

IoT Technology and its Applications in Various Fields

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Abstract— Now a day’s smart technology is replacing each and everything in the world. Internet of Things (IoT) has emerged powerfully as a more successful area to express new technologies. Current society is seeing a different flow in the number and domain of devices deployed and used in regular applications, including mobile phones, tablets, wearable devices, and other connected sensing devices, collectively referred to as the IoT. Internet of Things has grown into the lives of human being by allowing a communications between machines, objects and things along with people. The people, software systems and other machines are surrounded with IoT permitted objects which communicate about the present view of things. The world is becoming smarter in all aspect by using IoT technology. IoT features are provided in many of the applications like smart healthcare, smart homes, smart cities, smart energy, waste management, transportation and monitoring type. In IoT technology the physical objects are embedded with RFID, sensors and Internet protocols which allow object to communicate with each other. This paper highlights the application of IoT used in various fields and a review on the concept of IoT related technologies with the advantages and disadvantages that are encountered.

Keywords— Internet of Things, IoT Applications, Smart Devices

I. INTRODUCTION

Today’s world exists in the era of smart technology. In earlier days people used to handle the machines manually. After so many years many inventions came into existence where people started handling machines automatically with a single click. Then later the Internet of Things became the great advancement in creation of effective technology of which everything in association with the internet. IoT has become strong in many areas to express different kind of a new technology. In current situation IoT is familiar with various markets along with common people because of its different applications. The Internet is a system that connects the computers through networks with the help of standard Internet Protocol. The world is changing in technology to IoT because it is capable of interconnecting different objects and valuable data can be extracted from generated information. The actual term “Internet of Things” was proposed by Kevin Ashton in 1999 [1]. More and more everyday objects that have relied on manual control are expected to become smart in the future. IoT helps to access the information from any things. That helps to communicate among the things using internet. Figure 1. Show the concept of internet of things. It says that we can access internet such that anything can be able to communicate with anyone from anyplace at any time and can provide any services by any networks. IoT features are provided in many of the applications like smart healthcare, smart homes, smart cities,

smart energy, waste management, transportation and monitoring type. This research paper highlights the application of IoT used in various fields with advantages and disadvantages with a review on the concept of IoT related technologies and by sharing an idea on how to automate a smart lift with the challenges that are faced in the implementation of IoT.

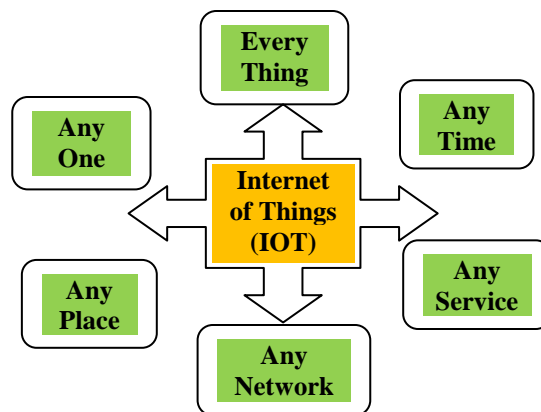


Figure 1: Internet of Things

This paper is structured as follows: Section II Related Work, Section III Applications of IoT, Section IV IoT Techniques, Section V Smart lift functionality, Section VI Advantages and Disadvantages of IoT, a brief conclusion is discussed in section VII.

II. RELATED WORK

The overview of IoT with emphasis on technologies, protocols, and application are discussed. The IoT is becoming more successful concept because of its technologies like RFID, smart sensors, communication tools [1]. Manipulation of communication tools will be done to support more services for organization with the help of applications of IoT [2].

III. APPLICATIONS OF IoT

Applications of IoT is not in single field, all most all of the areas are surrounded with applications of which broadly contains environment domain, society domain and industries domain. Each domain is different from the others but it is somewhat covering, because some applications are communal Figure 2. The application domains are transportation, smart cities, lifestyle, smart home, retail, factory, agriculture, supply chain, environment and energy, disaster, tourism, health care, user interface and culture.

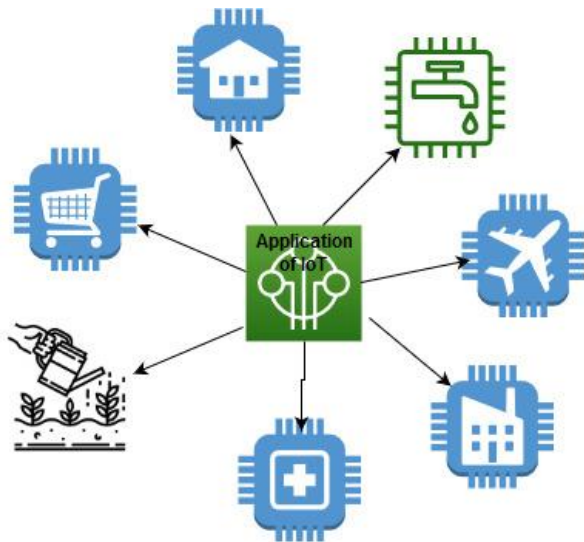


Figure 2: Applications of IoT

A. Smart Cities

Creating smart cities is possible by implementing the IoT technology in city development. By using IoT the cities can be developed in several levels by enhancing infrastructure, improving transportation and maintaining the safety of individual and traffic [3]. Smart cities connect systems like healthcare, weather noticing, transportation system. IoT support an individual by providing the internet which help to access the database of different transportation. To track and

operate the information by specified protocols at any place, IoT make cities more smarter Figure 3.

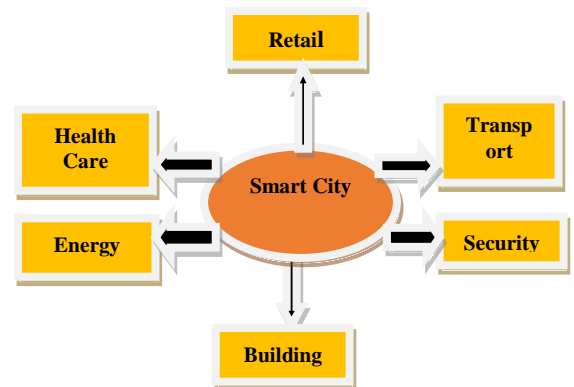


Figure 3: Smart City

B. Health Care

A basic application area of the IoT is the healthcare sector. IoT plays an important role in this field by improving service quality and reducing costs. It is possible to track health specifications, such as BP, blood glucose, body temperature and so on. IoT in healthcare also include smart beds, this encounter where patient occupied beds and a disabled individual trying to step down from the bed [4]. A smart bed itself can regulate to provide suitable support and strength which are used by the patient without human support. Another area where IoT is used in healthcare is to maintain the data and information of the patient and staff in the hospitals.

C. Smart Home and Buildings

Smart home and building are working by using Wi-Fi's technology. Internet of Things provides automation mainly used to connect electronic devices like Televisions, smart devices, mobiles and so on which are connected by Wi-Fi. Internet and Wi-Fi have become an important sector in home network, due to the enhance ration of using smart devices, and mobiles. For example a networking provides online services at home to control the function of the devices using network [5]. Mobile computing devices give guaranty to consumers by providing access to control the electronic devices. The concept of IoT can be implemented in buildings and home can allow operating more devices and objects in smarter way. Sensors, smart lighting, control of air conditioner and central heating, management of energy and

providing security are applicable in smart home and buildings using IoT Figure 4.

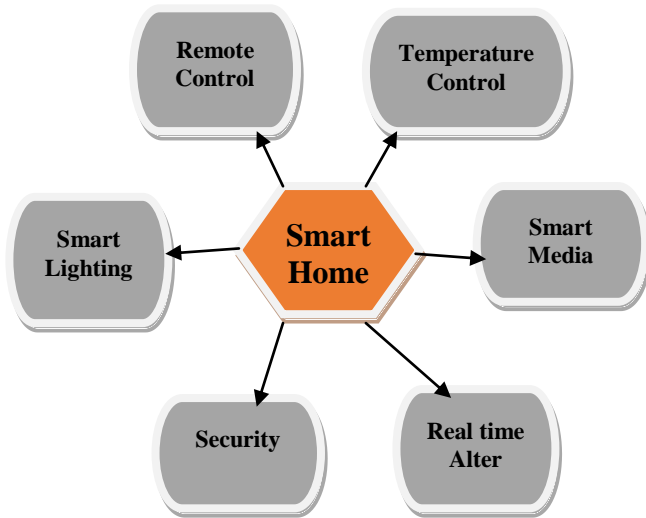


Figure 4: Smart Home

D. Smart Transportation

Country will be smart when we implement necessary effective technologies in it. Transportation is also one of the most important things to show the development of the country. Checking the road condition aware applications are mainly used in transportation applications. The process of marking identity on road map in smart devices has started by the users. The important perceptions of smart transportations are analysis of transportation, control of transportation, and connection with vehicles. Analyzing the interest expressed in advance and irregular detection represent the transportation Figure 5. Control of transportation can be done by maintaining the traffic and speed of vehicle, this is done on the basis of vehicle they are connected. Maintain of both cost and fuel by using electronic vehicle in transportation is possible by IoT [6]. Main application of IoT in mobility is to access the information and details of different travels and also can book the tickets for required transport.

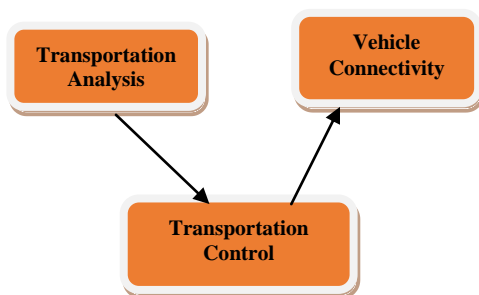


Figure 5: Smart Transport

E. Retail

Role of IoT in retail or resource sequence administration is very much useful for checking memory storage circumstances and object chasing for noticeable purposes and payment system depends on communal transportation, exercise centre, garden, etc. IoT suggests different ideas for retail shop like speed payment keys using biometrics, shopping, checking product for finding discovery of likely allergen in a given goods. The IoT approach includes characteristics of delivery circumstances, product place, storage of clash discovery, and so on.

IV. IOT TECHNIQUES

IoT mainly feats typical protocols and networking tools. The key aiding technologies of IoT are RFID, cloud computing, middleware, wireless sensor network. Technologies are the main building blocks of IoT. These technologies help to process particular functionalities that is required in an IoT [7]. IoT is like universal linkage technology which connects the different type of objects and also creates the interaction between the objects. IoT contains normal things like foodstuff, equipment, clothing, works of art, paper etc. These objects communicate with each other to reach the mutual aim.

A. RFID Technology (Radio Frequency Identification)

Radio frequency identification technology (RFID) is an instinctive tool and it can be used to recognise the things also to document the metadata radio waves. RFID technology is comprised of readers and tags. The tag can be attached to any of the objects or things through the microchip attached to tag. The RFID tag communicates with the RFID reader through radio waves. With the help of RFID technology it can be identify the objects automatically and can save the information and it also helps to lessen the cost of previously used systems. Passive RFID tags, Active RFID tags, and Semi-passive RFID tags are the different types of tags used in RFID. Passive RFID tags are able to save more information and it depends on radio frequency energy transmitted from the reader to the tag to power the tag. Active RFID tags helps to check the pressure, temperature and additional circumstances with the help of peripheral sensors. Business, hospital laboratories, and remote sensing IT asset management also use Active RFID tags. Batteries are used to power the semi-passive RFID tag microchips while interacting with the reader. Passive tags are more cost effective than Active and semi-passive RFID tags.

B. Cloud Computing

Now a day's data generated by different resources is hard to handle. IoT is also growing with vast amount of generation of information. Cloud collects data from different resources and comforts information to travel to its end.

C. *Wireless Sensor Networks*

Technology advances in wireless communications is to help reduce the cost and also help to reduce the use of power consumption [8]. These small sensor nodes consist of sensing units, data processing units, and interacting objects. A huge number of such nodes deployed in great areas can integrate or combine with each other.

V. SMART LIFT

The semi-automated lift is to switch ON/ OFF the light and fan manually every time when a person uses the lift is a problem. Both light and fan are switched ON during the movement of lift even if the person is not present inside and also the problem of power consumption. The solution for this is by using IOT technology to make the lift function to switch ON/OFF of light and fan which will automatically uses sensors to sense the presence of a person. The PIR (Passive Infra-Red) sensor is useful to detect the human motion. A PIR sensor observes the changes in the environment and converts changes into electronic energy and also helps to process the infrared light scattering from objects in its area. This idea can be implemented to help in power consumption. In this research paper it is discussed that sensor can be placed in the lift for identifying the presence of a person and base on it switching on/off of light and fan can be done.

VI. ADVANTAGES AND DISADVANTAGES OF IOT

A. *Advantages*

- Access of data and information by sitting far from location. This is done by connecting internet to the smart things. By this a person can access any information and data by sitting anywhere in the world.
- IoT technologies help to prevent the traffic, accidents and provide safety for the people.
- We can guide home through your mobile phones, with the capability to control it. They can provide personal safe.
- IoT helps to join various objects so that greater quality and transparency can be achieved.
- Automation is the need of the hour to maintain everyday exercise without human interference [9]. Automating performances in a business help boost the quality of services and decreases the level of human interference.
- IoT can provide a personal assistance that can alarm on your everyday plan.
- The patient check can be done on a real time support without doctor's visit and allow them to decide as well as offer treatment that is evidence based [10].
- Energy and resources can be utilized by using IoT technology.

B. *Disadvantages*

- In the world each and every device that an individual uses are connected via internet. This increase the risk of leakage of important data. By this sharing the important data on internet is not safe.
- In everyday life data flows in any direction on the internet. So there is no assurance for security of information.
- Networks that are connecting various devices is known as IoT. If there is any effect on outlet entire system gets damaged.
- Our daily tasks are managed by using different technologies. This result an individual to be a lazy and not giving work to brains.
- IoT technologies are connected via networks and smart things the cost is more efficient.
- IoT is playing an important role in the society as many companies and different task are done by using new technology.

VII. CONCLUSION

An application of Internet of things helps to connect different type of people in different locations throughout the world. Objects or things in various fields can be identified by connecting different objects through internet. This paper focuses on the idea of automating the functionality of switching ON/OFF the light and fan in the semi-automated lift by giving the importance of implementing it. Now a day IoT is helping in almost all the fields like medical, manufacturing objects, industries, transportation system, education system, governance, mining field etc. Not only this something going to be different can happen in the field of IoT. Definitely it will create different impact on the next generation.

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