A Review on Internet of Thing for Home Automation

Radhika Garg[1]
[1]Assistant Professor,
Vaish College of Engineering, Rohtak

Swati Gupta[2]
[2]Assistant Professor,
Vaish College of Engineering, Rohtak

***Abstract*: Internet of things(IOT) is the extension of current internet to provide communication and connection between different devices. This paper provides a review on IOT based home appliances which can make human life easier. There are different areas where IOT based device are used. IOT based home appliance can be easily managed from a distance. IOT based devices can be controlled at remote location without interference of human. There are several researches related to home Automation Platform using IOT device. The review paper would be helpful to know about IOT, IOT architecture, its benefits and working process of IOT based devices for home automation. In addition to this, this review paper would be helpful to know about different technologies and protocols.**

Keyword: IOT, Home Automation, Sensors, IOT based Appliances

[1] INTRODUCTION

Demand of IOT is increasing day to day as the demand of internet is increasing. Different IOT based devices or appliance are used to reduce the wastage of time by allowing user to operate their devices form any distance without any delay. There are several IOT systems which can be easily used for home automation based as well as industrial automation based. Generally the applications of IOT devices are divided according to their use in several sectors. There is numerous IOT application used in consumer sector. A number of applications used to fulfil the commercial purposes. In industrial sector these are very helpful. A lot of IOT application used in infrastructure spaces also.

1.1 Internet Of Things(Iot)

The Internet of Things (IoT) represents a comprehensive environment in which different appliances performs automatically. It is possible as these appliances are connected to sensors and also to Internet. It has been done to control and manage the different devices or appliances form a distance. Several developed applications of IOT devices have been made to make the easy life of the consumer.

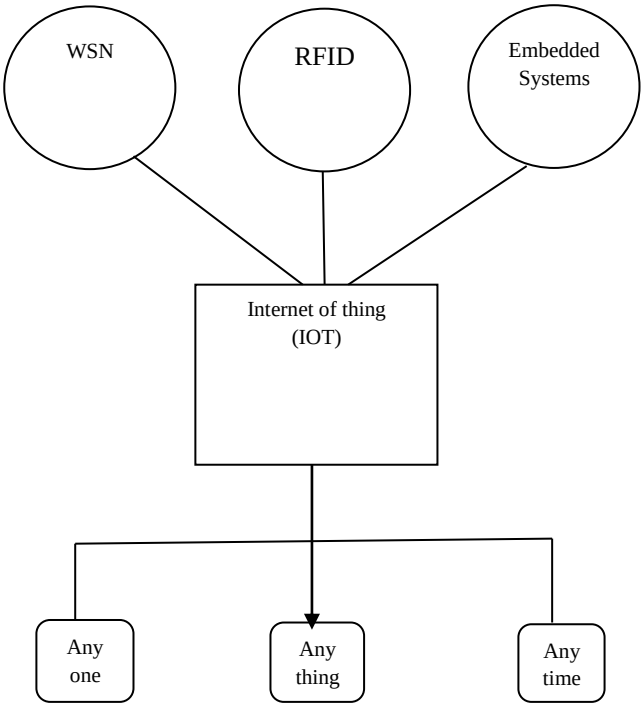

Fig 1 Internet of things

These application made to use by the consumer include the vehicles and home automation.

1.2 Home Automation

There are different IOT based devices for home automation. In home automation the domestic appliances are remotely controlled by used.

The pros of IOT enabled home automation are discussed here such as

1. Better Monitoring Of Devices

Using IOT devices there is no requirement of user intervention. Device-to- device transmission enable to the user to maintain the clearness in procedures. Such devices are used at the place where there is the similarity of jobs.

2. Efficient & Saves Time

Using IOT devices the user can save the valuable time. Using such IOT devices it avoids the user to do the same jobs frequently. The Device-to- device transmission allows to user to get the better efficiency. Therefore the exact results are obtained vastly.

3. Saves Money

Optimum use of energy and resources can be obtained. It is possible to adopt this technology. For this it is necessary to keep the devices under observation.

4. Better Quality of Life

All AI based applications are efficient to formulate our daily life better. Such devices are applicable to improve our comfort, convenience and better management. Therefore it is an obvious thing that the life of our will be better.

5. Smart Environment

A preset program could monitor opening & closing of windows & shades according to position of sun & wind flow to regulate temperature, humidity & fresh air inside house. We could monitor emissions from factories & vehicles to minimize air pollution.

6. Health Monitoring

The IOT based devices are also used to identify the issues related to the health. Such IOT devices are applicable in Hospitals to provide the assistance to the doctor. As well as, such devices are also useful to assist the senior citizens as well as the disabled people.

7. CONS of IOT

There is no doubt that future is internet & all fields human beings are linked within have widespread IT & internet applications. But on same time we don't expect each individual to be expert in IT & it poses handicap for those who are not related to this field & therefore such people are subjected to exploitations.

[2] IOT ARCHITECTURE

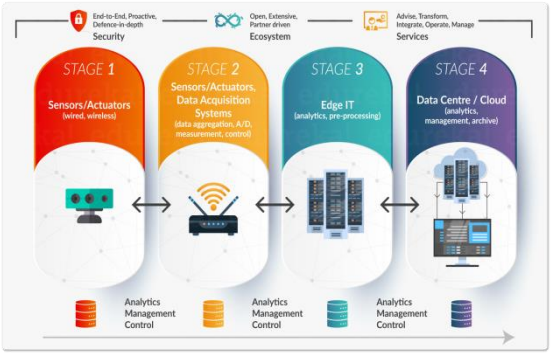

Fig 2 IOT Architecture

[3]APPLICATION OF IOT

Iot based devices are used in below given sectors such as:

1. Smart Cities

Some specific IOT devices are used for management of traffic. Some devices are applicable especially to manage the traffic at the time of jams, any type of accidents and at the raining time. The Internet of things systems is also applicable to monitor vibrations of buildings, bridges & monuments.

2. Home Automation

Home automation has been known as a process. This process has been performed to control the home devices. It is possible to use several devices which are IOT based. Electrical as well as the electronic devices are used in home. Such devices are may be fan, lights, and outdoor lights. Fire alarm, kitchen timer, etc are also smart devices.

3. Industrial Automation

Using the IOT devices it is easy to manage the record with the chain of supply. When such devices do not work properly, it is necessary to repair and maintain them. Using such monitor production of toxic gases, it is easy to eliminate the chances of workers' health and environment.

4. Health Monitoring

There are different types of devices. Such devices are capable to deal with the patterns of heart rate, digestive system, blood pressure etc. These systems are efficient to monitor and diagnose such diseases.

Fig 3 IOT Services

5. Smart Environment

Using the IOT devices it is easy to capture the releasing of dangerous chemicals. Such chemicals are mixed up in rivers and sea. Thus the water pollution has been made. Therefore it is essential to overcome such type of pollution. Such IOT systems are used in some specific sectors. The reason here are a number of applications that come under the IOT technology. Such fields are described below:

[4] REVIEW OF LITERATURE

There are several researches related to home Automation Platform using IOT device. Along with this in the past, the research on the IOT has been made along with the study on various applications of internet of things. The growth of Internet of Things (IOT) in future is totally depending upon us.

Ahmed ElShafee(2012)

This paper has presented a design and prototype implementation of new home automation system that uses WiFi technology as a network infrastructure connecting its parts.

Hence they concluded that the required goals and objectives of home automation system have been achieved. The system design and architecture were discussed, and prototype presents the basic level of home appliance control. and remote monitoring has been implemented. Finally, their system is better from the scalability and flexibility point of view than the commercially available home automation system[1].

Vinay sagar K (2015)

This system is designed to be low cost and expandable allowing a variety of devices to be controlle. The home automation using Internet of Things has been experimentally proven to work satisfactorily by connecting simple appliances to it and the appliances were successfully controlled remotely through internet. [2]

Neha Malik(2017)
The author discusses the various intelligent home automation system and technologies. The effort targeted on home automation concept where the controlling and monitoring operations are expediting through smart devices.[3]

Shaikh Amreen(2017)
They have discussed about architecture of home automation system. Also explained how internet of things are used for monitoring regular domestic conditions by sensing systems.[4]

AnuragTiwari et al.(2017)
The authors reviewed the Challenges and Ongoing Researches for IOT. The IOT systems are very common and are widespread. Therefore chances of security and privacy problems have become regular. Due to this all the things which are associated with internet may face safety issues. Due to the issue which is related to security and privacy IOT could not set himself as a reliable technology.[5]

Satish Palaniappan(2015)
Homes can be interfaced with sensors including motion sensors, light sensors and temperature sensors and provide automated toggling of devices based on conditions. More energy can be conserved by ensuring occupation of the house before turning on devices and checking brightness and turning off lights if not necessary. The system can be integrated closely with home security solutions to allow greater control and safety for home owners. The next step would be to extend this system to automate a large scale environment, such as offices and factories.[6]

[5] IOT TECHNOLOGY & PROTOCOLS

Several Communication Protocols and Technology used in the internet of Things. Some of the major IoT technology and protocol (IoT Communication Protocols) are Bluetooth, Wifi, Radio Protocols, LTE-A, and WiFi-Direct. These IoT communication protocols cater to and meet the specific functional requirement of an IoT system.

A. Bluetooth
An important short-range IoT communications Protocols / Technology. Bluetooth, which has become very important in computing and many consumer product markets. It is expected to be key for wearable products in particular, again connecting to the IoT albeit probably via a smartphone in many cases. The new Bluetooth Low-Energy (BLE) – or Bluetooth Smart, as it is now branded – is a significant protocol for IoT applications. Importantly, while it offers a similar range to Bluetooth it has been designed to offer significantly reduced power consumption.

B. Zigbee
ZigBee is similar to Bluetooth and is majorly used in industrial settings. It has some significant advantages in complex systems offering low-power operation, high security, robustness and high and is well positioned to take advantage of wireless control and sensor networks in IoT applications. The latest version of ZigBee is the recently launched 3.0, which is essentially the unification of the various ZigBee wireless standards into a single standard.

C. Z-Wave
Z-Wave is a low-power RF communications IoT technology that primarily design for home automation for products such as lamp controllers and sensors among many other devices. A Z-Wave uses a simpler protocol than some others, which can enable faster and simpler development, but the only maker of chips is Sigma Designs compared to multiple sources for other wireless technologies such as ZigBee and others.

D. Wi-Fi
WiFi connectivity is one of the most popular IoT communication protocol, often an obvious choice for many developers, especially given the availability of WiFi within the home environment within LANs. There is a wide existing infrastructure as well as offering fast data transfer and the ability to handle high quantities of data. Currently, the most common WiFi standard used in homes and many businesses is 802.11n, which offers range of hundreds of megabit per second, which is fine for file transfers but may be too power-consuming for many IoT applications.

E. Cellular
Any IoT application that requires operation over longer distances can take advantage of GSM/3G/4G cellular communication capabilities. While cellular is clearly capable of sending high quantities of data, especially for 4G, the cost and also power consumption will be too high for many applications. But it can be ideal for sensor-based low-bandwidth-data projects that will send very low amounts of data over the Internet.

F. NFC
NFC (Near Field Communication) is an IoT technology. It enables simple and safe communications between electronic devices, and specifically for smartphones, allowing consumers to perform transactions in which one does not have to be physically present. It helps the user to access digital content and connect electronic devices. Essentially it extends the capability of contactless card technology and enables devices to share information at a distance that is less than 4cm.

G. LoRaWAN
LoRaWAN is one of popular IoT Technology, targets wide-area network (WAN) applications. The LoRaWAN design to provide low-power WANs with features specifically needed to support low-cost mobile secure communication in IoT, smart city, and industrial applications. Specifically meets requirements for low-power consumption and supports large networks with millions and millions of devices, data rates range from 0.3 kbps to 50 kbps.

[6] CONCLUSION AND FUTURE WORK

The IOT has a wider scope in every aspect of life. As we know that life of people is becoming more busy. So the use of IOT based appliances is increasing rapidly, because these devices or appliances are making our life fast and comfortable. There are different sector where iot based device are used such as Industry, commercial organisation, hospital, etc. Apart from the several use of IOT devices, these are used for home automation. Iot based home appliance can be easily managed from a distance. The

concept of Artificial intelligence and internet of things can be combined to make life more easier and comfortable.

REFERENCE

[1] Ahmed ElShafee(2012)"Design and Implementation of a WiFi Based Home Automation System" International Journal of Computer, Electrical, Automation, Control and Information Engineering Vol:6, No:8, 2012

[2] Vinay sagar K (2015) Home Automation Using Internet of Things International Research Journal of Engineering and Technology (IRJET)

[3] Neha Malik and Yogita Bodwade,"*Literature Review on Home Automation System*" International Journal of Advanced Resesarch in Computer and Communication Engineering, Volume 6, 2017.

[4] Shaikh Amreen, Londhe Nishigandha, Birhade Apeksha, Gaikwad Jayprakash and Kodak Priyesh," *Architecture for internet of things for home automation*"International Journal of Engineering and Computer Science, Volume 6, 2017.

[5] A. Tiwari and H. Maurya, "Challenges and Ongoing Researches for IOT (Internet of Things): A Review," ,Volume 5, no. 2, pp. 57–60, 2017.

[6] Satish Palaniappan"*Home Automation Systems - A Study*", Volume 116, 2015