

# Advanced Home Automation System Using Open Source Android Operated Application

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*Abstract - In recent years, the number of network enabled digital devices and services at homes has been increasing fast. With the rapid increase of the Internet, the owners have been requesting remote control and monitoring of these in-home appliances. This application leads to networking these appliances to form a kind of home automation system. In this paper, an Android based home automation system that allows multiple users to control the appliances by an Android application developed as well as using a web server is created. The system used has three hardware components: raspberry pi a local connected device to transfer signals to home appliances, a Web server to store customer records and support services to the other components, and a smart mobile phone smart device running Android application developed. Distributed cloud platforms systems and services of Google are used to support messaging between the components. The prototype implementation of the proposed system is evaluated based on the criteria considered after the requirement analysis for an adequate home automation system. The aim of this paper is to survey papers, finding out the best method to provide home automation system using android application operation also by creating a web server connected to ARM 7 board.*

**Key Words:** Android, wi-fi, router, wireless communication, web server, ARM 7 BOARD.

## 1. INTRODUCTION

### 1.1 Review

In recent years, the number of network enabled digital devices at homes has been increasing fast. With the rapid increase of the Internet, the owners have been requesting remote control and monitoring of these in-home appliances. This leads to networking these appliances to form a kind of home automation system. In this paper, an Android based home automation system that allows multiple users to control the appliances by an Android application or through a Web site is presented. The system has three hardware components: a local device to transfer signals to home appliances, a Web server to store customer records and support services to the other components, and a mobile smart device running Android application. Distributed cloud platforms and services of Google are used to support messaging between the components. The prototype implementation of the developed system is evaluated based on the basis of considered after the requirement for an adequate and smart home automation system.

### 1.2 Need of Home Automation

Electronic and Electrical environment with respect to context is any environment which consists of appliances such as fans, television sets, air conditioners, motors, heater, lighting systems, etc. A remotely accessible environment is an environment in which each appliance can be remotely accessed and controlled using software as an interface, which includes an Android application and a Web application. Such remotely accessible systems are already available in the market, but have a number of drawbacks as well. This paper aims to perform a survey of all the existing such systems and compare the available features.

### 1.2. Challenges in Home Automation

Today's homes require sophisticated control in its different gadgets which are basically electronic appliances. This has revolutionized the area of home automation with respect to an increased level of affordability and simplicity through the integration of home appliances with smart phone and tablet connectivity. Smart phones are already feature-perfect and can be made to communicate to any other devices in an ad hoc network with a connectivity options like Bluetooth. With the advent of

mobile phones, Mobile applications development has seen a major outbreak. Utilizing the opportunity of automating tasks for a smart home, mobile phone commonly found in normal household can be joined in a temporary network inside a home with the electronic equipments. Android, by Google Inc. provides the platform for the development of the mobile applications for the Android operated devices. Home automation system is a mobile application developed using Android targeting its vast market which will be beneficial for the masses. Android maintained its leadership position in global market share. Bluetooth is a short-range wireless communication technology that comes in handy as the solution while communicating over an ad hoc network environment like the home environment for connecting the home appliances with the mobile phones. Bluetooth works over 2.4 GHz frequency range up to the range of 100 m with 1 Mbps speed, providing a safe and efficient solution for controlling home automation.

## 2. Survey of work done

[1] Sirsath N. S, Dhole P. S, Mohire N. P, Naik S. C & Ratnaparkhi N.S in 2014 [1], This paper proposes a Home Automation system that employs the integration of multi-touch mobile devices, cloud networking, wireless communication, and power-line communication to provide the user with remote control of various lights and appliances within their home [11]. This system uses a consolidation of a mobile phone application, handheld wireless remote, and PC based program to provide a means of user interface to the consumer.

[2] Basil Hamed in 2014 [2], The main objective of this Paper is to design and implement a control and monitor system for smart house. Smart house system consists of many systems that controlled by LabVIEW software as the main controlling system in this paper. Also, the smart house system was supported by remote control system as a sub controlling system. The system also is connected to the internet to monitor and control the house equipment's from anywhere in the world.

[3] Deepali Javale, Mohd. Mohsin, Shreerang Nandanwar, in 2015 [3] The prime objective of this paper is to assist handicapped/old aged people. It gives basic idea of how to control various home appliances and provide a security using Android phone/tab. The design consists of Android phone with home automation application, Arduino Mega ADK. User can interact with the android phone and send control signal to the Arduino ADK which in turn will control other embedded devices/sensors.

[4] Basma M. Mohammad El-Basioni, Sherine M. Abd Elkader and Mahmoud Abdelmonim Fakhreldin , in 2015 [4]. This paper proposes a new design for the smart home using the wireless sensor network and the biometric technologies. The proposed system employs the biometric in the authentication for home entrance which enhances home security as well as easiness of home entering process. The structure of the system is described and the incorporated communications are analyzed, also an estimation for the whole system cost is given which is something lacking in a lot of other smart home designs offers. WB-SH is designed to be capable of incorporating in a building automation system and it can be applied to offices, clinics, and other places. The paper ends with an imagination for the future of the smart home when employs the biometric technology in a larger and more comprehensive form. The paper ends with an imagination for the future of the smart home when employs the biometric technology in a larger and more comprehensive form.

[5] Baris Yuksekkaya, A. Alper Kayalar, M. Bilgehan Tosun, M. Kaan Ozcan, and Ali Ziya Alkar in 2006 [5] In this paper A GSM, Internet and Speech Controlled Wireless Interactive Home Automation System in which system uses the GSM network along with an AVR microcontroller. This is also an SMS based system. The user enters the commands. These are sent via SMS. However, this system uses a standardized AVR code that can be easily interpreted by the microcontroller. In this system a GSM module that is attached to the AVR. This system has remote access capabilities from all over the world. However it cannot function in real time.

[6] K. Atukorala, D. Wijekoon, M. Tharugasini, I. Perera, C. Silva in 2009 [6]. In this paper the main objective of this paper is to propose a solution to home automation and security. Automation can be defined as the replacement of manual operations by computerized methods. The early prototypes of commercial products were first being developed at the end of the 1970's, over

38 years ago. Number of attempts has been made to develop, implement and maintain standardization for control system of home automation.

[7] Saeed Uz Zaman Khan, Tanvir Hasnain Shovon, Jubayer Shawon, Adeeb Shahriar Zaman, Saadi Sabyasachi in 2013 [7]. In this paper a microcontroller based programmable home appliance manager, named as 'Smart Box' is presented. Which provides some excellent smart features such as like remote control, adaptive automatic control, programmability etc. Altogether these features help the user to control household appliances efficiently and reduce energy wastage in the home based equipments in the household appliances. In recent works, similar appliance control systems are introduced which use high level communication protocol like Zigbee . But in this system work common IR (Infrared detection) based TV remote controller is interfaced with the 'Smart Box' as a communication medium, which makes it very much user friendly and cost effective.

**Table 1.1 comparison of Home automation systems and technology used**

Sr no	Name of the paper	Method used and employed	Limitation of system developed
1	Home Automation using Cloud Network and Mobile Devices	Employs the integration of multi-touch mobile devices, cloud networking, wireless communication, and power-line communication to provide the user with remote control of various lights and appliances.	Requires more time.
2	Design & Implementation of Smart House Control Using LabVIEW	Consists of many systems that controlled by LabVIEW software	Requires detailed knowledge of Labview and less user friendly.
3	Home Automation and Security System Using Android ADK	Android phone with home automation application, Arduino Mega ADK	Arduino has live buffering problems.
4	Smart Home Design using Wireless Sensor Network and Biometric Technologies	The biometric in the authentication for home entrance which enhances home security as well as easiness of home entering process	Not fully secured for home leaving.
5	Internet of Things: Ubiquitous Home Control and Monitoring System using Android based Smart Phone	System uses the GSM network along with an AVR microcontroller. This is also an SMS based system	GSM network need more time to execute operation.
6	Smart Eye - Integrated solution to home automation, security and monitoring through mobile phones	The replacement of manual operations by computerized methods	GPRS technology requires more time for operation.
7	Smart Box : A TV Remote Controller Based Programmable Home Appliance Manager	A microcontroller based programmable home appliance manager	Very less operation speed. Used less application for home automation.

### 3. CONCLUSIONS

Thus we can conclude that by taking review of above papers and technology used we can decide that in what direction we have to work.

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