A Study on Internet of Things based Smart Home

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***Abstract*— In today's Information Technology driven society, automation systems are making people's life easier and comfortable than ever before. Internet of Things is one such technology that is widely being applied for automating several routine activities. The smart home system enabled by IOT is one of the trends that is gaining momentum. Internet of Things connects living and non living things through internet. IOT model views everything as a smart object and enables communication between them. This communication happens physically or virtually. This capability can be used for automating the systems like smart homes or precision agriculture which have a social relevance. It is observed that the IOT has been used extensively for building smart homes. Smart home means automation of activities such as controlling the lighting, heating, ventilation, air conditioning, and security. There is already a lot of work done in this area. This paper discusses how the IOT based smart home automation systems are built and it advantages.**

***Index Terms*— Home Automation, IOT, Sensors**

1) INTRODUCTION

The Internet of things is inter connecting of physical devices, buildings, vehicles and many other objects embedded with electronics, actuators, sensors, software, and network connectivity which enable objects to collect and exchange data. The Global Standards Initiative on Internet of Things in 2013, defined the IoT as a Global infrastructure for the information society, which allowed services by interconnecting things based on interoperable information and communication technologies.

The IoT allows objects to sense or control remotely around the existing network infrastructure and creates an opportunity for direct integration of physical world into computer based systems, and results in improving the efficiency, accuracy and economic benefits to reduce human intervention.

In recent days, the usage of electronic devices has been increased exponentially. Homes are now equipped with Wi-Fi, Computing devices like desktops, laptops, Smart TVs, Washing Machines with built in intelligence, Smart refrigerators.

Sensors are a part of IOT set up that generates information to enable intelligent decisions. The output of surveillance camera may be used to switch on /off the lights and sensors may be used to switch on television when a person enters the house. There are several such components that are used in building IOT driven automation systems. Some more examples of home automation are security by denying access to unauthorized physical entry and supporting elderly living by automating many manual systems. Therefore home automation systems have become more attractive option.

The following figure depicts the architecture used in home automation system.

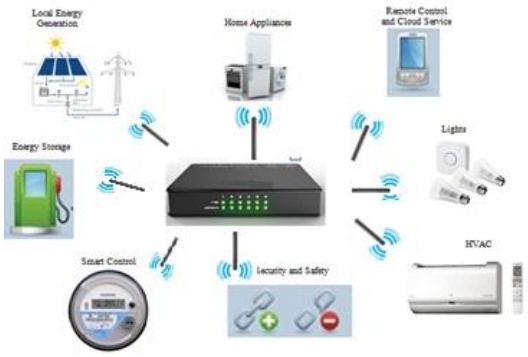

Fig. 1. IOT Control System

2) RELATED WORK

Luigi Atzori et al., [1] surveyed the various visions of IoT paradigm and reviewed the enabling technologies. The authors observed that there is exists rising interest in the concept of Internet of Things among the researchers. The vast literature available poses difficulty in understanding the complexity involved in it. The authors have discussed various domains in which IOT is in use including the smart home. The benefits include activities like changing room lighting according to time of day, homes can be secured by appropriate use of monitoring and alarm systems. In terms of technology, assigning IPv6 address to each IOT element makes them possible to reach from any node in the network. The researchers have identified another trend called Web

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Squared, which is the evolution of Web 2.0. It is aimed at combining sensing technologies and web.

Adithya Varma and Y. Srinivas [2] presented low cost ubiquitous sensing system for monitoring regular domestic conditions. The authors have provided the network architecture and interconnecting mechanisms. The controlling of devices over the internet is implemented using ZigBee communication. In this process, end devices collect data and this data is forwarded to coordinator. Later zigBee protocol format is translated to IPV6 using the gateway. The proposed system measures and controls domestic appliances. The application runs on laptop or any other computing device like i-pad. The major components used in the implemention are Sensors, and IoT Gateway.

Soundhar Ganesh et al., [3] presented an approach for home automation using Raspberry pi and agriculture activities automation that measures temperature, humidity, soil moisture and status of rain. The proposed automation system uses Raspberry Pi for home automation. The system intends to provide portable, scalable solution for optimized water supply. The proposed system works like this. For example, the message 'ON1' was sent from customer account to Raspberry account. Up on reading the mail content, the algorithm, triggers turning ON the device 1 represented by LED1. The user gets the reply having the subject that indicate activation of home automation. The switch gets turned off when the email with subject 'OFF1' is received in the raspberry Pi account. Multiple switches can be controlled by mapping switches and e-mail messages with subjects like 'ON2' to turn on Switch 2 and Switch 3.

Nisha Sangle [4] have proposed a low cost home appliances control and monitoring system based on wireless embedded gateway. The proposed system operates three types of home appliances like as LED light, fan and Television (TV). Infrared sensor used in this set up gets triggered when the light is detected. The signal is sent to Raspberry Pi for further processing. The action whether to turn off the light is initiated using wireless communication and related devices. In the similar lines, IR is used to detect the presence of human being and turn off/ on fans. The application that controls these operations can be executed at computer or a mobile app.

3) CONCLUSION

The outcome of these studies indicate that there is a wide use of IOT technology for home automation. There is a good scope for research in the area as the future society is predicted to IOT driven. There still exists some challenging issues that needs to be addresses in terms of technology as well as social many challenging issues still need to be ad dressed and both technological as well as social relevance. If addressed properly, the acceptance for IOT based applications will increase further.

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