System Description

For

[SMART-HOME-PROJECT]

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1 Project Overview

It is a popular project nowadays, it is a very comfortable application for humans, it aims to convert anything around to be controllable and smart. In this project we have implemented some requirements for the smart home application:

- ❑ Remote controlled by mobile
- ❑ Controlling without mobile use LCD and Keypad “user mode only”
- ❑ The controllable things are 6 lamps “5 on/off lamps, one dimming lamp”, door, air-conditioner according to the ambient temperature.

Login system admin and user “admin is remote only”

- ❑ Admin mode can register one user and switch to user mode.
- ❑ Usernames and password are kept into memory even if the system is powered off “EEPROM”.
- ❑ If user password is entered wrong more than 3 trials, the system breaks down and fire alarm until reset.
- ❑ Admin and user can access to all applies except user cannot control the door opening.

On starting the system, you will have to pair your mobile phone to the system using Bluetooth. After paring, this mobile phone will be the administrator of the system and will have the ability to either control everything, switch to user mode, or register a new user for the system.

If it is the first time for the user to register on the system, the user will be asked to register by choosing or making the desired password and confirming it. After the new password is set, the user will be asked to login to the system using the password that the user created "CAUTION: THE SYSTEM WILL BE BLOCKED IF THE PASSWORD IS ENTERED WRONG MORE THAN 3 TIMES, AND IT WILL TRIGGER THE ALARM!".

After logging in, the user will be able to control rooms 1 and 2's lights and air conditioner by setting the desired temperature.

1.2 Specifications –LCD& keypad:

1. They are used to login to system as a user only.
2. After login, user can control all features except opening door.
3. They can control the system until permission from admin.

1.3 Specifications –EEPROM:

Storing the new user to the system “registration”.

1.4 Specifications –TTL/Bluetooth:

1. Transmitting/Receiving between MC and PC/mobile.
2. Every action, Message is printed on Mobile/PC screen.
3. Transmitting/Receiving the commands to run the system.

1.5 Specifications –Led, Dimmer:

Dimmer is a circuit that can control on the current flow to lamp.

1.6 Specifications –Temperature Sensor, DC motor:

Temperature sensor reads the ambient temperature, if the temperature is higher than 24 °C, Air condition will be on, if the temperature becomes lower than 24 °C, Air condition will be turned off. In user mode the temperature can be configured to the desired temperature.

1.7 Specifications – Door:

The actuator used is a servo motor to control the opening door only in admin mode, it is controlled by command which is send by Mobile/PC “Open\Close the door”.

1.8 Components Used in the project:

1. 24AA16 EEPROM, or use the internal.
2. Bluetooth module HC-05.
3. 5 led.
4. Dimming circuit.
5. LM35 temperature sensor.
6. DC motor
7. Keypad
8. Lm01602A Character LCD.
9. Servo motor
10. 2 Microcontrollers (ATMEGA32 “Master/slave SPI connection protocol”)

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2 System Functions:

- 2.1U8 Password_Exist(u8 location)

  Checks the given specific location in the EEPROM to check if there is a password already existing in this location, in case yes then this means that this is not the first time for the user to login and he/she already got an account.

  This function return 0 if the location is empty, and return 1 if there is a password existing.

- 2.2 Void getPassword(u8 location, s8* Store)

  Extracts the password from the EEPROM given location and stores it in an array using pointer.

- 2.3 Void Menu1(void)

  If the user got no already account then it will make the user to provide a new password and save it in the EEPROM. If the user already got an account it will print on the LCD "Welcome Home", and then proceed with the application.

- 2.4 Void Menu2(void)

  In case the user made a new password or already got an account, this function will be called it will ask the user for the password that he created for his/her account. In case the password was entered wrong more than 3 times the alarm will fire and it won't be able to be disabled. If the user entered the password correctly, the application will proceed to the main menu of the application.

- 2.5 Void MenuMenu(void)

  Initiates the user main application menu lets the user control the provided options in the application, i.e., Lamps, air conditioner.

- 2.6 Void ALARM(void)

  Checks specific location in the EEPROM if the alarm was fired once it will be always enabled, otherwise it won't do anything.

- 2.7 Void Door(void)

  This function provides the menu and options for controlling the main door.

- 2.8 Void DoorCheck(void)

  Checks specific location the EEPROM if the "Main door" was opened or closed.

- 2.9 Void ROOM1(void)

  Controls the option provided for this room using SPI communication protocol

- 2.10 Void ROOM2(Void)

  Controls the option provided for this room using SPI communication protocol

- 2.11 Void AdminMenu(Void)

  Initiates the Admin menu if admin mode is in progress menu lets the admin control the provided options in the application, i.e., Lamps, air conditioner, door…etc

3 Project Flow Chart