

# Home Automation Installation Using Component Based Web Technology

B.N.L.Harika, K.Kiran Kumar, Y.S.S.K.Ashish

**Abstract:** In this present technological world, every work and everything has become smart. From smart mobile to smart home, world has been updated and rapidly developed. Our project is designed to create safe and secured smart home automation using component based web technology. It develops a unique platform for being able to lock and unlock the doors, switch on and off the lights, fans and provides the security for the owners using internet. It mainly works on a central device, a server and an android application [1].

The central device is a microcontroller which connects to an internet and it receives the order to control the motor which control the lock state condition using gears. The main circuit used in rotating the motor in both directions is H-bridge circuit. The middle component, server handles the users and devices which are stored in the database on the server. It mainly provides the communication between the application and the central device.

**Index Terms:** Home automation ,H-bridge circuit, Android, server.

## I. INTRODUCTION

The term automation is the method of operating and controlling a process by using electronic devices which reduces the human involvement and effort. The elemental of developing a home or office automation is rapidly developing with its numerous benefits. Many researches are being carried out to build a safe, secured and affordable home automation to control and monitor home or office appliances like TV, fan, ac, refrigerator and other devices. Automation makes efficient as well as a better usage of water and electricity and reduces the amount of wastage.

It makes people to connect to the things at any place, anytime and anywhere using network. This automation is one of the important applications in iot technologies. It controls the environment in schools, colleges and homes using sensors and actuators which control light, temperature and other components [2].

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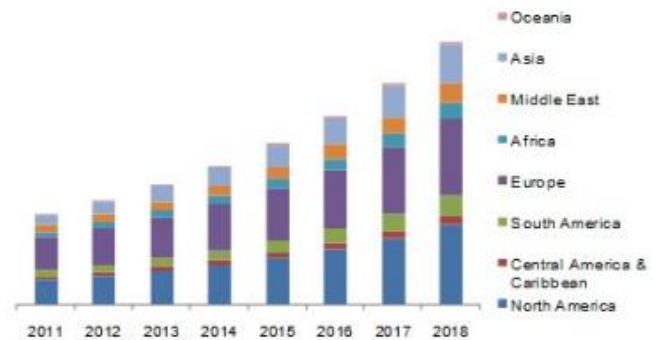


Figure 1: Home automation usage graph

## HOME AUTOMATION:

The main components which include the creation and development of a smart home automation using component based web technology are as follows [3]:

**User interface:** This module includes a monitor, a mobile phone, or a computer which can give the orders to the control system.

**Mode of transmission:** This module includes either wired connections like Ethernet or wireless connections like Bluetooth, GSM (global system for mobile).

**Central controller:** This module includes a hardware interface which communicates with the user interface.

**Devices:** This module includes electronic devices like AC, fan or a light which is sympathetic with the mode of transmission and which is connected to the central controller module.

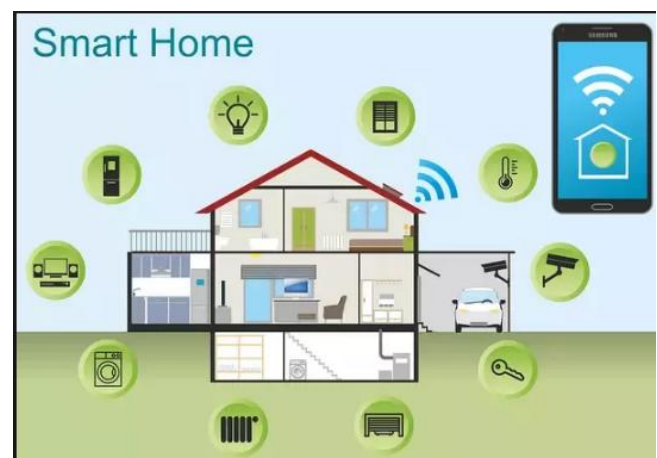


Figure 2: smart home automation



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## FEATURES OF HOME AUTOMATION:

In automation system, compared to wired technologies wireless technologies provides many advantages and also develops a unique platform for monitoring and controlling [4].

**Installation cost:** For this home automation, installation cost is low because cabling is not required. Installation cost is reduced.

**Scalable and expandable:** This home automation is highly scalable and expandable.

**Security:** This home automation provides a better security system and we can add devices easily to create a consolidated smart home security system.

## CHALLENGES OF HOME AUTOMATION SYSTEM:

Some of the challenges faced by the home automation system are high installation costs, high manufacturing costs and high development costs and so on. These challenges are reducing day by day with the advancement of time, updating of technology and the human power. The way the world is developing is decreasing the challenges of home automation system [5].

## II. LITERATURE REVIEW

In this literature review, different types of home automation systems and its features are discussed and the basic block diagram of smart home automation is figured below.

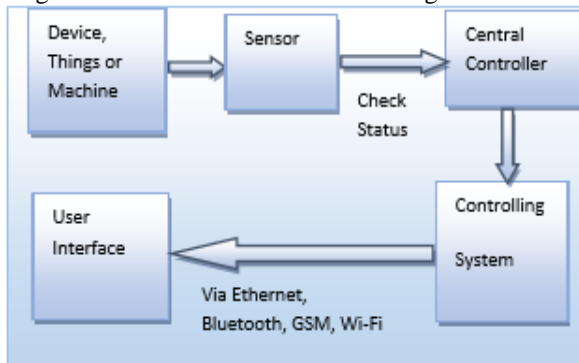


Figure 3: home automation block diagram

[6] Smart home automation has three generations:

- ✓ First generation: It contains wireless technology with proxy server. For example Zigbee automation.
- ✓ Second generation: The term called artificial intelligence controls the electronic devices the example of this generation is Amazon echo.
- ✓ Third generation: A user friendly robot which interacts with humans for example Roomba

This block diagram mainly consists of three components: Web server, hardware interface module and sensor. Web server presents system core that controls and monitors user's home. Hardware interface module is nothing but 8051 microcontroller and the sensor is the motion sensor.

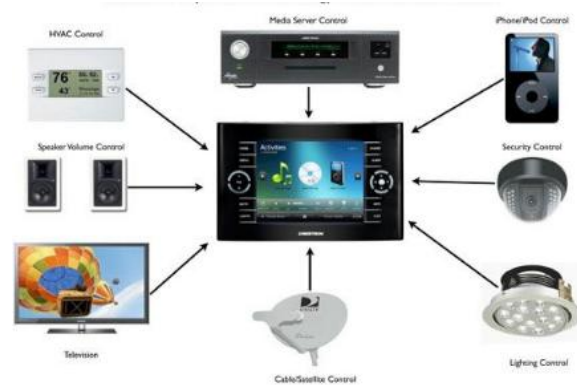


Figure 4: smart home devices

The home automation consists of sensors which detect the temperature, humidity, and the movement of the person in the home. The web server consists of the data which is stored in the database. The basic working principle of this home automation includes the application that has been installed on the android mobile, a web server and the microcontroller card to control and monitor the appliances. The android application on the mobiles issues the command to the microcontroller card. The process of home automation includes an electronic device like a light or a fan. After that a sensor is needed to detect the person. Following that a central controller is provided which acts as the bridge between the sensor and the controlling system. The order can be given by the user interface through the application that has been installed on his android smart phone [7].

**Aurdino:** Arduino is an open source hardware which is often termed as single board microcontroller. The memory used in Aurdino is SRAM and the storage is in FLASH and EEPROM. Most of the Aurdino boards consist of ATMEGA 328 AVR microcontroller. There are different types of Aurdino boards like Aurdino RS232, Aurdino Diecimila, Aurdino Uno R2, Aurdino pro, and Aurdino mega and so on. These are the printed circuit board which consists of different types of pins and features [8]



Figure 5: aurdino kit

**Sensors:** A sensor is a term which identifies and detects the person. There are different types of sensors like motion sensor, infrared sensor temperature sensors and so on. PIR sensor also called as passive infrared sensor consists of a thin pyroelectric film material which responds to IR radiation by emitting electricity. This particular sensor mainly activates the burglar alarm in the place where the flux of electricity takes place. These particular sensors are very economical, ecofriendly and it consumes low power as well as low cost [9].

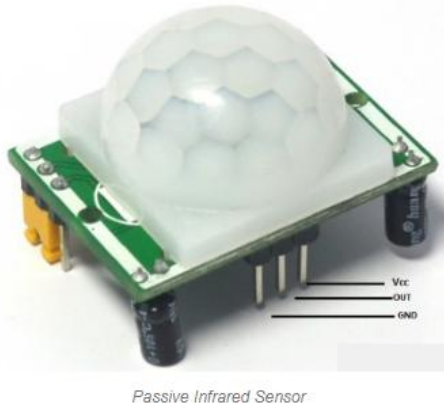


Figure 6: PIR sensor

**Wired or wireless connection:** Basically there are two types of connections: Wired connection and wireless connection. The connection which is connected to that particular system that is where the connection is wired type is called wired connection. For example Ethernet. The connection which is in the wireless form is called wireless connection. For example GSM, Bluetooth. This component is one of the important elements in smart home automation system.

### III. STEPS FOR SMART HOME AUTOMATION INSTALLATION:

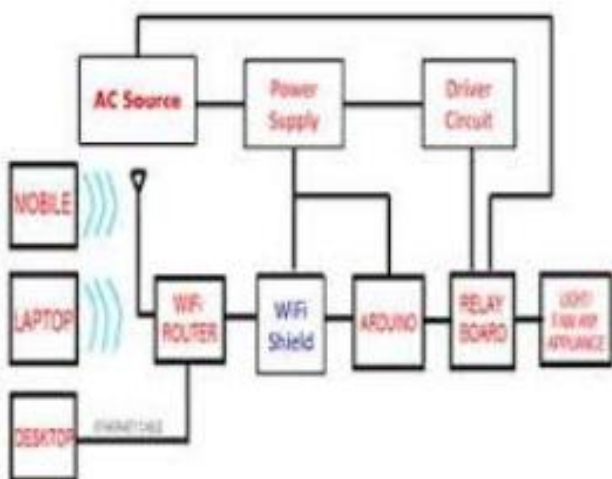


Figure7: steps for home automation installation

- ✓ Firstly give power connection.
- ✓ Next step is to connect to the internet. It may be a wired or wireless connection.
- ✓ Then use the application which has been installed on the smart phone.

- ✓ The next step is to create an account. For the new user we need to generate the password too.
- ✓ After creating an account add the devices which are needed to control using this technique. These are added to the central controller.
- ✓ And next we need to setup the time schedules and actions. Likewise the time at which all doors need to be closed and the time at which all the lights should be on and so on. These are the actions we need to serialize for monitoring our system.
- ✓ Finally the most important thing is to setup the alarm alerts. If any disturbances happened in between that message is sent to our mobile through email or message [10].

### OUTPUT:

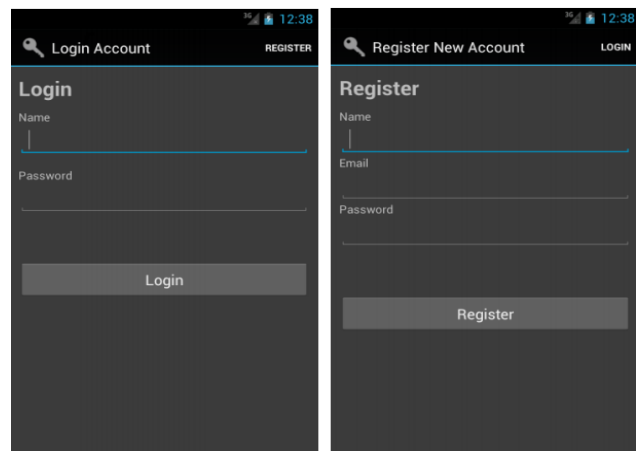


Figure 8: login and register module

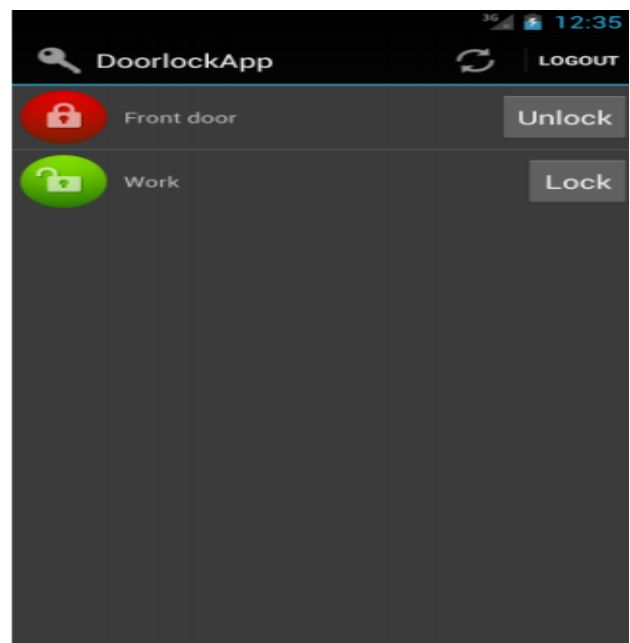


Figure 9: installed apps



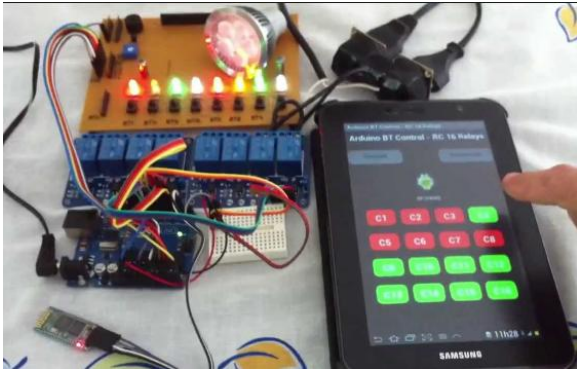


Figure 10:output

## IV. CONCLUSION

Home automation system has been increasing and developing day by day. The future scope of this system is very high since the demand of smart home automation system in the market is very high. These man affordable, secured and smart home automation systems can attract the people easily which in turn provides a rapid change in the technology. Now days there are many platforms which help us to develop our own safe and secured home automation very easily within the low cost and high performance. so, in future there is a better scope for the development of these smart home automation system and can be able to use in not only homes but also in offices, colleges and factories etc.

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