Economical Home Automation With Security System

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ABSTRACT: The objective of the proposed system is to design a circuit which can be used to measure ambient temperature and control light, using AVR microcontroller (atmega16). There is also a password encrypted door, only after entering it, the light and temperature inside the house is controlled. In the proposed system, temperature is also measured and then according to the current temperature fan, AC or heater switched on. The ambient light is measured and a LED is switched on if required. This project would help in conserving energy and also allow a person to remove few mundane tasks from his daily life.

KEYWORDS: Microcontroller unit(MCU), Security, LCD (liquid crystal display), Keypad, LM-35temperature sensor, Light Dependent Resistor(LDR).

I. INTRODUCTION

Nowadays automation systems have become widespread in several industries by playing a vital role in dominating many process-related operations. We live in the world of automation wherein most of the systems have become machine-driven, such asindustrial automation, automation in homes and alternative business sectors.

Home automation systems advancing towards mechanization processes whereby less human efforts are required by the machinery equipments to control numerous systems in homes. It involves automatic controlling of home appliances using completely different technologies. Automation systems are classified into two types such as industrial automation system and home automation systems [2]. This system involves control and automation of lighting, fan, heater, air conditioning, security, etc.

Home automation has greatly increased in popularity over the past several years. One of the greatest advantages of an automated home is the ease with which functionality can be managed. Before determining which home automation package is right for you and your family, it is important to become better informed of the features and settings associated with home safety and security systems. The three main elements of home security systems are sensors, controllers and actuators. Sensors can monitor changes in daylight, temperature or motion detection; home automation systems can then adjust settings to the preferred levels of a user. Controllers refer to the devices—personal computers, tablets or smart phones—used to send and receive messages about the status of automated features in users' homes. Actuators may be light switches, motors or motorized valves that control a mechanism or function of a home automation system [3].

One of the greatest advantages of home automation systems is that users can protect against break-ins and fires, while enjoying automations for lights, temperature, and more. The automation features in one's home helps to promote security, comfort, energy efficiency, and convenience. Another benefit of home automation systems is the amount of labor, time, energy and materials that is saved.

II. SOFTWARE DESCRIPTION

Embedded C compiler based software is used to create a hex file using Code Vision AVR(CVAVR) using C language.Then simulation software (PROTEUS) is used to test the prepared code as shown in fig.2.

CVAVR-Code vision AVR is a C cross-compiler, integrateddevelopment and automatic program generator designed forthe Atmel AVR family of microcontrollers. The program is designed to run under the windows 98/Me/NT 4/2000/XP/vista 32 bit operating systems. The C cross-compilerimplements nearly all the elements of the ANSI C language, asallowed by AVR architecture, with some features added totake advantage of specificity of the AVR architecture and the embedded system's needs.

Khazama-It is software used to burn the hex file into the controller. Extreme Burner-It is software used to check the connectionsof the controller.Bluetooth Module CIA-This android application is used tosend the command to the microcontroller [1].

III. HARDWARE DISCRIPTION

The ATmega16 is a low-power CMOS 8-bit microcontroller based on the AVR enhanced RISC Architecture. ATmega16 has 16 KB programmable flash memory, static RAM of 1 KB and EEPROM of 512 Bytes. ATmega16 is a 40 pin microcontroller. There are 32 I/O (input/output) lines which are divided into four 8-bit ports designated as PORTA, PORTB, PORTC and PORTD [6].

LCD screen is an electronic display module. A **16x2LCD** means it can display 16 characters per line and thereare 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and

Data. The command register stores the command instructions given to the LCD. The data register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the LCD [4].

Keypad 4X4 is used for loading numeric into the microcontroller. It consists of 16 buttons arranged in the Form of an array containing four lines and four columns. Typically one port pin is required to read a digital input into the controller. When there are a lot of digital inputs that has to be read, it is not feasible to allocate one pin for each of them. This is when a matrix keypad arrangement is used to reduce the pin count.
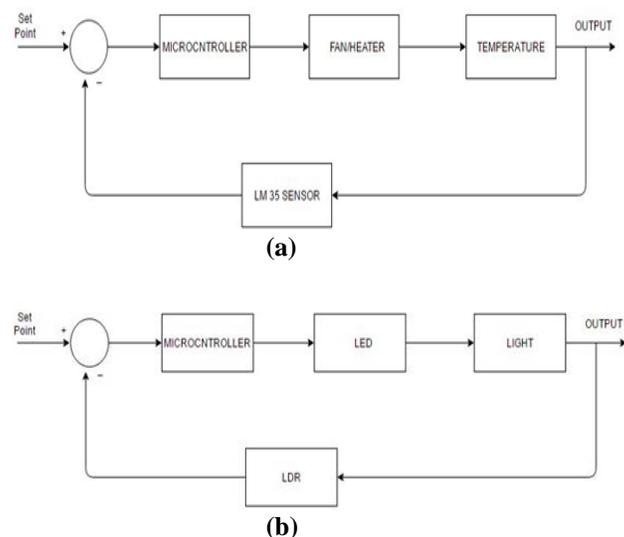

(a)

(b)

Fig. 1. Block diagram of (a) temperature control systemand (b) light control system

Light Dependent Resistors are extremely valuable particularly in light/dim sensor circuits. Typically the resistance of a LDR is high, in some cases as high as 1,000,000 ohms, yet when they are lit up with light resistance drops significantly. LDR change their resistance when light falls on them. At the point when there is no light, it will have high resistance. As the light force expands, its resistance decreases. [7].

LM35 gives its readings in centigrade. Its output is linearly proportional to temperature. It works on the principle that as the temperature increases, the voltage across the diode increases at known rate[8].

IV. WORKING

When the system starts the door will be closed. The door of the house will be encrypted by a password system which opens by entering a pre-defined password using the keypad matrix. After this the entry to the home will be enabled. This password is stored in EEPROM of the microcontroller. Password can be reset whenever required. If the user enters the incorrect password then door will not open and no appliance (fan, Heater, AC, light) will work in the house.

After entering in the home the whole house system will start functioning. Inside the house, the system contains two major modules: Temperature control and Light intensity control. First the system will check the room temperature of the house using LM-35 and get the analog value and by using that value room temperature will get to know in centigrade. Using this value either of the fan, heater or AC will start working.

After that system will check the light intensity if the room and according to that light can be switched on or off. And according to the light intensity of the room table lamp for study work can be switched on and off according. These entiretasks are performed automatically and no user work is requiring in these tasks.
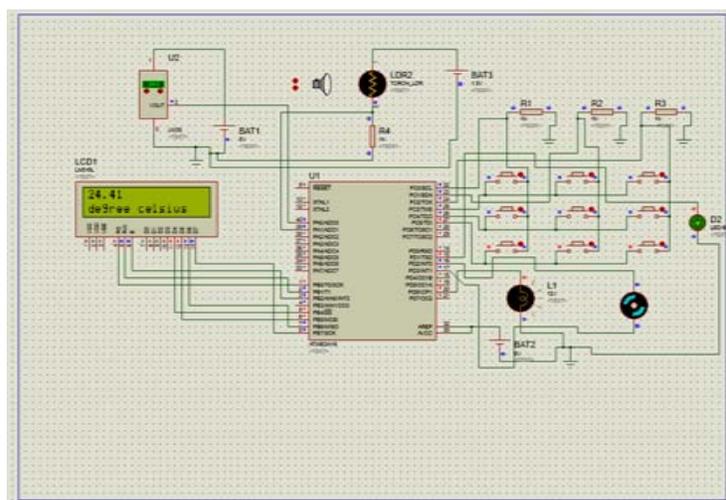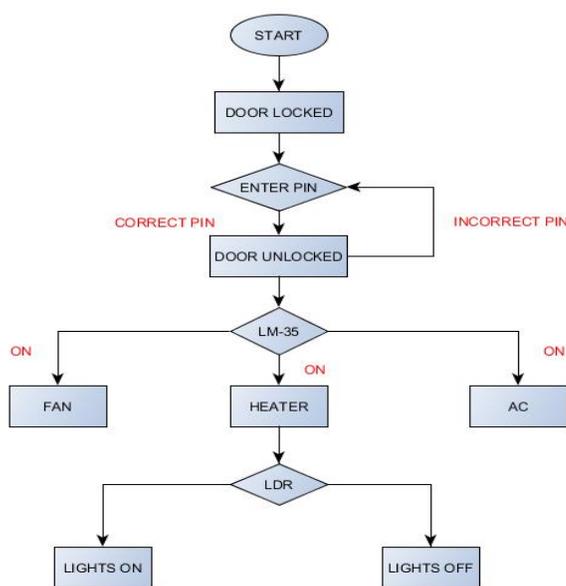

Fig. 2. Proteus simulation

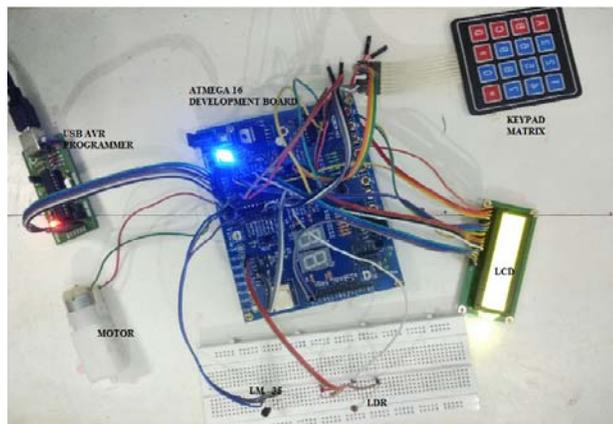Fig. 3. Flowchart of the working of the system

Fig. 4. Hardware

VI. CONCLUSION

This paper describes the design and implementation of a home automation system. This system also includes the security system. The proposed system is not complex, which enables user to readily master all the controls related to their security system. Therefore the overall implementation cost and affordability is very inexpensive.

REFERENCES

[1] Deepak Maan, WasimAkram, Saurabh Yadav, Khushal Bisht, "RACING SPEED LOCKING SYSTEM FOR ELECTRIC VEHICLE", Elins International Journal of Science Engineering & Management (EIJSEM),Volume-1, Issue-8, Dec 2016.

[2]https://www.elprocus.com/home-automation-projects-engineering-students

[3]https://pastichehomes.nowfloats.com/Home-Security Home-Automation-Home-automation-also-known-as-domotics-refers-to-the-automatic-and-electronic-control-of-household-features-activity-and-appliances-Various-control-systems-are-u/b404

[4] Hitachi, "LCD HD44780 datasheet", Hitachi.

[5]Neaz Md. Morshed, G.M. Muid-Ur-Rahman, Md. RezaulKarim and Hasan U. Zaman, "Microcontroller Based Home Automation System Using Bluetooth, GSM, Wi-Fi and DTMF", IEEE Conference Publications,Dec 2015.

[6]https://www.engineersgarage.com/electronic-components/atmega16-microcontroller

[7]Dileep K T, Dr. Sarika, "An Integrated Cellular Farming Management using Android Application", IJIRST – International Journal for Innovative Research in Science & Technology| Volume 3 | Issue 02 | July 2016.

[8]Hemlata Tomer ,Kapil Mangla, "Study and Development of Temperature & Humidity monitoring system through Wireless Sensor Network (WSN) using Zigbee module", International Journal of Engineering Research and Application,Vol. 5, Issue 7, (Part -2) July 2015