized authority is uploaded to an internet point, either by the original home gateway server or pall garçon. If a meddler disables Wi-Fi__ connection using DoS attack also the proposed system will not be ready to notify the house members about the continued theft. However, the proposed system is provided with Bluetooth network, which may still record the continued theft but cannot shoot the notification to the house proprietor thanks to the shortage of WIFI/ Internet connections. New exploration challenges of security and sequestration have arisen thanks to a rise in products that connect the cyber and physical worlds. it's anticipated that these research problems are going to be added resolved within the upcoming future by fellow researchers.

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Refrences

1. Zhang, Z.; Yi, D.; Lei, Z.; Li, S.Z. Regularized Transfer Boosting for Face Detection Across Spectrum. IEEE Signal Process. Lett. 2012, 19, 131–134.
2. Alobaidi, W.H.; Aziz, I.T.; Jawad, T.; Flaih, F.M.F.; Azeez, A.T. Face detection based on probability of amplitude distribution of local binary patterns algorithm. In Proceedings of the 2018 6th International Symposium on Digital Forensic and Security (ISDFS), Antalya, Turkey, 22–25 March 2018; pp. 1–5.
3. Jian, Z.; Chao, Z.; Shunli, Z.; Tingting, L.; Weiwen, S.; Jian, J. Pre-detection and dual-dictionary sparse representation-based face recognition algorithm in non-sufficient training samples. J. Syst. Eng. Electron. 2018, 29, 196–202.
4. Ahmed, T.; Ahmed, S.; Ahmed, S.; Motiwala, M. Real-Time Intruder Detection in Surveillance Networks Using Adaptive Kernel Methods. In Proceedings of the 2010 IEEE International Conference on Communications, Cape Town, South Africa, 23–27 May 2010.
5. Yang, S.; Luo, P.; Loy, C.C.; Tang, X. Faceness Net: Face Detection through Deep Facial Part Responses. IEEE Trans. Pat. Anal. Mach. Intell. 2018, 40, 1845–1859.
6. Sepas-Moghaddam, A.; Pereira, F.; Correia, P.L. Light Field-Based Face Presentation Attack Detection: Reviewing, Benchmarking and One Step Further. IEEE Trans. Inf. Forensics Secur. 2018, 13, 1696– 1709.
7. Zhang, H.; Li, Q.; Sun, Z.; Liu, Y. Combining Data Driven and Model-Driven Methods for Robust Facial Landmark Detection. IEEE Trans. Inf. Forensics Secur. 2018, 13, 2409–2422.
8. Begelman, M.T. Identity Theft Handbook: Detection, Prevention, and Security; John Wiley & Sons: Hoboken, NJ, USA, 2015; pp. 263–276. ISBN 978-1-119-20316-2.
9. Kim, J.S.; Yom, D.H.; Joo, Y.H.; Park, J.B. Intelligent Unmanned anti-theft system using network camera. Syst. Int. J. Control Autom. Syst. 2010, 8, 967–974.
10. Jog, V.V.; Jain, D.; Arora, R.; Bhat, B. Theft prevention ATM model using dormant monitoring for transactions. In Proceedings of the 2013 IEEE Conference on Information and Communication Technologies, Azerbaijan, Baku, 23–25 October 2013.

25. Smart Home System

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Abstract

Smart home is one of the applications of IoT. Applications of IoT are increasing day by day. Rapid growth in technologies and improvements in architecture comes out many problems that how to manage and control the whole system, Security at the server, security in smart homes, etc. This paper explores the use of IoT in its fields. Smart homes are those homes where we can control home appliancesfrom anywhere. When these household devices in smart homes connect with the internet using proper network architecture and standard protocols, the whole system can be called as Smart Home in IoT environment or IoT based Smart Homes. Smart Homes helps us to simplify the task of home automation. This paper presents the problems and challenges come in IoT and Smart homes system using IoT and some solutions that would help to overcome them.

Key Words: Internet of Things (IoT), Smart Home, Radio Frequency Identification RFID

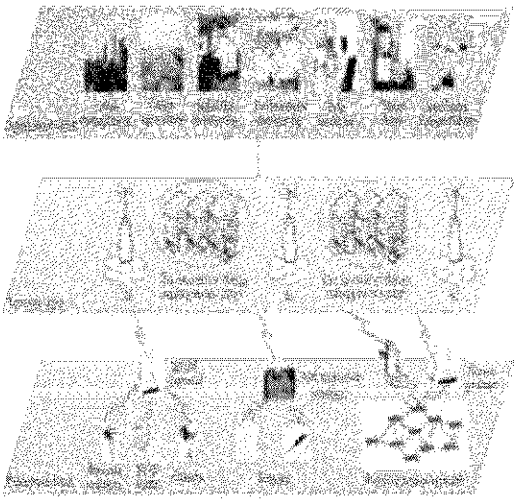
1. Introduction

Internet has changed human's life by providing anytime, anywhere connectivity with anyone and everyone. With the advancements in technologies, devices like the sensors, transmitters, receivers, etc. are now available in very cheap rate. Hence these all things can be used on a daily basis. Expansion of internet services can be done by anybody and everybody. Today's internet is becoming the Internet of Things(IoT).

Internet-of-Things: The internet where the existing network of internet to the computer systems will connect to the real world objects or things. Things may include any objects, home appliances, devices, vehicles, etc. And when these things connect to the internet in specific infrastructure via standard protocols then the whole system is said to be Internet of Things (IoT).

Things: Things may be real or virtual, moving or steady but things will be active participants in the whole system. Things will communicate with each other, called as things-to-things communication. Things communicating or interacting with human's is called as things-to-human communication.

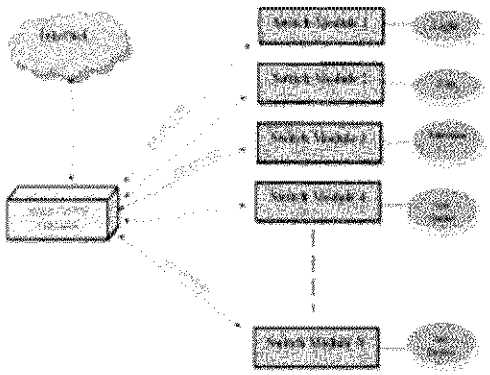
The internet of things is not just deep vision for future. It is already being used and is having an implication on more than just development in technologies. These communicating objects which used to communicate with the internet by human commands now can configure themselves independently and can operate without human disturbance. Figure 1 shows the architecture ofIoT.



Architecture of IoT

A smart home is the home that allow all the home appliances to be controlled automatically and remotely by anyone anywhere having proper access. In Smart homes user having the access can easily control all home devices through IoT Using standard protocols, home appliances connect in predefined proper network architecture. Basic idea for Smart Homes using IoT is shown in figure.

The whole system is divided into two parts: first part consists of all the home devices and RF transmitter receiver and the second part includes all the interface device, processor, data collector, GPRS module to communicate with the internet.



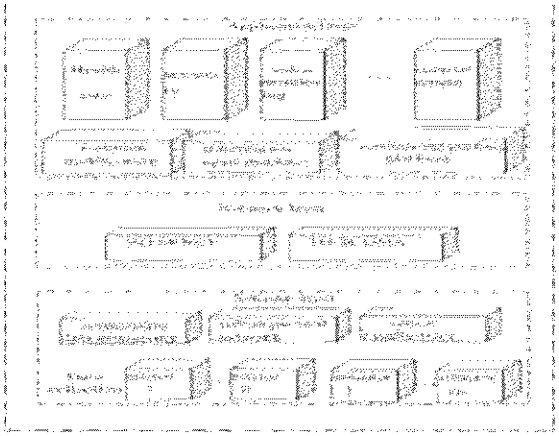
Basic idea for Smart Home System using IoT

In this paper for consideration only four households devices: Light, Fan, Television, Gas outlet are shown. But in reality user can connects number of devices. These all household devices will connect to the switch modules. Switch module may contain any type of module which changes its state as it received signal. Switch module connected to the device in such a way that when it change the state, the state of household device connects to it will also change. Relays can be used as a switch module. It is an electromagnetic device or normally called as relay switch. It isolates two circuits electrically and connects them magnetically. In basic relay there are three contactors which are normally open (NO), normally closed (NC), and common (COM). COM is normally connected to the NC. At normal condition when household devices is not in working mode then relay is on NO state. When it gets signal then it changes the state to NC and the device will get on working state [9]. Switch modules will connect to the smart central controller through RF transceiver. Each switch module will has one transceiver or one transceiver can also be connects to all switch modules. Each switch module and device will be identified by assigning a unique identity to them. One RF transceiver will connects at the smart central controller. RF modules communicate between themselves at 433MHz. 433MHZ spectrum is specially made for the RF communication. Smart central controller will act as interface device between household devices and internet server. Smart central controller will not be a single device. It will be the set of devices like microcontroller, CPLD processor, RF transceiver, GPRS or Zigbee module, etc. Microcontroller can be used as a main controller and for data processing. Data acquisition can be easily done by microcontroller hence it can be act as interface device.

2. Related Work and Methodologiesused

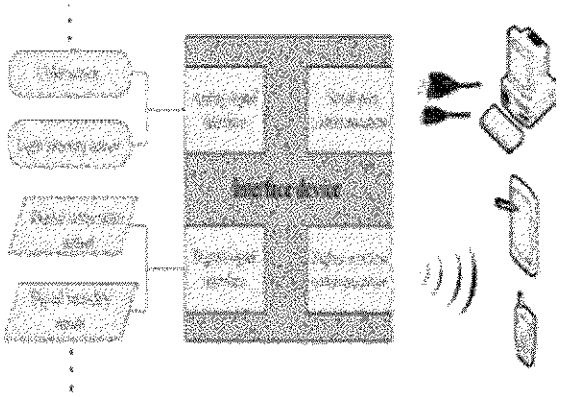
Layered architecture of the IoT-based Smart Home System is described by Kang Bing et al., in [8]. The smart home system is divided into three layers: application layer, network layer, and sensing layer. Starting from the bottom, sensing layer is responsible for data collection from all the home appliances and it sends data to the middle layer that is network layer. Network layer

usesinternet for sending data to the upper most application layer which has different applications on different level for different purposes. For data collection and data processing at the sensing layer it used microprocessor SAMSUNG S3C2440A which is a type of ARM microcontroller. To transfer the collected data to the network layer it uses Zigbee module which is based on IEEE 802.15.4 wireless standard.



Layered architecture of the IoT-based Smart Home System

A reconfigurable smart sensor interface device that integrates data collection, data processing, wired and wireless transmission together is already design for industrial Wireless Sensor Network (WSN) in IoT environment using CPLD by Qingping Chi et al., [5].

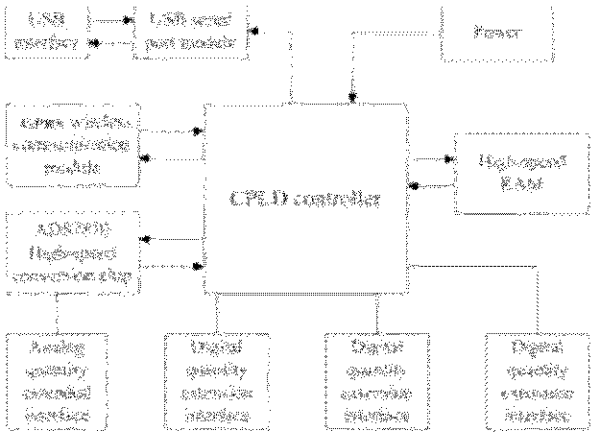


Reconfigurable Smart Sensor Interface for Industrial WSN

For industrial wireless sensor network in IoT environment the problem is regarding with the data acquisition of multi sensor nodes. If microcontroller is used as the interface device it performs a task by way of interrupt, which makes these multisensor acquisition interfaces not really parallel in collecting multisensor data though microcontroller has the advantages of low cost and low power consumption. CPLD is a complex programmable logic device. Both microcontroller and CPLD are near about same. But both have their advantagesand disadvantages.

CPLD/FPGA is used in industrial wireless sensor network. FPGA is a field programmable gate array which has unique hardware logic control; it has real time performance and synchronicity. CPLD/FPGA has more demand because of its advantages over microcontrollers. It is mostly used in wireless sensor network as interface device. CPLD/FPGA can acquire multisensor data in parallel and improves real time performance of the system . Hardware block diagram ofCPLD is shown below.

The smart home control system uses a smart central controller to set up a radio frequency 433MHz wireless sensor and actuator network (WSAN). Radio frequency modules, switch modules, control modules, etc. have been designed to control directly all kinds of appliances by Ming Wang et al., and Sarita Agrawal et al. The smart system holds the functions of appliance monitor, control and management, home security, energy statistics and analysis. RF identification used by Gaurav Tripathi et al., Ming Wang et al., and Sarita Agrawal et al., in is very useful for security purpose. This technology assigns a unique identity to each household device. So, that, each device can be uniquely identified. Range of the RF can be increased or decreased. It is easy to deploy and has low deployment cost. RFID tags take low power to operate and tags can be active or passive.



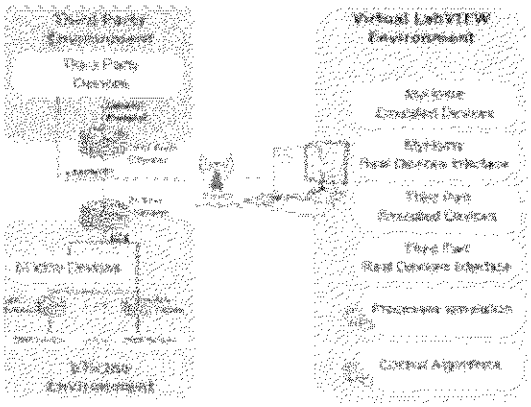
Hardware block diagram of CPLD

A FPGA based Grid Friendly Appliance (GFA) controller has been already designed by Yu-Qing Bao and Yang Li in [10]. FPGA chips are used to make the GFA controller. GFA has an advantage of used of FPGA chips that it can be used for real time applications .

To manage secure and efficient communication between human being and machines is very difficult for smart homes. Tongtong Li, Jian Ren, And Xiaochen Tang gave the architecture and design of Secure Access Gateway (SAG) for home area network which serves as the interface between remote users and managed devices . Lucio Ciabattoni, Gionata Cimini, Massimo Grisostomi, Gianluca Ippoliti and Sauro Longhi have given an interoperability framework which

is realized with the software LabVIEW and integrates a real and a virtual environment to enable vertical solutions in different and multi-functional (energy, security, comfort) domotic applications . They have been provided the complete home automation architecture together with details about the implementation of the virtual environment in.

Scheme of the developed interoperable Real/Virtual framework is shown in figure below.



Scheme of the Developed Interoperable Real/Virtual Framework

For wireless sensor network there are several nodes connected to the internet, hence the problem of security comes. The main problem in this type of network is how to establish the initial session key between the wireless sensor nodes and how to control the center. For the problem of security and issue A lightweight key establishment protocol for the smart home energy management system is proposed in by Yue Li.

M. Al-Qutayri, H. Barada, S. Al-Mehairi, and J. Nuaimi have been also made the system for control and to monitor home appliances using simple PIC Microcontroller and GSM modem. The system gives the successful output. They use mobile network to monitor and control house hold devices. Basim Hafidh, Hussein AL Osman,Juan Sebastian Arteagafalconi,Haiwai Dong, presents the simple Internet of Things enabler (SITE), a smart home solution thatallows users to specify and centrally control Internet of Things smart objects. Unlike most existing systems,SITE supports End-User Development. Hence, it defines a simple language for the specification of controlrules for smart objects. It also provides a user interface to graphically illustrate the data received from smart objects.

Every device that connects to the internet needs IP address. People are still working on IPv4 which has very low address space. As number of users increasingpeople need to move towards IPv6 which offers large address space. Vittorio Miori et al., has proposed an interesting approach of DomoNet, Which is a 'ecosystem" software created to overcome the issues of compatibility with pre- existing systems of smart home, lack of interoperability in smart home

system which is due to the fact that current market practice effectively binds consumers to proprietary technologies, thereby forcing them to purchase only devices conforming to a specific manufacturer's system to enjoy full interoperability. DomoNet has been coded using Java language and open source libraries and tools IPv6 and DomoNet link together and work together.

For better performance of system and to provide better services by the system network should have the capability of self-organization. Arjun P. Athreya et al., has proposed five key components of self-organization which are as follows :

- Neighbor discovery
- Medium access control
- Local connectivity and path establishment
- Service recovery management

Problems and Challenges

There are many problems, issues and key challenges related with the Smart Home system. It becomes difficult to handle all the applications in IoT environment as the applications of IoT are increasing rapidly. The whole system could not be more comfortable and secure if these increasing applications are not controlled with efficiency and convenience. As no special methodfor authentication is being used, this makes security less on server side. An attacker or a burglar can get access and enter the home of the victims' home and he would break the whole Smart home system. Connectivitycan also prove to be a problem that could occur. It also comes into challenge that how to achieve connectivity at any place any time. For communication towards internet 3G services are used. But it could have signal problemhence it will not connect every time. The functioning of the smart home system in IoT environment should be done in real time. RF identification is used at 433MHz. It may cause the problem of interference.

Standards: Standardization is very essential for IoT environment as it is expanding globally. Challenges are coming related which standard should be used, which will provide secure medium, how it will make system more reliable.

Identification: Identification is required for each device so that each device can identifyuniquely.

Privacy: The user's data should be confidential.

Connection should be done with providing privacy.

Authentication: Authentication is must to secure Smart Home system from an attacker. Server has to give access only authentic users.

Security: The system should able to take appropriate actions on security threats.And system should be able to reconfigure by itself afterattacks.

Integration: The main challenge with IoT is to integrate applications in IoT environment.

Coordination: Coordination is required between the globally connected objects, humans, programs, process, etc.

Data Storage: As applications of IoT are increasing, the amount of data getting collected is huge. The challenge is where to storage the huge data. Huge database can solve this problem. Artificial intelligence algorithms must be applied to extract meaning data from redundant data.

Network Self-Organization: Network structure should be created in such a way that every deviceconnected to it could self-organize them. Actually, it is network which should be able to self-organize.

Conclusions

Internet of Things has a variety of applications in many different sectors. IoT has been already designed for industrial WSN. It has been developed for Smart Homes System. This paper presents the architecture of IoT and architecture of Smart Homes using IoT. There are some problems found in IoT that are discussed in the paper. Newer technologies help in minimizing some of them. This paper makes us aware about the problems and challenges that could come in the field of IOT. New technologies and methodologies which are already used to improve applications of IoT have been discussed in this paper. RF modules are currently in used for IoT.

Possible Research Direction

IoT environment and Smart Home System has very low security at the server side. Designing of secure system can be the part of future work. Kerberos technology can beused to make the environment more secure at server side. Artificial intelligence algorithms can be made in future for making easier data extraction process from redundant data. A cloud platform can give revolutionary and potential solutions.

Ackhnowledgement

I gratefully acknowledge the support, guidance and encouragement of my Dissertation Guide Assistant Professor Aishwarya Sedamkar Maam for this Nobel work.

References

- Gaurav Tripathi, Dhananjay Singh, and Antonio J. Jara, "A survey of Internet-of-Things: Future Vision,
- Architecture, Challenges and Service", IEEE World Forum on Internet of Things (WF-IoT), 2014, pp. 287- 292
- Ming Wang, Guiqing Zhang, Chenghui Zhang, Jianbin Zhang, and Chengdong Li, "An IoT-based Appliance Control System for Smart Homes",
- FourthInternational Conference on Intelligent

- Control and Information Processing (ICICIP) June 9 – 11, 2013, pp. 744-747
- Vittorio Miori, and Dario Russo, "Domotic evolution towards the IoT", 28th International Conference on Advanced Information Networking and Applications Workshops, 2014, pp. 809-814
- Sarita Agrawal, and Manik Lal Das, "Internet of Things A Paradigm Shift of Future Internet Applications", International Conference on Current Trends in Technology, December, 2011
- Qingping Chi, Hairong Yan, Chuan Zhang, Zhibo Pang, and Li Da Xu, "A Reconfigurable Smart Sensor Interface for Industrial WSN in IoT Environment", IEEE Transactions on Industrial Informatics, vol. 10, no. 2, May 2014
- Arjun P. Athreya, and Patrick Tague, "Network Self Organization in the Internet of Things", IEEE International Workshop of Internet-of-Things Networking and Control (IoT-NC), 2013, pp. 25-33
- Moataz Soliman, Tobi Abiodun, Tarek Hamouda, Jiehan Zhou, and Chung-Horng Lung, "Smart Home: Integrating Internet of Things with Web Services and Cloud Computing", IEEE International Conference on Cloud Computing Technology and Science, 2013, pp. 317-320
- Kang Bing, Liu Fu, Yun Zhuo, and Liang Yanlei, "Design of an Internet of Things-based Smart Home System", The 2nd International Conference on Intelligent Control and Information Processing, July 2011, pp. 921-924
- Vladimir Gurevich, "Electric Relays Principles and Applications", Taylor and Francis Group, 2006, pp. 1- 52
- Yu-Qing Bao and Yang Li, "FPGA-Based Design of Grid Friendly Appliance Controller", IEEE Transactions On Smart Grid, Vol. 5, No. 2, March 2014, pp. 924-931

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