

Home Automation System using Android for Mobile Phone.

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Abstract- Automation of the surrounding environment of a modern human being allows increasing his work efficiency and comfort. There has been a significant development in the area of an individual's routine tasks and those can be automated. In the present times, we can find most of the people clinging to their mobile phones and smart devices throughout the day.

Hence with the help of his companion a mobile phone, some daily household tasks can be accomplished by personifying the use of the mobile phone. Analyzing the current smart phone market, novice mobile users are opting for Android based phones. It has become a second name for a mobile phone in layman terms. Home Automation System (HAS) has been designed for mobile phones having Android platform to automate an 8 bit Bluetooth interfaced microcontroller which controls a number of home appliances like lights, fans, bulbs and many more using on/off relay. This paper presents the automated approach of controlling the devices in a household that could ease the tasks of using the traditional method of the switch. The most famous and efficient technology for short range wireless communication- Bluetooth is used here to automate the system.

Keyword- *Android, mobile, HAS, Bluetooth (BT) , microcontroller.*

I INTRODUCTION

In the past few years there are so many inventions in the field of consumer electronics such as cellular phone, air conditions, home security devices and home theatres. All these appliances can be easily controlled by a single controller, using

personal area network in a home environment. Busy environment and personal limitation the market is going towards the home automation and networking and Bluetooth is an ideal solution for this purpose. In buildings, temperature and other electronics devices can be easily controlled by home automation but high degree of computer work is involved. This report demonstrates a simple home automation system which consist of remote mobile, host controller, and several home appliance. The client module can communicate with host controller through a wireless devices such as Bluetooth.

II LITERTURE SURVEY

Automation is a technique, method, or system of operating or controlling a process by electronic devices with reducing human involvement to a minimum. For literature survey we studied the 8 IEEE papers. The fundamental of building an automation system for an office or home is increasing day-by-day with numerous benefits. Industrialist and researchers are working to build efficient and affordability automatic system to monitor like lights, fans, AC based on the requirements. Automation makes not only an efficient but also an economical use of the electricity and water reduces much of wastage.

During survey on Home Automation, we understand there are some technology which workings on same. Some of them uses WI-FI based HAS, web server based, email based wireless sensor based GSM based, android, BT based, Dual Tone Multi Frequency based (DTMF) etc.

Some of there has drawback, like GSM based system has disadvantages of cost and reliability of SMS and call tariff. DTMF uses telephone wires,

keypad but it has drawback that the no. of appliances is limited by the number of keys in the keypad. Home automation using zigbee has drawback of data rate and results in slow speed commands.

Our system Android based Home Automation System has advantages over all those which are discussed on above. Our system uses BT as a communication interface, which has fast data speed than zigbee. It has only one time cost and some negligible maintenance while some system requires data tariff and call tariff to put system working mode continuously. Some system listed above requires expertise to keep system on track but in our system uses Android GUI which is suitable for present condition and its ease of use. So overall our proposed system is good and it overcomes all the suggested drawbacks.

III METHODOLOGY

A. System overview-

Automation is also involved in building management system in which lights, temperature, security devices and other appliances are controlled through a high degree of computer involvement. In this report, all the devices which are used in buildings management system are control by a single controller using a wireless network. Client module and host controller are used to communicate with each other through a wireless device such as Bluetooth enabled the mobile phone. In this, an android based home automation is not a new thing but the advanced automation system in nowadays require a abig and expensive infrastructure. In this , we have proposed a low cost, flexible secure automation system that can easily control TV, tube lights and fans from android based mobile phone using Bluetooth. Here HC-05 Bluetooth module and microcontroller PIC16F877A is used for switching .this controller has 5 I/O ports.

B. Block diagram-

Description:

In this block diagram microcontroller is programmed in c language and used to turn on and off the appliances, which are connected through relays, when we send the commands through Bluetooth from a mobile phone. A feedback circuit also designed and implemented to check the current

status of the device after it receives the command from mobile phone. Once the command has sent to turn on the device, then the feedback circuit first check the current status then send the command to turn on and the circuitry led indicates the malfunctioning that the command was not executed successfully. The communication is done one by one at one time in both directions between the android mobile phone and Bluetooth module. This communication is half duplex.

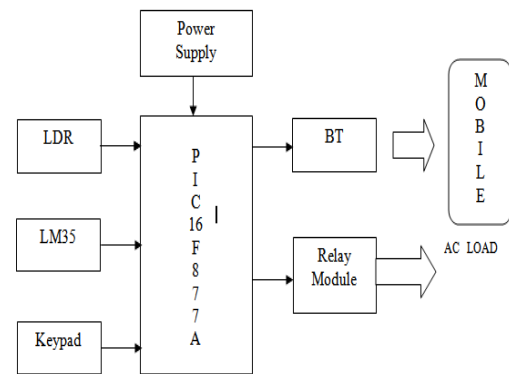


Fig.2 Block diagram

IV HARDWARE SPECIFICATION

A.LDR SENSOR:



Fig.3 LDR sensor

A Light Dependent Resistor (LDR) or a photo resistor is a device whose resistivity is a function of incident electromagnetic radiation. Hence they are light sensitive device. They are also called as photo conductors, photo conductive cells or simply photocells. They are made up of semiconductor materials having high resistance.

A light dependent resistor works on the principle of photoconductivity. Photoconductivity is an optical phenomenon in which the material conductivity is

increased when light is absorbed by the material. When light falls that is when photons fall on the device, the electrons in the valence band of the semiconductor material are excited to the conduction band.

B. TEMPERATURE SENSOR:

We are giving facility in our proposed system to measure and display the surrounding temperature. For this purpose we are using the LM35 sensor IC to measure temperature. The LM35 series are precision integrated-circuit temperature devices with an output voltage linearly proportional to the Centigrade temperature. The LM 35 devices has an advantage over linear temperature sensors calibrated in Kelvin , as the user is not required to subtract a constant voltage from the output to obtain convenient Centigrade scaling. The LM35 device does not require any external calibration or trimming to provide typical accuracy of $\pm 1/4^{\circ}\text{C}$ at room temperature and $\pm 3/4^{\circ}\text{C}$ over a full -55 to 150°C temperature range. Lower cost is assured by trimming and calibration at the Wafer level.



Fig.3 Temperature sensor LM 35

The low-output impedance, linear output and precise inherent calibration of the LM35 device makes interfacing to read out or control circuitry especially easy. The device is used with single power supplies, or with plus and minus supplies. As the LM35 device draws only $60 \mu\text{A}$ from the supply, it has very low self-heating of less than 0.1°C in still air. The LM35 device is rated to operate over a -55°C to 150°C temperature range, while the LM35C device is rated for a -40°C to 110°C range (-10° with improved accuracy). The LM35-series devices are available packaged in hermetic TO transistor packages, while the LM35C, LM35CA, and LM35D devices are available in the plastic TO-92 transistor package. The LM35D device is available in an 8-lead surface-mount small-outline package and a plastic TO-220 package.

C. BLUETOOTH MODULE:



Fig. 4 Bluetooth module

Bluetooth is a standard for the short-range wireless interconnection of cellular phones, computers, and other electronic devices. Bluetooth consumes less energy, simple to setup, secure and needs less hardware. This technology is especially useful in home environment, where there exist hardly any infrastructure to interconnect intelligent appliances.

Wireless networks for short range communications have a wide spread usage of Bluetooth radio transmissions between 2400–2480 MHz by Telecom vendor Ericsson since 1994. Bluetooth technology forms small ad hoc networks termed as Personal Area Networks (PANs) also provides a mechanism to emulate the RS-232 data cables, supervised by the Bluetooth Special Interest Group, since 1998. Modern mobile devices embed small, low-powered and cheap integrated chips functioning as short-range radio transceivers for Bluetooth radio communications. Device pairing, authentication, encryption and authorization techniques have given recognition to Bluetooth technology due to its vital security mechanisms.

Different types of Bluetooth applications can be developed using Android platform architecture using the Bluetooth profiles. The device manufacturers provide the services using the support of these profiles in their devices to maintain compatibility for the Bluetooth technology.

The Bluetooth profile used in Home Automation System (HAS) Android mobile phone application is the Bluetooth Serial Port Profile (btspp). RFCOMM is a connection-oriented protocol. It provides streaming communication between the devices. The btspp profile and RFCOMM protocol are used in the application to access the serial port and communicate using streaming data. All of the Bluetooth APIs is available in the android Bluetooth package.

Bluetooth has inherent security in two ways. The first is that it is not always broadcasting, unlike a Wi-Fi connection. When you want to connect two devices via Bluetooth you set them to be visible, also sometimes called "discoverable." This visibility is only necessary until the devices have been paired. Once paired, you can turn off visibility and keep the device closed to new connections. The second level of security is that in most cases you will need to

authorize the connection using a PIN or code to connect two devices. For instance, if you have your laptop's Bluetooth set to discoverable, a stranger still can't connect to your computer until you approve the connection manually. Finally, the shorter range of Bluetooth devices means that users outside your home are unlikely to even see your Bluetooth device.

D.SMARTPHONE:

In our project android based home automation project we have to use a mobile phone to control home appliances. Recently numbers of mobile phones are available in market. As per surveying report which we done, many people uses android operating system mobile phone. The reason behind it is that it's easy Graphical User Interface (GUI) and easily available. So keeping these factors in mind we decided to use android based Smartphone.

V FLOW CHART

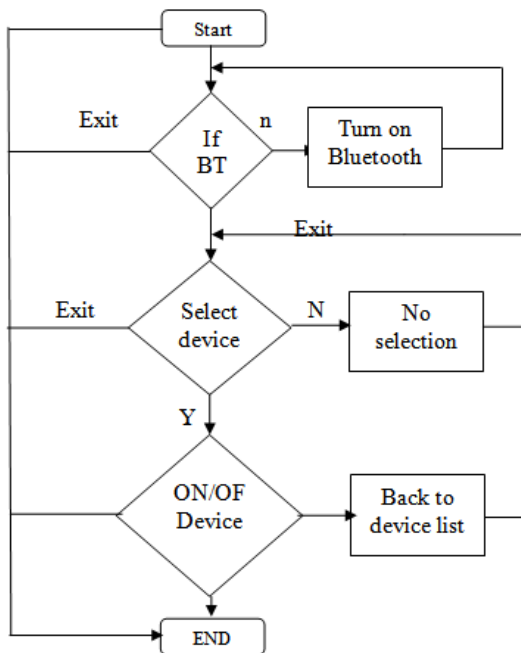


Fig 5. Flow chart of system

VI. CONCLUSION

Design and implementation of a Home Automation System using Android for mobile phone has been discussed. The purpose of the system is to use mobile phone's inbuilt Bluetooth facility for

automation without using Air Time. Different hardware and software unit of the system are described. The complete application software has been, Bluetooth API and C Language. The HAS application program is tested on various mobile phones and the results are quite satisfactory and response received from the community in general is encouraging. The HAS furnishes a good paradigm for any Automation System based on Mobile Phone and Bluetooth.

VII. REFERANCES

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