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HOME AUTOMATION SYSTEM BASED ON AURDINO

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ABSTRACT

The main objective of this project is to develop a home automation system using an *arduino* board with Bluetooth being remotely controlled by any android OS smart phone. As technology is advancing so houses are also getting smarter. Modern houses are gradually shifting from conventional switches to centralized control system, involving remote controlled switches. Presently, conventional wall switches located n different parts of the house makes it difficult for the user to go near them to operate. Even more it becomes more difficult for the elderly or physically handicapped people to do so.

Remote controlled *home automation* system provides a most modern solution with smart phones. In order to achieve this, a *Bluetooth module* is interfaced to the Arduino board at the receiver end while on the transmitter end, a GUI application on the cell phone sends ON/OFF remotely through this technology. The loads are operated by Arduino board up to – isolators and thyristors using triacs.

USAGE: The home automation systems are used for controlling the indoor& outdoor lights, heat ventilation, air conditioning in the house to lock or open the doors &gates to control electrical &electronic appliances and so on using various control systems with appropriate sensors.

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I. INTRODUCTION

The main purpose of any automated system is to reduce the human labor, efforts, time and human negligence. With this system we can control our home appliances very finely. This paper is designed to control the home appliances using an Android Application with the help of a text message sending through the mobile phones. Moving away from the traditional method like keyboard or switches to control the devices here we are using a method of sending a text message with The Automation is a very trending topic in 21st century, and playing a very important role in our daily lives. The automated system is widely used to reduce human labor, efforts, time and errors due to human negligence, and that's why it is used very widely in our society. Today everyone is having their own Android phones, and the people are using many Android Applications in it. And that's why, this paper presents microcontroller based text controlled Home Automation System using smart phones.

This system enables the user to have a control on every appliance in their homes, as per the user requirement. The system consists of a smart phone and a control circuit. The control circuit consists of Arduino UNO Microcontroller, which processes the user commands which are in the form of text messages. It compare that commands with the the help of our smart phones towards the home appliances, wirelessly with the help of Bluetooth technology and using an Android Application. The foremost aim of this technology is to increase efficiency and reduce the efforts. With the advent of 'Internet of Things' in the last decade, we have been pushing for ubiquitous computing in all spheres of the human interfacing with technology. Automation has an aim to achieve the simplicity with the most efficiency.

In this 21st century everyone is well familiar with the use of the smart phones and the Android Applications. By just writing a text message we are controlling our so many home appliances, in this technique. This system provides the simplest way for making our home as an automated home and an Android Application based home. And hence this home automation system is getting much popularity day by day due to their ease of use and wide operations capabilities. Also the system is very flexible and hence we can control number of home appliances with the help of the system as per the requirement of the users The main objective of this project is to control the home appliances without any physical activity i.e. by operating only the mobile phones. This can help the handicapped person very much by reducing their physical activity. Thus it provides the maximum ease and safety to that handicapped peoples.

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Previously the Same Home Automation System was made with the help of the technology like voice controlled home automation system. But in this system the problems are occurred due to the frequency interfacing of the two or more voice signals interfere with each other if we are going to control the number of home appliances at the same time. Hence this system was not that much accurate.

Block diagram

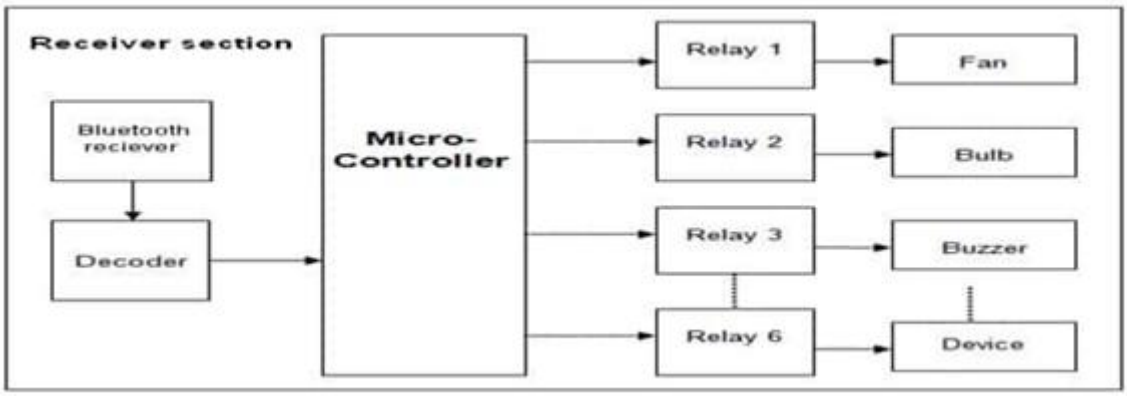

Fig 1.1 block diagram of home automation system

II. LITERATURE SURVEY

Wireless Connection

Due to the advancement of wireless technology, there are several different of connections are introduced such as GSM, WIFI, ZIGBEE, and Bluetooth. Several studies have done based on the wireless connection implemented in HAS. Elshafee and K. Hamed implement WiFi technology as a network infrastructure connecting its parts of system [1]. The system can be accessed from the web browser of any local computer in the same LAN using server IP, or remotely from any mobile device. Preject [2 - 4] by Ahmad Arbab Waheed, J. Zhu and J.-K. Guo demonstrate the design and implementation of ZigBee-based HA networks. The project [3] & [4] are Zigbee based voice interactive HA system. The HA system of [2] & [5] are applied with Bluetooth technology in the design. C.L. Hsu designed Zigbee-GSM combination HA system [6]. B. Yuksekkaya designed GSM-Internet interactive voice control HA system [7]. The system implemented microprocessor and GSM SMS control method by a GSM modem. The system [7] mentioned as low cost but the cost of GSM modem and microcontroller is not considered. Also, long term cost by the GSM is not fully accepted by every user. 6 Based on the study of HAS project done by researchers and developers, K. P. Dutta implemented Microcontroller and a pair of FM transmitter and receiver to establish a RF connection [10]. The simplex connection between control board and controller limited that only one type of input (voice) to the system. Each of the connection has their own unique specifications and applications. Among all the studies described previously, Bluetooth is being chosen due to its suitable capability. Bluetooth connection is most suitable to be implemented as a cost effective HAS designed for disabled people. Bluetooth with globally available frequencies of 2400MHz is able to provide connectivity up to 100 meters and data rate of up to 3Mbps depending on the Bluetooth device class [8]. In addition, a Bluetooth master device is able to connect up to 7 devices in a "Piconet" [9]. Figure 2.1 below illustrates the example of BT "Piconet" with five Slave devices connect to a Master device. The "Piconet" specification allows multiple control boards designed in the system in order to provide full control to the appliances at home.

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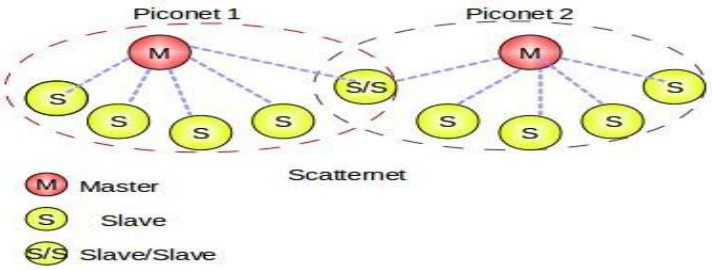

Fig 2.1 example for picone

The capabilities of Bluetooth are more than enough to be implemented in the design. Also, most of the current computer or smart phones are come with built-in BT adapter. It will indirectly reduce the cost of this system.

III. PROBLEM FORMULATION AND STATEMENT

Problem Statement

Disability refers to the inability to perform tasks and maintain life roles. Tetraplegic people are completely unable to operate a button unless they use their tongue, which is obviously a very tedious task. Simultaneously, Paraplegic and Blind people deal with a very uneasy situation which couples with locomotion and identification problem. Elderly people with impairment may not be disabled but they might face inconveniences in identification and reorganization of various home appliance switches in house.

According to World Health Organization (WHO), there are already 1 billion people experiencing disablility globally in year 2012. The amount has occupied 15% of the world's population and growing due to population ageing. The implementation of HAS at home is one of the great steps towards the integration of severely physically disabled and elderly people. The system is being developed to overcome the problems described above, allowing the end-user to perform home appliances control and accomplish some daily life important tasks by voice control. The application designed for portable smart phones through a Bluetooth wireless network provides users with a simple interface to interact with appliances at home. The application also relies on the implement of speech recognition voice control on personal computer.

Solution

A simple home automation system was designed and developed using GSM technology that controls electrical devices at home from a remote location by a simple android smart phone. This is achieved by sending an SMS to receiver present at home which is in turn connected to a hardware kit. The SMS received by the receiver is transmitted to the microcontroller which reads the message and controls the appropriate device.

Scope of Work

This project focuses on developing of a main control board prototype and two Graphical User Interfaces (GUIs) on computer and smart phone. The main control board is constructed by a main controller device, Microcontroller (PIC). The microcontroller interacts with GUIs on computer and smart phone in order to control and monitor the function of target home appliances by using relay circuit. The microcontroller connects to sensor in order to monitor the temperature and humidity level at home. The main control board is designed so that complies with the household electrical standards. Computer GUI is designed with speech recognition system that understands speech and responses appropriate action. The GUI designed on computer implemented Microsoft Agent character to provide virtual real interaction between computer and user. The user interface is designed as simple and powerful as possible, and operates in a self- organized way. complex user interface User interface must be simple so no one need to teach the other every time. But in similar project interface is complex.

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IV. RESULT

The android based home automation project is to control the home appliances by using android mobile phone for very low cost is done and having future scope due increase of technology now a days.

V. CONCLUSION

In this research work a low cost and user friendly design for home automation system is presented. It has better performance than existing Bluetooth based conventional home automation systems, it provides a general approach for home automation which is not only suitable for elderly and handicapped people but it is also beneficial to reduce human labor and save energy with the help of sensors. For the knowledge of readers, this is the first paper on home automation system in which ultrasonic sensor and floating plate are used for water level detection. In addition proposed system has ability to transmit the measurement report of sensors on user smartphone application. Moreover smartphone application used in proposed system.

VI. FUTURE SCOPE

Home automation can be extended to controlling the devices like fans, lights, bulbs, T.V, etc. by monitoring the heartbeat of an individual. The heartbeat is being monitored continuously via heartbeat sensor circuit. If suppose person forgets to switch of a device such as T.V, A.C etc. and falls asleep, then the proposed system is useful. Though there are various systems for home automation already available but none of them gives a provision like this. It will be helpful in saving energy and bringing down the annual cost of an individual's electricity bill thus helping both ways.

Based on surveyed study the comparison of home automation systems are presented. Microcontroller, user interface, a communication interface and their performance factor are compared. There are a number of do-it- yourself (DIY) platforms available that allow to create Home Automation system quickly and easily with low cost and high performance e.g. Raspberry pi, Arduino, other microcontrollers, etc. In this review explained different home automation system e.g. Web based, email based, Bluetooth-based, mobile-based, SMS based, ZigBee-based, Dual Tone Multi Frequency-based, cloud-based and Internet based. In future home automation will more smart and fast. It would be extended to the large-scale environment such as colleges, offices and factories etc.