ARDUINO BASED HOME AUTOMATION USING RF TRANSCEIVER FOR OLD AGED PEOPLE

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ABSTRACT

In today's world most of the home appliances such as fan, light, cooler and air conditioner are generally function through switches of the regular switch board. It is kind of boredom work for most of the people. It is yet critical for senior citizens to move each and every time to operate. They also depend on others to do these tasks and have a guilty feeling of being a burden to others. This situation can be modified using an advanced switching method like a remote control for electronic home appliances. The user will control various indoor appliances via remote by using Radio Frequency (RF) transmitter and receiver in home automation systems. This automation is achieved with the help of arduino microcontroller. So, it could be of greater boon to people who feels difficult to move. During emergency condition, the old aged person can just touch the button in the remote to send messages to the nearest hospital through GSM module. So they can save their life by their own without depending upon others.

Keywords: Arduino, Global System for Mobile communications, Radio Frequency Transmitter and Receiver.

I INTRODUCTION

Nowadays, the remote control Home Automation becomes more significant as well as more attractive. It improves the value of our lives by automating various electrical appliances or instruments. It is is a famous and most used technology in the world.

Most of the electronic and electrical atmospheres are based on this concept. The houses are gradually shifting from normal switches to centralized control system, involving a remote control transmitter. This paper can be upgraded by using arduino microcontroller in the basis of home appliances are controlled through the radio frequency signal. During emergency period, the GSM modem will send an SMS or a call through remote to a mobile.

A RF remote is interfaced to the microcontroller on transmitter side which sends ON/OFF commands to the receiver where loads are connected. By operating the specified remote switch on the transmitter, the loads can be turned On or OFF remotely through wireless technology. The main objective of this paper is to develop a home automation system with a RF controlled remote.

II LITERATURE SURVEY

Nathan David has proposed an embedded micro – web server in Arduino Mega 2560 microcontroller, with IP connectivity for accessing and controlling devices and appliances remotely. These devices can be controlled through a web application or via Bluetooth Android based Smart phone app. The proposed system does not require a dedicated server PC with respect to similar systems and offers a novel communication protocol to monitor and control the home environment with more than just the switching functionality. To demonstrate the feasibility and effectiveness of this system, devices such as light switches, power plug, temperature sensor, gas sensor and motion sensors have been integrated with the proposed home control system.

Mahesh N. Jivani was proposed the remote Home Automation turns out to be more and more significant and appealing. It improves the value of our lives by automating various electrical appliances or instruments. This paper describes GSM (Global System Messaging) based secured device control system using App Inventor for Android mobile phones. App Inventor is a latest visual programming platform for developing mobile applications for Android-based smart phones. The Android Mobile Phone Platform offers an ample of resources and already

incorporates a lot of sensors. No need to write programming codes to develop apps in the App Inventor, instead it provides visual design interface as the way the apps looks and use blocks of interlocking components to control the app's behaviour.

Mohamed S. Soliman presents design and implementation concepts for a wireless real-time home automation system based on Arduino Uno microcontroller as central controllers. It is referred to a self-automated mode that makes the controllers to be capable of monitoring and controlling different appliances in the home automatically in response to the signals comes from the related sensors.

III HOME AUTOMATION

Home automation is the technology, which is formed a networking system to make the all home appliances working together. It is the housing extension of building automation system. This system is actually automating the housing activity.

In this process Home automation system has been introduced to using home appliances without any muscle power. Whereas in performance based people can get automated performance from all home appliances without using the physical efforts. There are several kinds of Home automation system have been introduced such Remote control Home automation system, Global System for Mobile,Zigbee etc. In this paper GSM technology is used which helps the user can easily operate their home via a mobile phone by a simple miscall or short message services.

This system can extent from usual remote control of lighting through to diluted computer or micro-controller based networks with different degrees of intelligence and automation. Most of household tasks are automated by the development of specialized machineries It is obtained for motives of ease, security and energy efficiency.For instance a heater and washing machine. The function of these two instance are a heater can transmit a discrete message when it requires cleaning or a fridge when it wants service whereas automatic washing machines are developed to reduce the physical labour of washing clothes.

IV METHODOLOGY

The GSM based system will provide the three controls such as gsm network signal, the speech and the internet. The real time monitoring has been an important feature that can be used in

the home automation systems.GSM is used as a communication medium to help establish connection in places where there may not be proper internet connectivity. The server uses AT commands to communicate with the GSM modem.

The system can be controlled using SMS. It can send confirmation messages. Speech processing is done with a dynamic time wrapping algorithm. The system makes use of a ardunio microcontroller for home appliances control . It makes use of GSM for control of the appliances. This is an SMS based system. GSM has been used due to its high availability, coverage and security. The control of home appliances is done primarily through SMS codes.

AT commands can be sent through the GSM network and this controls the home devices. An Arduino board is the controller used to interface the appliances. It uses certain peripheral drivers and relays to achieve this interfacing. The smart phone is the user interface device. The app generates SMS messages based on the user commands and sends it to the GSM modem attached to the Arduino. This allows the user to control the home appliances.
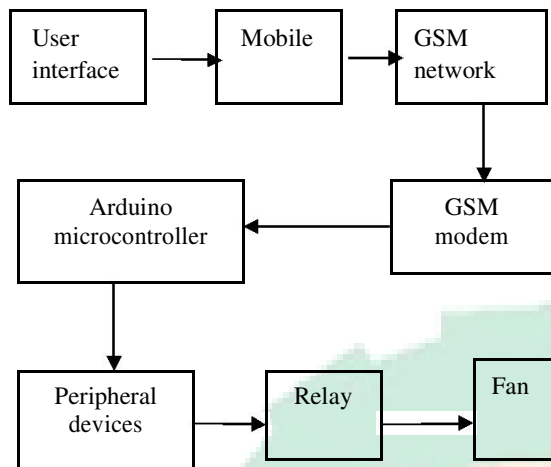
Fig 1: Based on GSM Technology

The primary communication means is through GSM. An Android mobile phone is used to get the voice commands and converts them into text. This is sent via SMS to another phone through the GSM network

A 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. There is a GSM module that is attached to the AVR. This will receive the commands that are sent via SMS. AT commands are used to communicate with the modem. Thus the AVR in turn instructs a driver circuit to control the appliances as necessary. This system has remote access capabilities from all over the globe.

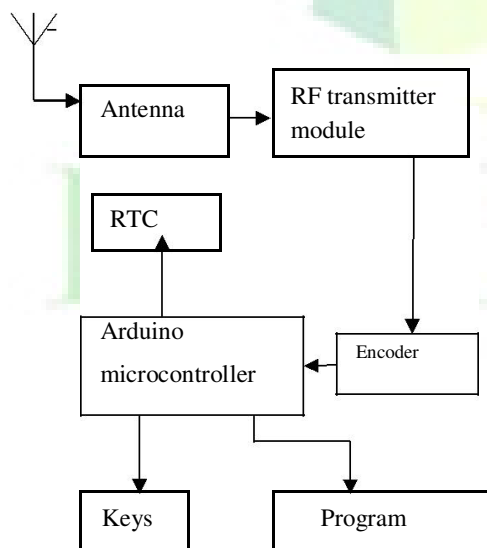A Remote Control transmitter has been used to transfer signals.

Fig 2: Block diagram of transmitter part

Instead of using an android touch screen or a mobile phone remote control console, a key fob transmitter has been possible to arrange. This transmitter is very easy to use and comfortable to carry. This key fob works on 315 Mega Harz frequencies and can control four separate appliances through four different keys or buttons. This transmitter is based on remote control encoder; it is actually paired with PT2272 utilize Complementary metal oxide semiconductor technology.

Considering the electronic & radio communication, a receiver is a group of components that can receive electromagnetic or radio waves and helps to convert the signal into a usable form. There is an antenna which intercepts electromagnetic waves and transforms them into a small source of information for the receiver, which receiver will transfer into the craved signal or information.

For this process a simple radio frequency receiver has been used, which does not require any programming, addressing or configuring. It works on direct current and automatic connected with the 315 MHz matching transmitter that is 4-key fob remote control. It is actually a remote control decoder based on data IR application circuit.

This transmitter and receiver can be paired for transmitting and receiving exactly four signals. Besides through this particular remote control transmitter user can control more than one receiver at a time. Therefore if more than one receiver is in the area of transmitter, then the transmitter can transfer same information to all of them. RF modules are normally divided into three groups, RF transmitter module, RF receiver module and RF transceiver module 433MHz ASK transmitter and receiver is used for the remote control.
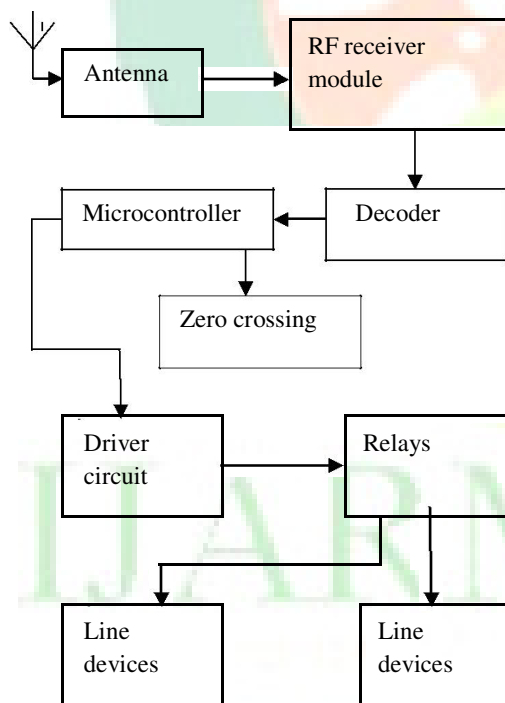

Fig 3: Block diagram of receiver part

V RESULTS AND DISCUSSION

Thus the home appliances are function through switches of the regular switch board. The remote control can extend up to a long distance depending on the frequency used and the efficiency of the circuit.
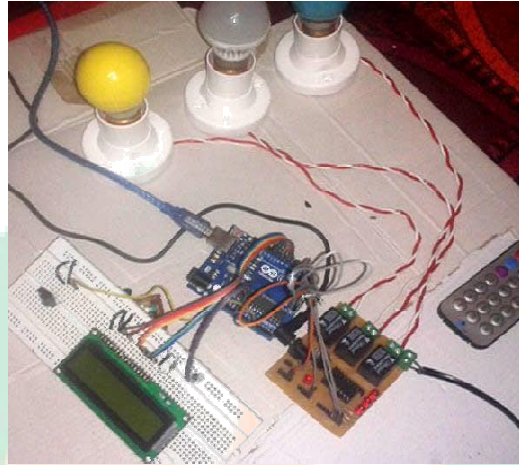

Fig 4: Image of hardware output

This paper also gives a comparison of all the above systems described. The systems that have been studied have certain common features. All these systems use a basic underlying communications technology. The advantages and drawbacks of the system derive from this underlying technology. All the systems have a control circuitry that is used to interface with the electrical appliances. There has to be a common command system that will be used to issue commands to the control circuits. The next important feature of the system is the user interface. This determines how the user will interact with the system and extent of control the user exerts over the system. This influences the usability of the system. Most systems also have security features to ensure only authorized access.

VI CONCLUSION

Based on all the systems surveyed and their advantages and drawbacks, this paper presents the features to be possessed by an ideal system for home automation with remote access. An ideal system should be available from all over the world to a user and in real time. Future scope for the home automation systems involves making homes even smarter. This automation is achieved with the help of arduino microcontroller. So, it could be of greater boon to people who feels difficult to move. During emergency condition, the old aged person can just touch the button in the remote to send messages The next step would be to extend this system to automate a large scale environment, such as offices and factories

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