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A REMOTELY CONTROLLED HOME AUTOMATION SYSTEM FOR ENERGY SAVING

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ABSTRACT - Design and development of a household appliances control system using mobile handset through GSM technology. GSM-SMS technology can be used to control household appliances. In the system allows the homeowner to monitor and control his house appliances via his mobile phone set by sending commands in the form of SMS message? The homeowner mobile phone that automatically enables an microcontroller to take the necessary actions like switching OFF and ON appliances such as fan, light, air-conditioner and so on. Basically, it reads the SMS and acts according to the message. However, the GSM based remote control system allows the homeowner to control household appliances from anywhere using the mobile phone access to these appliances. The system uses GSM technology thus providing ubiquitous access to the system for appliance control.

Keywords: *Microcontroller, Temperature sensor, Smoke sensor, LDR, DC fan, DC MOTOR, Relays, GSM.*

I. INTRODUCTION

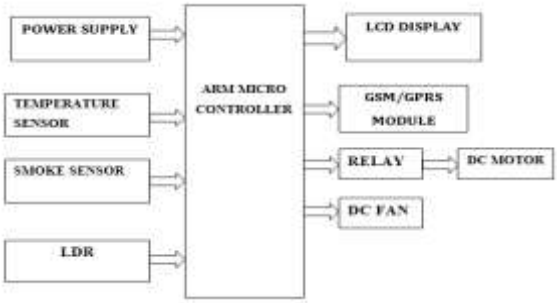
Home/office automation is the control of any or all electrical devices in our home or office, whether we are there or away. Home/office automation is one of the most exciting developments in technology for the home that has come along in decades. There are hundreds of products available today that allow us control over the devices automatically. There are many sensors we have used in this system (like temperature sensor, smoke sensor, etc). In order to make home energy efficient we also paid attention on home devices like fans and lights .Moreover , the system also focus on outside environment such as main door , garage door and irrigation. The heart of this system is a LPC2148 microcontroller which is controlling home devices. If the thermometer feels an increase in room temperature then an electrical signal is sent to microcontroller, the microcontroller takes a necessary action like turn the fan on which work as air-conditioning. In case, there is a smoke in home smoke sensor detects the smoke then send a signal to microcontroller to turn the extractor on, to take out the smoke from home. If it detects sensors will be send a signal to the microcontroller and microcontroller send a specific SMS message to the owner through GSM module. In this project is focused on the development of a prototype for an internet based home automation system. The focus is to establish a platform that allows communication between the web-enabled mobile application and the microcontroller situated at a remote location anywhere in the world.

PROPOSED SYSTEM

In this paper we are proposing Home automation system to control the home appliance remotely using GSM. Smart Energy management algorithm has been proposed that includes switching the device OFF if it has reached maximum threshold value of power consumption. This will allow saving immense amount of power when any device is running unnecessarily.

Our world is consisted of various ‘‘things’’. As one of the enablers of smart world, internet of things (IoT)

II. BLOCK DIAGRAM



Fig(3.1). System block diagram

System Overview

Power Supply:

This section is meant for supplying Power to all the sections mentioned above. It basically consists of a Transformer to step down the 230V ac to 9V ac followed by diodes. Here diodes are used to rectify the ac to dc. After rectification the obtained rippled dc is filtered using

a capacitor Filter. A positive voltage regulator is used to regulate the obtained dc voltage.

Microcontroller

This section forms the control unit of the whole project. This section basically consists of a Microcontroller with its associated circuitry like Crystal with capacitors, Reset circuitry, Pull up resistors (if needed) and so on. The Microcontroller forms the heart of the project because it controls the devices being interfaced and communicates with the devices according to the program being written. ARM is the abbreviation of Advanced RISC Machines, it is the name of a class of processors, and is the name of a kind technology too. The RISC instruction set, and related decode mechanism are much simpler than those of Complex Instruction Set Computer (CISC) designs.

Fig (3.2):LPC2148 module

Liquid-crystal display (LCD)

It is a flat panel display, electronic visual display that uses the light modulation properties of liquid crystals. Liquid crystals do not emit light directly. LCDs are available to display arbitrary images or fixed images which can be displayed or hidden, such as preset words, digits, and 7-segment displays as in a digital clock.

Fig (3.3): LCD display

Temperature sensor

Thermistors are a temperature sensing devise. It is used to sense the temperature. In this project by depends on the value of temperature the exhaust fan will run.

Fig (3.4) Temperature sensor

Smoke Sensor

Smoke sensor is used to detect any leakage of smoke and any hazardous gases such that an alarm can be initiated to avoid any damages in the industries. These sensors are also used in many applications like corporate and in any office work areas these are linked to fire alarms

Fig (3.5):Smoke sensor

LDR Sensor

The LDR is used to measure the light intensity. LDRs or Light Dependent Resistors are very useful especially in light/dark sensor circuits. Normally the resistance of an LDR is very high, sometimes as high as 1000 000 ohms, but when they are illuminated with light resistance drops dramatically.

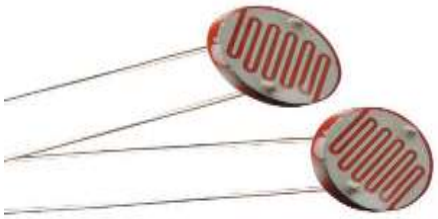


Fig (3.6): LDR sensor

GSM modem Section:

This section consists of a GSM modem. The modem will communicate with microcontroller using serial communication. The modem is interfaced to microcontroller using MAX 232, a serial driver. The Global System for Mobile Communications is a TDMA based digital wireless network technology that is used for communication between the cellular devices. GSM phones make use of a SIM card to identify the user's account. A GSM modem is a device which can be either a mobile

phone or a modem device which can be used to make a computer or any other processor communicate over a network. A GSM modem requires a SIM card to be operated and operates over a network range subscribed by the network operator.

Fig (3.7) GSM module

Relay

This section consists of an interfacing circuitry to switch ON / OFF the system whenever any unhealthy conditions i.e. overload is detected. This circuitry basically consists of a Relay, transistor and a protection diode. A relay is used to drive the 230V devices.

Fig (3.8) Relays

Dc motor

DC motor is an output for this project. And DC motor is connected to microcontroller. And this motor controlled by the microcontroller with the respective inputs given by us. Its speed will be varied according to the speed set by the switches.

Fig (3.9): Dc motor

Dc fan

Dc fan is the output section. Dc fan needs dc supply. So we can directly add the dc motor to micro controller with transistor logic.

Fig (3.10): Dc fan

III. CONCLUSION

In conclusion, a HACS has been designed and implemented with remote access and control of appliances. A prototype of the design has also been developed which presents a mobile controlled and user-friendly approach to the available home automation system which provides solutions to the problems homeowners face concerning Energy wastage and appliance control.

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