



International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijirccce.com

Vol. 5, Issue 2, February 2017

A Comparative Study and Implementation of Smart Home Automation and Security

D.V.Shinkar¹, Pallavi B. Bhole², Pratiksha R. Giram², Reshma Y. Kale², Harshada V. Patil²

Asst. Professor, Dept. of I.T., JSPM's BSIOTR, Pune, Savitribai Phule Pune University, Maharashtra, India¹

B. E Student, Dept. of I.T., JSPM's BSIOTR, Pune, Savitribai Phule Pune University, Maharashtra, India²

ABSTRACT: Smart Home Automation and security system mainly introduction for the Residential places to make powerful security and avoid the work of aged people. Now a days, people have smartphones with them all the time. So it makes sense to use these to control home appliances. Presented here is a smart home automation system using a simple Android app. which you can use to control electrical appliances with clicks or voice commands. Commands are sent via router to Arduino Uno. Smart Home Automation with Android + Wi-fi + Arduino' system implemented a Home automation using Arduino and Android smartphone App (App inventor). This is a good example for studying about remote control implementation using android Apps. Showing on Smartphone that you can switch on/off lamp in your apartment miles away. It's mostly useful for handicapped people who can handle easily mobile phones and equipment. In this paper we detailed a survey on home control automation using JAVA based ,GSM and Internet by considering the parameters like efficiency of working, controllers used, type of communication, the apps developed etc. A comparative analysis of home automation system is done at last.

KEYWORDS: Smart Automation and Security, Arduino, Embedded Systems, Android ADK, Android phone.

I. INTRODUCTION

Today we are living in 21st century where automation is playing important role in human life. Home automation allows us to control household appliances like Light, door, fan, AC etc. It also provides home security and emergency system to be activated. Home automation not only refers to reduce human efforts but also energy efficiency and time saving. The main objective of smart home automation and security is to help handicapped and old aged people who will enable them to control home appliances and alert them in critical situations. The system proposed provides to control the home appliances using android APK and Arduino board. mainly the use of cellular phones got the novelty of distance communication at remote location. Paper makes use of this ability for remote control of instruments and appliances; take a look at this example, a person on a drive within his car all of a sudden memorizes that he left the Cooler, ON actually it should be OFF. The usual circumstance is to drive back and switch OFF. But with the Android mobile phone in the hand equipped with android application, one looks on how the same could be used to result control at any point, anywhere and time without worrying geographical locations.

II. LITERATURE SURVEY

As per our survey currently there exists no system at cheaper rates. Various systems are hard to install, difficult to use and maintain. Current systems are generally proprietary and closed, not very customizable by the end user.



International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 2, February 2017

Title 1:-Java-Based Home Automation System

Authors :- A. R. Al-Ali & M. AL-Rousan

Year Of Publication:- 2004.

In this paper[1], we present an attractive low-cost solution for home automation via the Internet. Using Internet access, home owners can remotely monitor and control almost any appliance at home. Local control is also offered in our design. Some security is imposed when logging into the system using Java Beans and Java Server Pages (JSPs). Appliances at home are connected to an embedded system board (E-board). The control code on the E-board operates the appliances and communicates with Java-based code that resides at the server at home. The user can interact with the home automation system from anywhere at any time. Furthermore, the system is flexible and scalable. Additional home appliances can be integrated into the system with little modification. Since the server's software engine is written in Java, it is portable and can run on any platform.

Advantages-

- 1.The system is scalable and allows multi-vendor appliances to be added with no major changes to its core.
- 2.Password protection is used to block unauthorized users from accessing the appliances at home.
- 3.If the Internet connection is down or the server is not up, the embedded system board still can control and operate the appliances locally.

Limitations-

1. the system only shows how to solve home automation problems at the software level; hardware aspects were not considered.
2. This system is not affordable by common people because of its high cost.
- 3.System implementation is complicated because its includes many java server pages and packages hence it is not easily understandable to the user.

Title 2:-Design and Implementation of Home Automation System

Authors :- A. Alheraish

Year Of Publication:- 2004

M2M Wireless communication of various machines and devices in mobile networks is a fast growing business and application area in industry, maintenance business, customer service, security and banking areas. This paper presents design and implementation of remote control system by means of GSM cellular communication network[2]. The design integrates the device to be controlled, the microcontroller, and the GSM module so that it can be used for a wide range of applications. Detailed description and implementation of each design element are presented. To verify the principle operation of the M2M design, two home applications are experimentally tested using PC-based environment.

Advantages-

1. The wide spread coverage of GSM which makes the machine online for almost all the time.
2. The GSM network has a low cost compared to constructing a network for M2M and also compared to other mobile communication such as satellite communication.
3. The GSM network security is very high so the information can not be taken by any outsider.

Limitations-

- 1.The module logs on to the GSM network to send or receive the data needed for monitoring or controlling.
2. The process of the system is very time consuming because the microcontroller takes the data from the interface and makes some calculations if needed then translates the data into AT command.
3. using so many technologies such as DMTF, SMS, and GPRS and the designer has to choose the suitable technology for the design.



International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 2, February 2017

Title 3:-An Internet Based Wireless Home Automation System for Multifunctional Device.

Authors :-Ali Ziya Alkar and Umit Buhur

Year Of Publication:- 2005.

The aim of home automation is to control home devices from a central control point. [3]In this paper, we present the design and implementation of a low cost but yet flexible and secure internet based home automation system. The communication between the devices is wireless. The protocol between the units in the design is enhanced to be suitable for most of the appliances. The system is designed to be low cost and flexible with the increasing variety of devices to be controlled .

Advantages-

1. secure web based, flexible, wireless solution where the home appliances of most types can be connected to a central node through a server.
- 2.The system is designed to be low cost however at the same time more flexible alternative with respect to similar systems.

Limitations-

- 1.The system is modeled with three different units,if one unit is down then another two units are of no use.
- 2.the process of the system is very time consuming because the internet we can access the database directly,the status changes that are reflected to the database are transferred to the device through first the master and then to the slave nodes.

III. PROPOSED SYSTEM

The proposed or we can say to introduce this system for overcome the drawbacks and limitations of the existing system. In this system we are going to use arduino board with the android phone. The arduino is computer open-source hardware, open source software and micro controller based kits mainly to provide low cost and professionals to create device that interact with their environment using sensor. Smart Home management system consists of several module to remotely control the lamp, central lights,door,air-conditioner. But in this system we are going to implement for electrical appliances are fan and lamp only.

Arduino board is open source electronics platform based on easy-to-used hardware and software.Arduino boards are able to read inputs - light on a sensor, a finger on a button and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do the arduino programming language and the arduino software (IDE), based on Processing.

Android is a software stack for mobile devices that includes an operating system, middleware and key applications. The Android OS is based on Linux. Android Applications are made in a Java-like language running on a virtual machine called 'Dalvik' created by Google. The Android SDK provides the tools and APIs necessary to begin developing applications on the Android platform using the Java programming language. Accessory mode is a feature of Android OS since version.

Architecture of Smart Home Automation system:

As shown in figure 3.1, The home appliances are connected to the input/output ports of arduino. The android running OS in any phone connected to a network can access the status of the home appliances via an application. It presents the design and implementation of automation system that can monitor and control home appliances via android phones.For this smart home automation and security system we are targeting Android platform since it has huge market and open source. The major components of the system as follows :

Android Device - It is the device through which application interacts with sensors.

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 2, February 2017

USB Connector - It is the hardware port in the kit through which the USB device is attached to the embedded kit.

Embedded Device - It consists of individual embedded kits along with respective sensors.

This project is based on Android and Arduino platform both of which are FOSS(Free Open Source Software). So the overall implementation cost is very cheap and it is affordable by a common person.

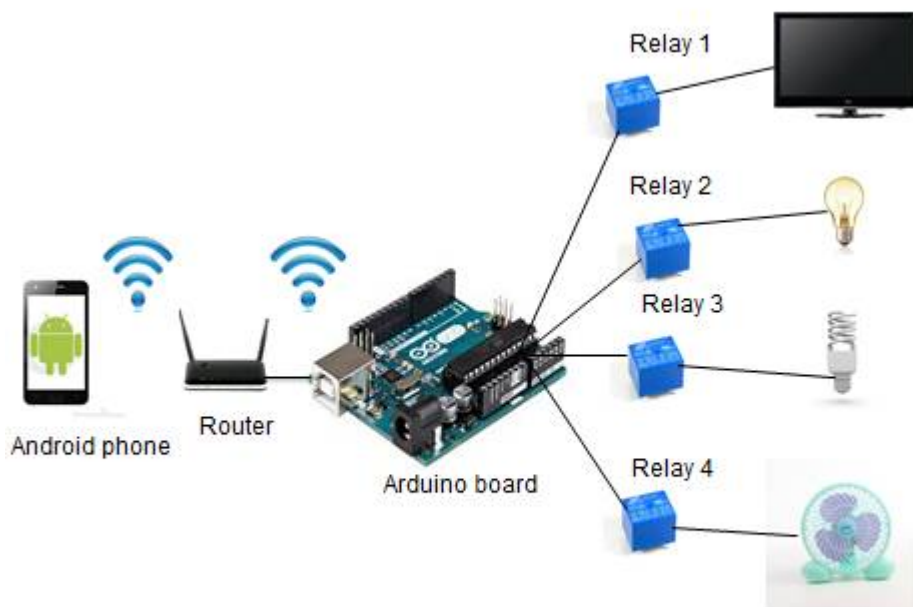


Figure 3.1. Architecture of Home automation

IV. CONCLUSION

Smart automation system will definitely help everyone in day to day life. As we are using an android application which will help us remote access of any electrical appliances. Use of Arduino instead of Raspberry Pi reduces the main cost of the Home automation kit. This system can be expanded to many areas by not restricting to only home. Emergency alarm can be added into the system for more safety. It will be flexible to support various wired as well as wireless technologies like Bluetooth, Zigbee, Wi-Fi, World Wide Web.

REFERENCES

- [1] Al Ali, Member, IEEE & M. AL Rousan, "Java Based Home Automation System R." IEEE Transactions on Consumer Electronics, Vol. 50, No. 2, MAY 2004
- [2] A. Alheraish is with the Electrical Engineering Department, King Saud University, Riyadh, Saudi Arabia, IEEE Transactions on Consumer Electronics, Vol. 50, No. 4, NOVEMBER 2004
- [3] Ali Ziya Alkar and Umit Buhur, "An Internet Based Wireless Home Automation System for Multifunctional Device" ,IEEE Transactions on Consumer Electronics, Vol. 51, No. 4, NOVEMBER 2005
- [4] Deepali javale, Mohd Mohsin, Mayur Shingate & Shreerang Nandanwar " Home Automation and Security System Using Android ADK" IJECCT Volume 3 Issue 2 March 2013