CSE 316: Project Report

Name of the Project: Smart Room

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1 Introduction

This a smart room simulation project in Proteus software. In our smart room we have used some sensors and controls to control different devices inside room. The motivation behind doing this project is to learn about how smart room works and what we can do to make life more comfortable. We also got the knowledge of Microcontroller AtMega32 and its use by doing this project.

2 Components

2.1 Softwares

- Proteus 8
- ATMEL Studio 7

2.2 Key Equipments

- ATmega32 Microcontroller
- 16×2 LCD Display
- 4×4 Keypad
- Motor
- LM35 Temperature Sensor
- MM74C922 Encoder
- L293D Motor Driver
- Flame Sensor
- MQ-2 Gas Sensor
- PIR Sensor
- Virtual Terminal
- Buzzer
- Lamp
- LDR Sensor

3 Circuit Diagram

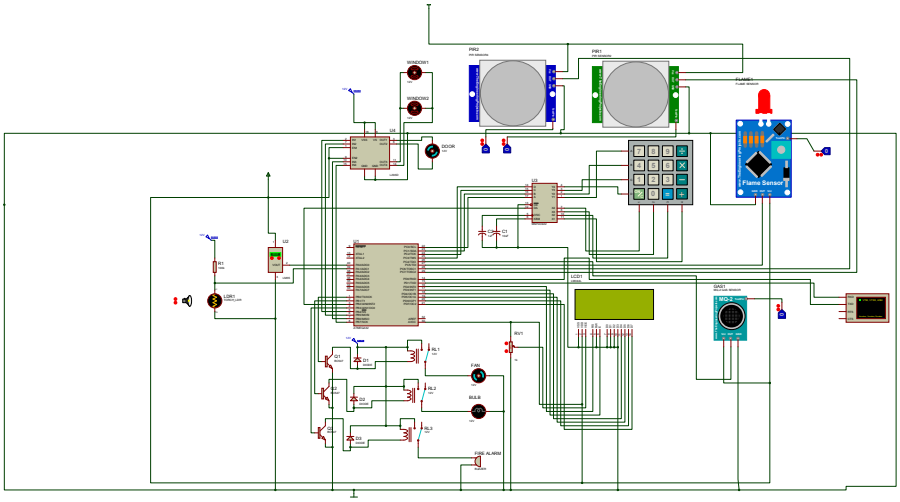

Figure 1: Complete Circuit Diagram

4 Features

Below is the short description of each feature we have implemented in smart room simulation.

Human Count We have used two PIR sensors to count the number of people entering or exiting the room. PIR sensor detects human movement. Combination of two PIR sensors on opposite side of the door can detect human entry or exit. This way we can know how many people are currently inside the room.

Display Info An LCD display for showing all the information & events of the room. This display shows different values, messages, warnings etc.

Keypad Input It is possible to control different devices of the room using a 4×4 keypad.

Automatic Light Lights of the room works both in automatic mode and manual mode. In automatic mode, lights turn on or off based on the light intensity and human existence in the room. It is possible to change threshold value of the light intensity. In manual mode it is possible to control the light using keypad or mobile phone message.

Automatic Fan Fans of the room works both in automatic mode and manual mode. In automatic mode, fans turn on or off based on the temperature and human existence in the room. It is possible to change threshold value of the temperature. In manual mode it is possible to control the fans using keypad or mobile phone message.

Password Protected & Automatic Door To enter the room a person will have to enter password. It is also possible to open the door using cellphone message. The doors open automatically if someone try to come out of the room.

Window Control It is possible to open or close all the windows of the room using keypad or cellphone message.

Fire Alarm The smart room can give fire alarm based on the reading of temperature, flame sensor and gas sensor. It turns on the buzzer in case of any fire hazard. It also sends warning message to cellphone during fire hazard.

Connected with Cellphone Using the cellphone it is possible to control certain things of the room like controlling lights, fans, doors, windows etc. Any types of hazards or warning message is sent immediately to our cellphone. To show this process in simulation virtual terminal has been used.

5 Conclusion

Building the smart room simulation was very interesting. It also gave a lot of ideas about smart room because it needed extensive information collection about different sensors, controls, their drawbacks, usage etc.

In our smart room all the functionality added works smoothly without any unwanted error in the system. The sensors and controls were cheap and easy to install. So, this system would be both reliable and realizable.

During the progress of the project there were slight challenges. Interfacing with keypad, LCD display, cellphone and working with them sometimes caused unwanted errors. But in the end all of them were sorted out successfully.

Although the number of sensors and controls in our smart room is not robust, it is very easy to add new features in our smart room. It has been kept simple focusing on necessity.

As it is only simulation, there were lot of things unavailable than in hardware implementation. That's why some components were not like actual hardware components. Some features were not available in simulation at all that could be added to our smart room.