



PROCEED TO DIGITAL WORLD AS IoT: A REVOLUTION

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ABSTRACT

Internet of Things (IoT) extends the concept of a digital world into the physical world. This extension will lead the human to be more secure, comfortable and happier than before. The merger of the internet and things also influence the growth of the economy due to its numerous applications. IoT applications cover almost all aspects of human life and make the connectivity possible at anytime, anywhere and to anything in near future. Implementation of this type of connectivity opens many research challenges for the research community. This paper mainly focuses on the different domains of future IoT applications and their research challenges.

KEYWORDS : IoT, RFID, IP, WSN

1. INTRODUCTION:

Digital world revolutionizes our life styles by incorporating the things and the internet in a more organized and disciplined way. This merger had a great impact on our economy, governance, and industry in terms of efficiently utilizing the resources as well their better organization. One of the main ideas that play a big part in the revolution of the digital world is Internet of things. It was first coined by British Scientist kavin Ashton in 2019, when he was working on item identification with RFID tags in supply chain management in which all operation performed without the involvement of humans. After that many developments have been made in the IoT and it becomes an emerging field for future. By 2024 this technology will become leading technology around the world. In this paper predict that by the end of 2022 nearly 215 billion smart objects being deployed in the market. Further machine to machine traffic flow will show enamor increase in the market by 75% till 2024. It will greatly impact on the economic growth in almost all fields of life.

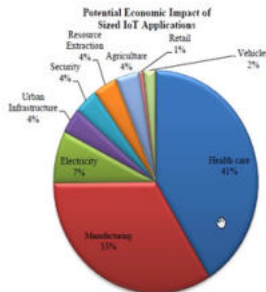


Fig.1 Projected Market share of different IoT applications domains

2. IoT APPLICATION

IoT is now become very exciting and challenging technology for applications developer due to its diverse nature which covers different aspects of life. IoT application domain not restricted to one aspect of human life like building concept as a smart building or smart homes but also dominant in other fields like health,



Fig. 2: Application domains of IoT

Agriculture, environmental monitoring, smart businesses, banking and etc. We have divided the application domain of IoT into the following domains and discuss their respective application that made human life more comfortable, easier and healthier WSN and IoT

3. IoT and WoT

IoT (Internet of Things) offers the possibility of connecting trillion of things through the Internet using a single open standard interface such as IP (Internet Protocol). Internet of Things (IoT) also known as Web of Things (WoT) is a concept where everyday devices - home appliances, sensors, monitoring devices - can be accessed through the internet using well known technologies such as URLs and HTTP requests. There are still open issues regarding five IP-WSN (Internet Protocol Wireless Sensor Network) features in an IoT scenario: IPv6 Adaptation, Mobility, WEB Enablement, Time Synchronization and Security. Presents SNAIL (Sensor Networks for an All-IP World) which integrates four important features: mobility, web development, time synchronization and security with a complete IP architecture adapted to WSN. The standard dedicated IP stack needs to be adapted to low-processing-power microprocessors such as the ones found in WSNs. Mobility is one important characteristic of a WSN. A protocol that supports high speed communication on nodes and route optimization is required. WEB Enablement offers simple access to things using a web browser. Global time synchronization between things is necessary if the things are in different parts of the world. In the WSNs case the security needs to be both lightweight and robust.

4. SMART ENVIRONMENT IN IoT:

Smart environment includes smart homes, smart buildings, and smart city. Smart homes equipped with IoT infrastructure gives us a comfortable life and more importantly, this technology gives the concept of efficiently utilizing the resources. Smart homes and buildings also help to determine the needs of human by collecting the real time data. The main object of this technology is the sensors that will not only sense the data but also communicate with the appliances and make them efficient in terms of energy resources, utilization and security. For example, Lights will be on and off according to requirements as well as it will switch on and off as per the situation. There are many other applications in this regard but the concept is to enhance the comfort level of the human within the building premises. Smart city is the concept of advanced city infrastructure equipped innovative services and merger of technology within the city. Smart city will be able to utilize the concept of IoT to efficiently utilizes the available resources and provide the services to people to feel more comfortable, secure and well aware. Traffic control system connected with IoT is one of the projects of the smart city. In this system

information of traffic congestion or traffic jam will transfer to the vehicle driver and also share an alternate route in order to avoid the congestion. Further smart car parking, smart waste management, smart grids, smart health and smart education are some more examples of smart city projects around the world.

5. DfPL IN IoT ARCHITECTURE

This project focuses on deploying a DfPL system on top of a Wireless Sensor Network (WSN). The filtered data is fed to traditional classifiers (e.g. Naive Bayes or Tree Bagger) in order to detect people's presence. The next step is using classified data, timestamps and links affected as parameters in a decision making algorithm that will detect the presence of people in the monitored environment. Such an environment is presented in Figure 1. Four Java Sunspot nodes were placed randomly in a room of size 3.6m by 3.4m. In the case of four nodes we collect data from 12 links as each node in the network uses a bidirectional connection with every other neighbor node. Multiple collection threads, more than one base station, or transmission on multiple channels improve the collection speed in case of congestions.

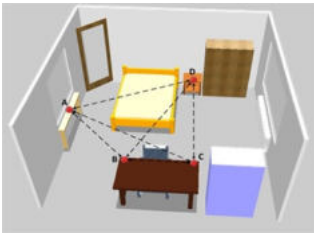


Figure 1: DfPL test bed in random locations in a room

6. IoT MONITORING:

IoT technology can effectively use for environmental monitoring like temperature, rain fall and river height etc. All these systems integrate with a central or global system for decision making with the help of IoT technology. Further with the development of wireless sensor network linked with IoT, we can monitor those areas where a human can't reach like volcanic eruption areas, mountain abysses and some of the remote areas. One of the application scenarios of IoT in this regard is the fire detection mechanism or monitoring the fire. It also includes the safety of human with the technology. For example, with the help of IoT sensors, temperature sensors sense the fire and quickly inform the rescue team. Further, it also incorporates the other data like a number of human beings, assets, the intensity of the fire, material present over there and some other related information that help people for better rescue as well as it reduces the damage.

7. IoT IN HEALTH:

IoT improves the health department due to its innovative applications. IoT technology changes the way of medication and treatment by using some innovative ideas. Now monitoring the patient becomes easy and manageable with IoT technology. Sensor technology senses the patient blood pressure, body temperature, breathing activity of patient etc. The data from those sensors either periodically or real time will collect and share to health management system equipped with IoT technology. Further patient living can also be a monitor for proactive measures related to health. In authors discuss the technologies related to medicine reminder in health homes. Furthermore, discussing the health issue of an elderly people authors describe the use of health smart homes in order to monitor the patient's special for elderly people. We can emerge the concept of telemedicine and information system under the umbrella of IoT. To enhances the functionalities of health smart homes with IoT technologies. They use the images and facial expression to enhance the functionality of smart homes in terms of health. First tracking of person is done with the help of sensor, then with the help of

face expression emotion recognition can perform to enhance the healthcare assistant for people.

8. IoT IN BUSINESS INTELEGENGE:

There are many things that are included in the smart business but the more fascinating is the use of RFID technology to introduce the concept of smart businesses and inventory control management system. We can track and monitor the goods with the help of RFID technology. Further, with the help of RFID, we can check the availability of the product in stock real time as well as it also helps in inventory management. Discussing more the smart business we can track as well as check the quality of products by combining the RFID and bio sensors. Further by using the IoT we can enhance the productivity of our business by the quality of our products.

9. IoT IN SOCIAL NETWORKING:

Social networking interlinks the Society for sharing the information and values with each other. It provides us platform for better communication. There are many applications that connect people in a unique way when we relate to the concept of IoT. The concept of the web of things is also important in this regard that plays a vital role in social networking innovations.

10. IoT CHALLENGES AND RISKS:

- Due to its massive scaling and coverage, the internet of things attracts the scientist and researcher for its research. IoT is still under development phase that means much more works needs to be done to make this concept. During the last decade's lot of work has been done in the different domains of IoT which includes application development, security, privacy, its connectivity, protocols, and architecture and much more. But still, there are some research challenges that need to be focused for future work in the above mentions domains of IoT. This paper mainly focuses on the Applications areas, Standards, Networking/Connectivity issues, Architecture, Security and privacy issues of IoT.
- As IoT gives the new paradigm to society so there is a need to change in laws as per this new era of technology. There should be a threat for sanctions in the case of violations of rules. Further, there is a need to be work on the global accountability related to legal aspects of using this new technology.
- For IoT communication as it handles a large number of sensor and actuators, we need a dedicated spectrum so that devices can effectively communicate with each other. Further a standard mechanism for spectrum management. In IoT huge number of devices relates to each other in order to share the information. Due to the processing of this huge amount of data devices will consume more amount of energy. It will affect the lives of devices that are connected under the umbrella of IoT. We need to adopt some mechanisms that will reduce the energy further we can use green technology for IoT devices so that we will make them energy efficient.
- These are some research challenges that need to be focused in near future to fulfil the dream of IoT implementation in the real world.
- Application developed for IoT should be capable to handle the real-time data and communicate with the other devices. Further, it should not only deal with sensing and actuate rather it will in cooperate with the human as well e.g. Human to Human (H2H), Human to Machine (H2M) and Machine to Machine (M2M). Including more about application development, it also satisfies the requirement of IoT which is distributed and heterogeneous in nature. Further in future, considering the IoT perspectives some of the possible applications types are as follows: Application those who predict the natural disasters, Industrial applications that includes simulations, monitoring the performances of varies phenomenon, Water security

monitoring applications, application needed to designing the smart homes and Medical applications which includes monitoring the activities and health parameters, medical intakes.

- Agriculture applications for agriculture which include smart packing, alerts via text message about the land defect, intakes etc. Including more about future applications: applications for intelligent transport system design like monitoring that traffic, law enforcement, controlling the environmental pollution. Some of the future applications also touch areas like applications for smart cities, smart meetings and smart security.

11. CONCLUSION AND FUTURE SCOPE:

In this paper I have elaborated IoT application as an applications of smart devices and revaluation approach. Internet of things improves the human life by incorporating the internet and things together as well as web of things. IoT will not only provide the human comfort but also improve the efficiency of the things and make them intelligent. Due to diverse nature of IoT, it will become the most emerging technology in near future. In this paper, we have discussed different applications related to IoT domain: how these applications contribute to society. This paper will also help the researchers and practitioners to understand potential research challenges of IoT that will become research trends for future researchers to enhance their practical phenomena of WoT.

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