

# Android based Smart Home : Remotely Controlling and Monitoring Home Appliances

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**Abstract** - This research work inspects the latent of 'Full Home Control', which is the aim of the Home Automation Systems in proximate future. The main idea behind the "smart" devices is that they can operate to some extent interactively and autonomously thereby helping people in managing the appliances freely and smartly. Based on this approach, a smart home automated system is designed by implementing related software and hardware.

The paper proposes an implementation of IoT (Internet of Things) based smart home automated system to remotely control the home appliances using Wi-Fi. The investigation and enactment of the home automation technology to control home appliances such as light, conditional system, and security system via Short Message Service (SMS) text messages is presented in this paper. The android mobile is used to direct the commands to the arduino to switch all the home usages. The main feature of this system is to control the energy levels of home usage like speed of fan based on temperature, intensity of light and another feature that get the prestige of our home appliances from our android mobile phone. So the concept of IoT is being used to make home smarter.

**Key Words:** Arduino, Android, Wi-Fi, Home Automation, SMS, GSM, Automatic Switching, sensors etc.

## 1. INTRODUCTION

Internet of Things (IoT) is extension of current internet to provide communication, connection, and internetworking between various devices or physical objects also known as "Things". IoT term symbolizes a general notion for the ability of network devices to sense and gather data from the world around us, and then share that data across the Internet where it can be processed and utilized for various interesting purposes. Home automation system signifies and rumors the status of the connected devices in an innate, user-friendly interface allowing the user to interact and control various devices with the touch of a few buttons. Some of the major communication technologies used by today's home automation system include Bluetooth, Wi-MAX and Wireless LAN (Wi-Fi), and Global System for Mobile Communication (GSM) [1].

All GSM is one of the most widely used cellular technologies in the world [2,3]. With the increase in the number of GSM subscribers, research and development [4- 6]

is heavily supported in further investigating the GSM implementation.

Among the cellular technologies, GSM system is chosen for the communiqué between the home appliances and the user due to its wide spread coverage [8,9] which makes the whole system online for almost all the time. Another advantage of using the GSM network in home automation is its high security infrastructure, which provides maximum reliability whereby other people cannot monitor the information sent or received. Hence, this exploration graft implements SMS based control for home appliances using the GSM architecture without accessing the native network.

## 2. LITERATURE REVIEW

Every day we are aiming for a relaxed and more convenient method of living. Technology plays an anchor role in making our homes more automated and hence more convenient. This research objective is to design and implement a cost effective but yet flexible, adaptive and secured Home automation system. This paper is about home automation system which would use a Smartphone to enable the authorized user to operate all the appliances.

## 3. PROPOSED SYSTEM

The android OS provides the flexibility of using the open source. The inbuilt sensors can be accessed easily. We have built an application with following features. Android Phone acts as a client and data are sent via sockets programming.

1. Switch Mode
2. Voice Mode

Switch mode uses the radio buttons that are used to control the home appliances. The radio button sends the status of the switch.

Voice Mode is used to control the home appliances using voice command. Using the inbuilt microphone of Smartphone, the application creates an intent that fetches the speech data to the Google server which responds with a string data. The string data are further analyzed and then processed.

## 4. SYSTEM REALIZATION

The design of our proposed smart GSM-based home automation system is given in Fig. 1. The architecture

consists of mobile phone and GSM modem. In the proposed system design, incoming SMS message is sent from the user phone to the GSM modem as a text message via cellular network. Outgoing message from the system containing the home appliances status is delivered to the mobile phone through GSM modem.

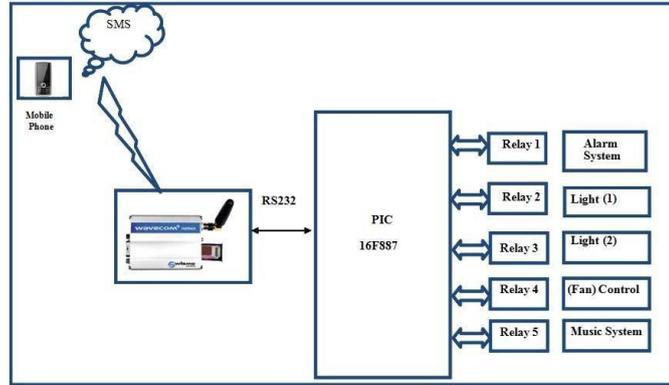


Fig. 1. System Realization.

4.2. SYSTEM OVERVIEW

In this section an elaborated design of proposed home automation system and the components used in it is presented.

3.3 SYSTEM ARCHITECTURE

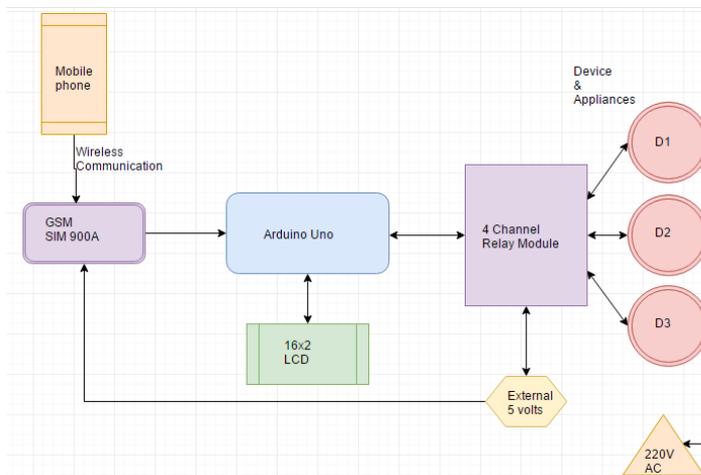


Fig. 2. System Architecture with GSM

Features:

**Voice Command :** The project will have an android application in the users android device. This application is designed to receive the voice commands from the user and automatically. The application will the automatically convert the voice signals into digital data and send these signals to the Microcontroller.

**Smart Speech Sense :** The application will be coded as such to decode the meaning of any statement from the user. The user won't be restricted to use of any particular command set. He would just have to state out his command & the

application will itself sense the meaning of the user's speech & convert it into respective available command (this is done by Google).

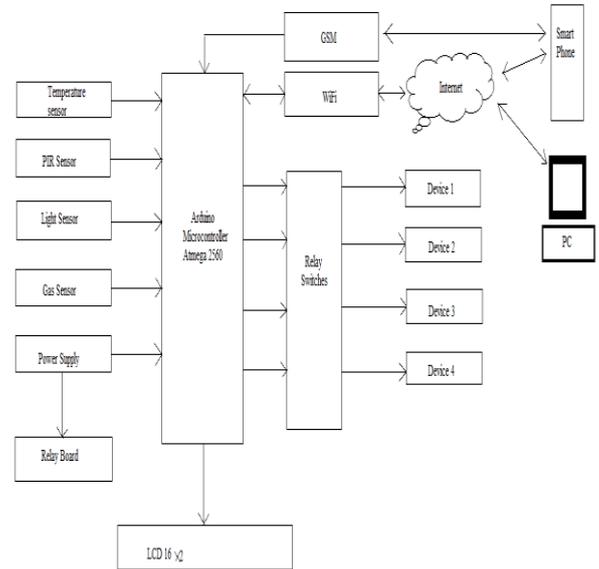


Fig. 3. System Arch. With sensor.

4. METHODOLOGY

Our methodology is divided into six phases.

**Phase 1 - Problem identification and background:** In this phase, the objectives of the research and the problem statement are formulated and defined. Both functional and non-functional requirements are identified and described.

**Phase 2 - Literature review and survey:** In this phase, a detailed literature review is carrier out. Relevant papers are analyzed, and the methods and concepts used in different types of smart home technologies are catalogued. In addition, methods used to connect sensors with computing systems are analyzed. Then, the most suitable server to be used in this system is proposed. The method of integration of Android application to the smart home technologies is analyzed.

**Phase 3 - Design proposed model:** In this phase, the Graphical User Interface (GUI) and database is designed based on the requirements identified in Phases 1 and 2.

**Phase 4 - Develop prototype and simulation:** In this phase, the prototype is developed and simulations are performed.

**Phase 5 - Testing and Evaluation:** Here, the developed system is tested to ensure the system objectives and requirements are met. The developed *app* undergoes alpha and beta test before deployment. If bugs or errors occur, refinements and improvements are conducted until the objectives are satisfied.

**Phase 6 - Deployment:** In this phase, the tested system is officially released for public use. In the next three sub-sections A to C, the wireframe of the proposed model, the algorithm and the conceptual model are shown and described.

### SOFTWARE DESIGN

The software section includes speech recognition software design and embedded software design. Voice recognition is the technology by which sounds, phrases etc. spoken by beings are converted into electrical signals and these signals are changed into coding patterns to which meaning is allotted.

This concept could more generally be called as speech recognition. These human voices are converted into signals by application.

### 6. RESULT ANALYSIS



Fig 4. User Authentication

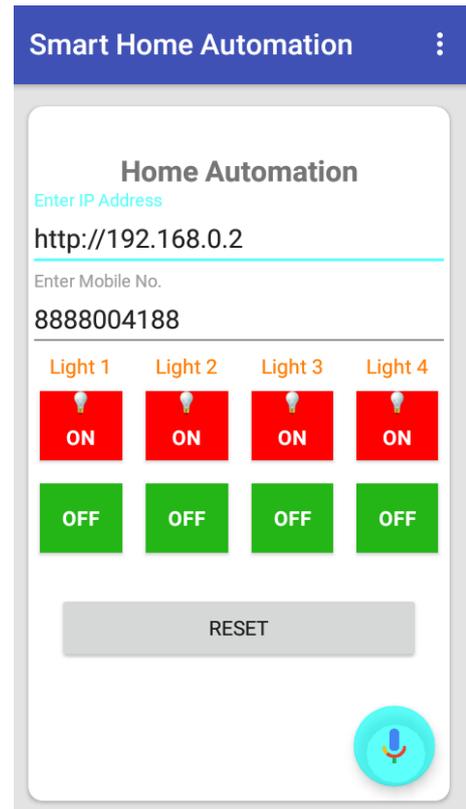


Fig 5 . No. of Devices

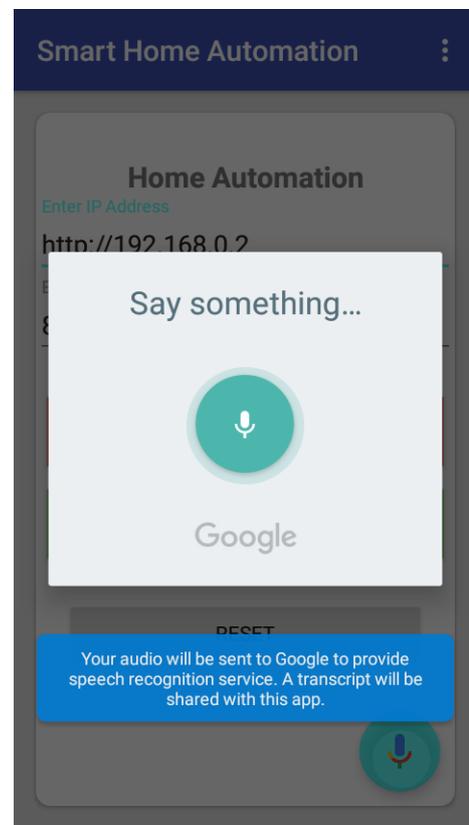


Fig 6. Speech Recognition

## ADVANTAGES

The system is requires less cost and is very flexible. It also provides security to the system. Finally it makes home as SMART HOME.

## CONCLUSION

Recently, the home automation market is very promising field that is growing very fast and needs vast range of developments that can be carried out in the concept of smart home.

Voice Controlled Home Automation is a very different concept than what is presently available in the market. This would make automation easier.

In future, the system could use more concepts of Artificial Intelligence so as make it more user friendly and increase the automation.

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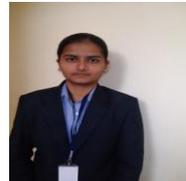
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