

# A Survey on Intelligent Controller System for Home Automation System

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## ABSTRACT

In Internet of Things (IOT), the smart home is an application developed by connecting several home appliances and devices with each other. The controlling and managing of all devices by using a single remote controller becomes a complexity process. The main challenge is to reduce the power consumption when large home appliances are linked together. This paper provides a brief discussion about communication protocols, sensors, controllers, and appliances, which are widely used for the implementation of the smart home.

**Keywords:** Internet of Things, Smart Home, Remote Controllers

## I. INTRODUCTION

Internet of Things (IOT) has increasingly found its way in the latest technology such as machine to machine applications, Telemetry applications, environment, health care etc. IOT consist of mainly four pillars which form the major part of the development of various technologies. One of the recent IOT technology used is the smart home technology in which providing smart home with home automation control. Users can easily control the home appliances with the use of network-connected devices.

The Smart development of devices is used to reduce the work of users by using the technologies. The home devices can be controlled with the use of the remote control but it may not be suitable for the users to carry over to other places. The Home automation system is useful for the users to control the devices without the use of the remote control and from any places with the use of the sensors and other technologies.

The home automation system is designed with the use of the network devices with the wireless technology like Bluetooth where it can be controlled within the network range. The system can be used only in the

limited range where the users can easily control home devices.

Many of the adaptable devices have been used to produce intermediate in such cases the user may easily use the home devices in any of the locations. The main problem in using this home automation system is that there is a lack of the production of the user-friendly between the home appliances and the users.

The remainder of this paper includes the brief introduction in using the IOT. In Section II the various available smart home automation technologies are discussed briefly and Section III provides the overall conclusion of this paper.

## II. METHODS AND MATERIAL

### Taxonomy of Home Automation Technologies

#### A. A RF4CE-Based

Remote Controller In [1] there is a remote named RF4CE-Based Remote Controller to connect appliance end and the controller end. Radio Frequency for Consumer Electronics (RF4CE) is will pair both the appliance end and controller end. A

communication protocol is set between the appliance and controller by the system after they were connected. The current state and service in the form of bundles will be sent to the controller by appliance automatically. Then the controller will project it onto an LCD screen. The number of appliances connected also shown by the controller, it allows the user to use one controller for all home appliances easily. It also achieves a simplified and instinctive control interface to construct the incorporated control environment for commercial appliances.

### **B. Touch-screen Domestic Universal Remote Controller**

In [2] a remote controller with touch screen for all household electrical appliances was proposed. There are two technologies proposed in the remote controller. They are computer controlling technology and infrared communication technology. The remote controller consists of a touch screen, microcontroller, infrared emitter, and receiver. Using a self-learning function, the controller could control all the appliances. There are some encodings which are distributed to different functions of the household appliances. The function encoding may send by the microcontroller to the receiving circuit when the domestic universal remote controller's function button is held down. This function remotely operates the home appliances.

### **C. Adaptive user interface for universal remote controller**

In [3] a context-aware plug and play universal remote controller was proposed. By using this controller, users can control the devices which were recognized by Near Field Communication (NFC) technology. The descriptions of appliances were downloaded through a Bluetooth device. The controller depends on some contexts. The context consists of the permission level, personal style, and location. The smartphones are used by this controller. An adaptive user interface for the universal remote controller (AURC) was proposed. It consists of graphical user interface (GUI), context-aware environment, and automatically generates UI.

### **D. PoE Switch Based Remote Control System**

In [4] Power over Ethernet (PoE) switch based system was proposed in order to control all the electronic

devices. It also facilitates for the data communication. Using a splitter the PoE switch system can manage the power and the data separately. For controlling devices power is used and for communication, purpose data is used. Electrical appliances, as well as data communication, can be controlled by the same switch port in PoE based system. Using an electromechanical relay the power supply is given to all the appliances. Relays are used to control the electronic devices. All the relays are controlled by PoE switch port. This is cost effective and it is a password protected solution. It also allows the user to control the home appliances and data communication remotely in the absence at home.

### **E. Facebook in a smart home environment**

Many of the technologies have been used for the processing of a collection of a large amount of data in the cloud computing. A new technology [5] called UPnP is implemented to gather the information of home equipment. Facebook validation along with Ethernet services are used to gather and store information and are transferred to the facebook user page. The user can control the equipment by transferring instructions from the facebook account.

### **F. Dual Radio ZigBee Homecare Gateway**

For the telehealth application homecare gateway provide the development of automation and healthcare applications. The proposed method [6] is used to explain regarding the remote patients monitoring. The zig bee provides exact services at home and user-friendly applications to all types of patients. The basic idea includes the monitoring of the remote patients. The status of the remote patients is observed regularly with the use of the mobile medical sensors. The sensor gathers the data and they are transferred to the telehealth platform. If the patient's health is seemed to be critical the message is passed over to the doctor and the treatment is provided to the patients. The ZigBee gateway is a sink node in wireless sensor network from various sensors and transfers them to the telehealth platform. The effective medical services of home telehealth application are provided by using the homecare gateways. This method is implemented to attain no data loss and the streaming sensor is used to provide the progress of the telemedicine.

## G. Advanced Universal

Remote Controller The remote controllers are used for controlling the devices like air conditioners, car keys, projectors and also home appliances like DVD players, Televisions, lights, door management and audio/videos. Individual remote controllers are provided for each appliance which increases the inconvenience when the number of devices is increased. To overcome this problem, an advanced URC[7] is proposed which can control various home appliances and also used for security purposes. Some controlling techniques like RF receivers, Wi-Fi, ZigBee protocols in both wired and wireless communication are used for controlling all kinds of appliances in the environments.

## H. ZigBee Controller

The usage and size of home appliances become large where the important issue of power consumption arises. To reduce and manage the power consumption in the home, the room architecture is developed which is composed of ZigBee controller [8], two power cut-off outlets and a dimming light. ZigBee controller has an IR receiver and button switches where one switch is connected to power outlet 1 and another switch is connected to the power outlet 2. All the devices are connected to the outlets. The device is turn on by the user manually and it is turning off automatically. The monitoring circuit in power outlets will monitor the power consumption periodically. When the monitored value is below the threshold value, then the outlet completely cut-off the power supply.

## III. CONCLUSION

In Internet of Things (IOT), the smart home is an application developed by connecting several home appliances and devices with each other. The controlling and managing of all devices by using a single remote controller becomes a complexity process. The main challenge is to reduce the power consumption when large home appliances are linked together. This paper provides a brief discussion about communication protocols, sensors, controllers and appliances which are widely used for the implementation of the smart home. By using these technologies home automation system will be improved.

## IV. REFERENCES

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