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MICROCONTROLLER BASED ROOM AUTOMATION AND BIDIRECTIONAL VISITOR COUNTER

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ABSTRACT

Electricity is one of the most important resources in this century. We should conserve the electricity; otherwise next generations may have to live without Electricity. But many times we come outside the room/hall and forget to turn off the lights/fan, thus the electricity is wasted. Also in most cases switches of lights and fan are located inside the room and so we may have to search them in darkness and in case of guests, it becomes more difficult. To overcome these problems we have planned to implement a project called "microcontroller based room automation".

This project has 2 parts. First is "Person counter" and the other one is "Automatic room light and temperature controller with a temperature and light intensity display". The first part is to count and display the number of persons entering in any room which can be used in large rooms like seminar halls, conference rooms, theatres etc to decide the no of seats remaining. When number of persons inside the room is zero, power supply inside the room can be cut using a TRIAC and when somebody enters the room, the system automatically measures the temperature and light intensity inside the room and accordingly controls the light and fan. During daytime lights will not be operated and during cold season fan may not be operated. This helps to save electricity and reduces our effort. LCD display placed outside the room displays number of person inside the room, temperature and light intensity.

Keywords: *Arduino Uno, IoT module, LDR module Infrared sensors, Fire sensor, LCD display, DC motor.*

I.INTRODUCTION

Energy crisis is the main problem that we are facing nowadays. So the conservation of energy is relevant in this occasion. The objective of this project is to overcome this problem. This project has 2 parts. First is "Person counter" and the other one is "Automatic room light and temperature controller with a temperature and light

intensity display". In today's world, there is a continuous need for automatic appliances. With the increase in standard of living, there is a sense of urgency for developing circuits that would ease the complexity of life.

The temperature and light intensity in the room is sensed and with respective to that, light and fan in the room is switched ON/OFF when a person enters/leaves the room. The circuit consists of IR transmitter and receiver LEDs which are used to sense the entering or leaving of a person to or from the room. The temperature sensor measures the temperature inside the room and the analog signal from the sensor is processed by the microcontroller. Likewise the Light dependant resistor (LDR) generates the analog signal proportional to the available light inside the room. This signal is also processed by the microcontroller. The speed of the fan and brightness of the light is controlled accordingly. Whenever the person leaves the room, light and fan will be switched OFF.

The circuit which we have designed is simple and compact. With the help of some software tools, we were able to develop the required coding and burn it to the Integrated circuit. This Project ―Microcontroller based room automation is a reliable circuit that takes over the task of controlling the room lights as well us counting number of persons/ visitors in the room very accurately. When somebody enters into the room then the counter is incremented by one and the light in the room will be switched ON and when any one leaves the room then the counter is decremented by one. The same is done with the fan also. The light will be only switched OFF until all the persons in the room go out. The total number of persons inside the room is also displayed on the seven segment displays.

The microcontroller does the above job. It receives the signals from the sensors, and this signal is operated under the control of software which is stored in ROM. Microcontroller ATMEGA328 continuously monitor the Infrared Receivers, When any object pass through the IR Receiver's then the IR Rays falling on the receiver are obstructed , this obstruction is sensed by the Microcontroller.

Thus this project will provide more convenience and comfort for the user. More than that it saves a appreciable amount of energy. The only disadvantage is that the initial cost of establishment is high. This project can be implemented in malls, offices, schools, etc.

II. LITERATURE SURVEY

This project is an implementation to the idea of automatic visitor counting and load controlling using a microcontroller. Currently the main work that has been done on this proposed system is using ultrasonic sensors which give longer detection range compared to IR rays. If user wants to switch on and off the electrical appliances, he/she has to go to a specific area and on /off the appliance. But in this design, we are controlling the electrical loads remotely using RF Technology. The user has RF Transmitter and RF receiver is kept at the application side. The user is able to control the electrical appliances within the range of 100 feet. We have also used LDR sensor to sense light condition and depending upon it controls the electrical light loads.

This project titled "Microcontroller based Bidirectional Visitor counter" is designed and presented in order to count the visitors of an auditorium, hall, room ,offices, malls, sports venue, etc .The system counts both the entering and

exiting visitor of the auditorium or hall or other place, where it is placed. Depending upon the interrupt from the sensors, the system identifies the entry and exit of the visitor. On the successful implementation of the system, it displays the number of visitor present in the room. This system can be economically implemented in all the places where the visitors have to be counted and controlled. This system can be used as an automated switch to increase energy efficiency. The system can be used at the entrance of a room to control the light sand other appliances.

III. BLOCK DIAGRAM

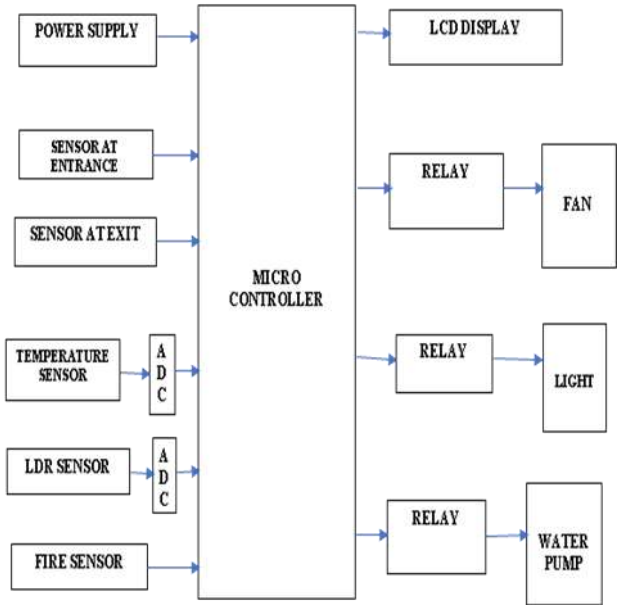

FIG1: BLOCK DIAGRAM

IV.DESCRIPTION

This system uses Infrared(IR) sensors to detect obstacles. The basic concept of IR(infrared) obstacle detection is to transmit the IR signal(radiation) in a direction and a signal is received at the IR receiver when the IR radiation bounces back from a surface of the object. The other feature present in the system would be the Visitor counter which is displayed on PC monitor which will help congestion control in the room . There is also a emergency LED which gets switched on when all LEDS fail to switch on. The same is show on the PC monitor. All this features are controlled by the Microcontroller which is programmed using assembly language.

V.HARDWARE REQUIREMENTS

1. ATMEGA328
2. Temperature sensor LM35
3. LDR

4. Resistors
5. Capacitors
6. Transistors
7. IR LEDs
8. LCD
9. Rectifier IC
10. IR sensor
11. flame sensors
12. fan
13.water pump

VI. SOFTWARE REQUIREMETS

1. ARDIUNO IDE
2. EMBEDDED C
3. EXPRESS P C B

VII.APPLICATION

- Home automation
- Office automation
- visitor couniting and monitoring
- waiting rooms (Bus or railway station)

VIII.ADVANTAGES:

- Power saving
- Room or office monitoring

IX. FUTURE SCOPE

The number of applications for this system is numerous which are as follows:

- By using this concept we can implement various applications Such as fans, tube lights, etc.
- By modifying this circuit and using two relays we can achieve a task of opening and closing the door.

X.CONCLUSION

Studies on energy consumption have shown that it is at a stage of retardation by the involvement of government and due to advance technological growth. Such a mechanism to improve not only energy consumption but also a comfortable living can be achieved by room automation technique. Since the technologies are growing day by day there will be more advanced automation techniques which can improve current life style and can save more energy will capture our market. by doing this project we came to the conclusion that even though we have

developed a small part of automation in a single room, it can be extended using more components such that it could be installed in bigger rooms. By using the internet services more development can be done.

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