

Chapter 12

Home Automation and Security System Using Internet of Things

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ABSTRACT

The internet of things (IoT) is viewed as something that connects everyday objects like smart TV and smart phones. Automation is the future of human civilization. It's like operating various devices and machinery with minimum or no human intervention. In this chapter, home appliances and other electronic devices are proposed to be controlled over internet with the help of website or smartphone. Speech recognition technology has been implemented in this chapter which will help complete or partially visually impaired people or persons with physical disability. Smart CCTV concept has been developed in this chapter which will allow to operate the web camera whenever it detects motion and sleep at other times which will save energy as well as storage unlike current CCTV scenario. Also, smart CCTV captures images and video footage and provides the real-time status of the place via a registered email address, website, and mobile app. If you are outside, you can check the status of your home and be in line with it, and you will activate the home appliances from the web site and through speech.

INTRODUCTION

The automated house is a system developed to control electrical and electronic appliances in our house such as light, fan, air-conditioning, security system, television etc. Besides controlling our house, this system may also do the monitoring job ("Home Automation System with Their Applications", 2018). For example monitor the temperature, live status of the electrical and electronic home appliances, closed-circuit television (CCTV) system and many more.

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With the current technology, this system can be accessed through several ways; web-based, software, and smart phone application (Wang, Dixon, Bhimani & Sugiura, 2015). This makes the automated house easier to be used depending on our target of what we want to control, our budget, our type of system and so on. This system will be integrated with our house electrical system.

The Internet of Things (IoT) is viewed as something that connects everyday smart devices like Smart TV, smart phones and sensors. These devices allow modern styles of communication between individuals and things, and among things themselves (Sagar & Kusuma, 2015). IoT technology has advanced considerably in a previous couple of years since it adds value to a brand new dimension to the world of communication and technologies. Automation may be defined as the technology through which various machines, vehicles, electronic devices etc. which are used commonly by people can be operated with minimum or no human intervention.

Home automation is one of the future aspects of automation. It makes an autonomous environment for home appliances which are connected to a wireless network. These are controlled by wireless communication technology.

Nowadays, automation plays a very important role in all workplaces and living homes. Presently automation techniques are implemented either using microcontroller or computer. With the use of microcontroller, it is difficult to control, manage or monitor the home appliances or devices, intruder detection and speech recognition at the same time i.e., it is very complex to perform the multiple functions simultaneously (Ganesh & Khan, 2015; Kaur, 2010). The researchers can achieve this with the help of computer, but the use of computer is very expensive for this purpose and consumes more power also. The Raspberry is a single board computer and it can be used to overcome these problems. Simply, the Raspberry Pi system functions like a computer with the small setup. It contains GPIO and USB ports. Using these ports users can control the home appliances using the sensors, speech recognition as well as interface the camera for intruder detection. Raspberry Pi is a computer that can be used for multiple purposes based on user requirement (Shroff, Kauthale, Dhanapune, & Patil, 2017).

The work presented in this chapter mainly focuses on energy savings over the current scenario of home security via CCTV and integration of speech recognition technology using smart phone to control the home appliances.

This chapter proposes a system which will control home appliances by using the website or smart phone, once the system installed in the house. It is meant to save lots of electrical power and human energy. Controlling by using wireless communication is best suited for those that belong to the oldster class or physically disabled.

The system is portable and designed in such a way that its installation, configuration, and maintenance are extremely easy and straightforward.

In this work, some of the home appliances are completely automated like fans will automatically turn ON/OFF when the room temperature goes HIGH/LOW (above threshold/below threshold), lights will automatically turn ON/OFF when brightness goes LOW/HIGH with the use of LDR sensor (Soumya, Chavali, Gupta & Rao, 2016; Kodali, Soratkal & Boppana, 2016).

There are different objectives for the home automation system like safety, security, energy conservation, reducing human effort.

- **Safety:** Modern home is so hybrid that there are several possible safety hazards in our lives. For example gas leakage, fire due to short circuit, water leakage, overflow in the tank etc. there may be natural hazards as well as an earthquake, storm or heavy rain. There is a need to protect our-

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