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Home Security and Automatic Irrigation System

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ABSTRACT

This paper presents an idea or a concept for home security system and automatic irrigation system using GSM. Today, home automation and home security industry is growing widely. The purpose of the system is to protect the home from thieves, fire, leakage of LPG and also manage water at homes. It involves GSM based door locking system with vibration sensor, automatic irrigation system, gas sensor, fire sensor and ultrasonic sensor. This project focuses on wireless home security system which is based on GSM and automatically irrigating plants in home garden when the soil goes dry. In order to alert the user if someone tries to break the door in their homes, an SMS is sent to the user so that the user can take necessary actions. The user is also alerted when there is an intruder inside the house. The gas sensor and flame sensor plays a major role is preventing fire accidents at home in case of gas leakage or any other factors that causes fire at home. This project mainly focuses on flexible, cost friendly wireless home automation system which would be affordable by everyone.

1. INTRODUCTION

As the mobile devices are continuously increasing in its popularity and also for its smooth functionality the demand for advanced and responsive mobile applications is increasing day by day in people's daily routine. Mobile GSM services utilization is the most open and also practical way for providing remote service access or enabling the applications to make them communicate with each other. Busy and most engaged families also individuals with physical limitations are the people who represent an attractive market for home automation and security.

2. METHODOLOGY

2.1. Location Implementation

The device can be implemented at electrical home appliances and door locks. The sensors are installed at the required place at homes. Ultrasonic Sensor is used to locate and record the movements of intruders.

2.2. Optimization of Sensors

The gas sensor and flame sensor is fixed in the kitchen at homes. The vibration sensor is fixed on the door. The ultrasonic sensor is fixed on the walls of the room. The soil moisture sensor is kept in the soil at a particular depth in home garden.

2.3. Requirement of Supply Source

Sensors that are used for this project requires 5- 12 V supply. The step-down transformers is used which converts the domestic usage voltage of 230 V (a.c.) to the corresponding voltages. And further voltage regulators are used in individual modules to get the required voltages of either 5V or 12V.

2.4. Sensor Resistance

The sensors used in the system normally has higher resistivity. The resistivity values can be adjusted by using the potentiometer in each modules of the system. Whenever any change in voltage levels is detected, the corresponding actions take place.

2.5. GSM Module Alert

A message is sent to the user, when there is a gas leakage or fire or vibrations on the door.

2.6. Activation of GSM Module

The GSM modem is used for the purpose of unlocking and locking the door by sending a message from the pre-programmed phone number, and also used to alert the user in case of gas leakage, fire and vibration on the door.

3. MODEL SMART HOME

A SMART home is becoming more and more important to provide a safe, sound and secure living environment in day-to-day life. Much work had been done earlier on the development of smart home and is still going on. In the last few decades, wireless sensors have been widely used by creating a network of sensor nodes inside the smart home. An old house converted to a smart-home with sensing technology.Fig.1 shows how a normal home is converted into a smart home. Environmental sensors are also used to measure the temperature, humidity and other related factors. Different types of sensors are used to monitor the different activities of the inhabitant living at the house.

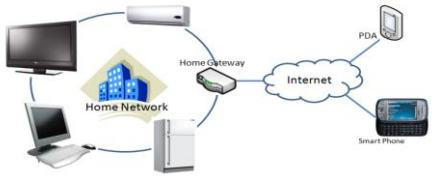

Fig.1 An old house converted to a smart-home.

4. BLOCK DIAGRAM

The block diagram is shown in Fig.2.All the sensors are interfaced to the main microcontroller ATMEGA 328P.

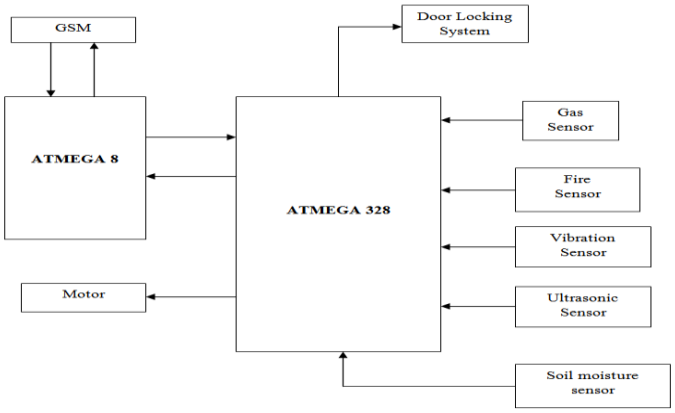

Fig.2 Overall Block Diagram of the project

5. CIRCUIT DIAGRAM

The overall circuit diagram is represented in Fig.3 .Two microcontrollers are used. One is used as a main IC while the other is used to manage the sending and receiving of message from GSM.

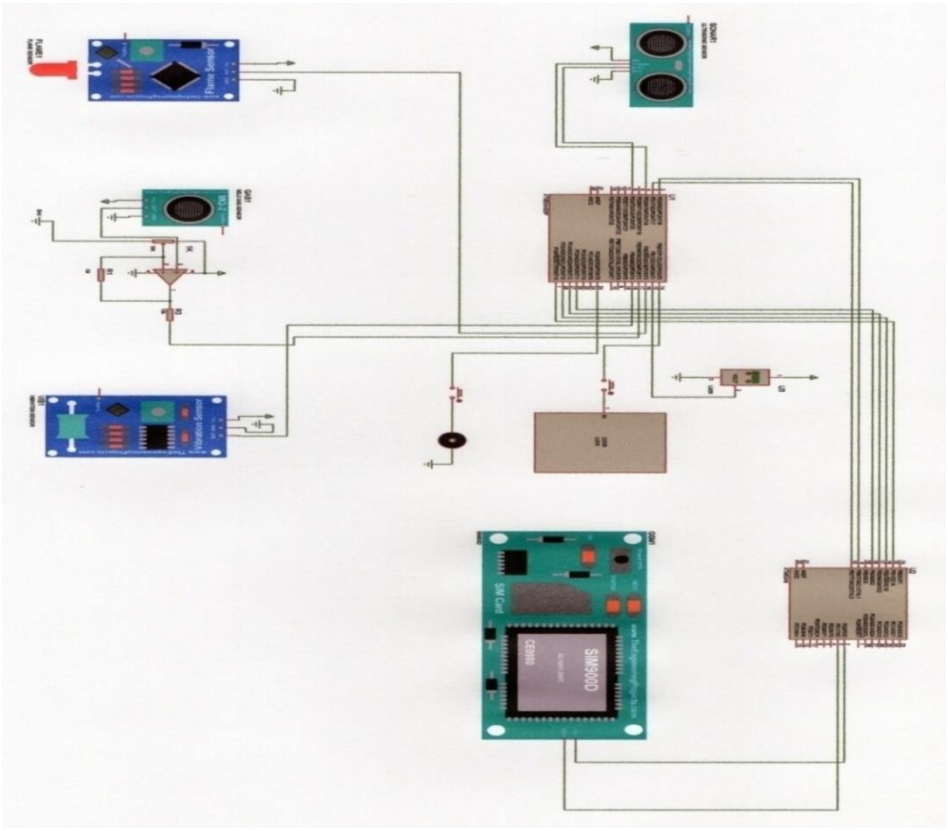

Fig.3 Overall Circuit Diagram of the project

6. RESULTS

In the proposed project, we have used Proteus 8 software to design the circuit diagram of our system. We have used Arduino IDE to code the program of our system. The program is executed to find any errors in it. Then the errors are debugged and executed by Arduino IDE software. The coding is then dumped into the IC in the circuit diagram designed using Proteus 8 software. A new design model is opened by clicking on File -> New Design. This is shown in Fig 4.

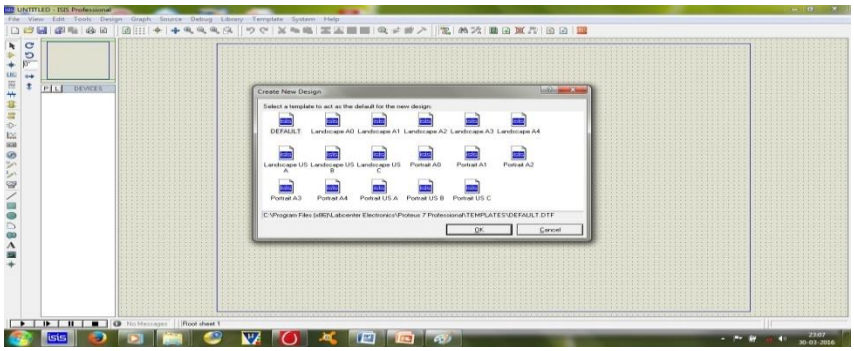

Fig.4 Opening a new design model

The Proteus library is opened and the required components are chosen. This is shown in Fig 5.

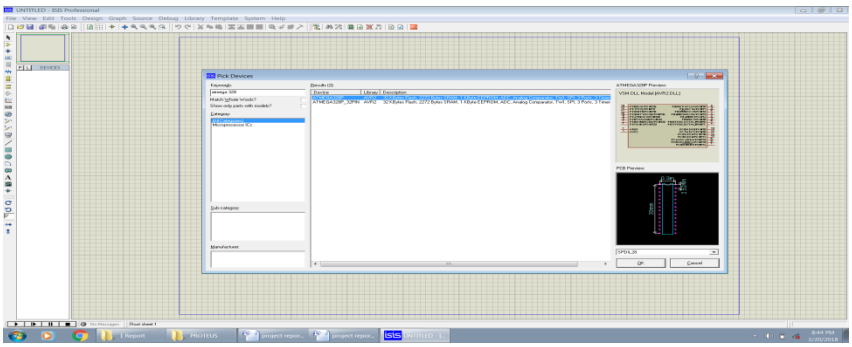

Fig.5 The required devices are picked up from the library tools.

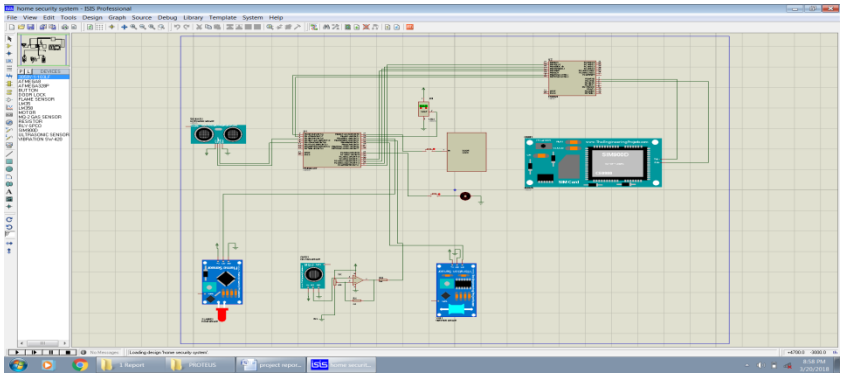

Fig.6 All the devices are connected to the run the simulation.

Finally all the devices are connected to the respective pins in the microprocessors. The overall circuit diagram designed using Proteus is shown in Fig.6.

A new sketch is opened in Arduino IDE.

The code for the main kit, that is, ATMEGA 328P is written in Arduino IDE. The initializations are done at the beginning, before the start of the loop. The baud rate is set inside the void setup().The process that is to be repeated is written inside the void loop().This void loop() is an infinite loop that it never terminates at any condition.

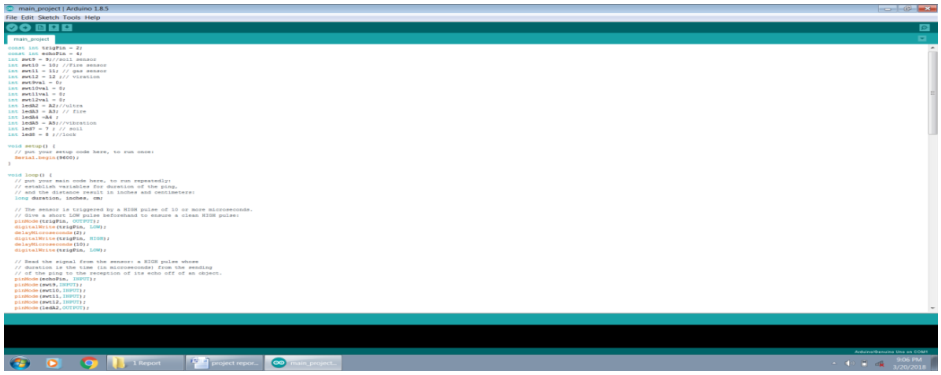

Fig.7 Writing the code for kit

Then the code is compiled which is represented in Fig 7 and the if there is no error in the code, the code is uploaded into the main kit which is shown in Fig 8.

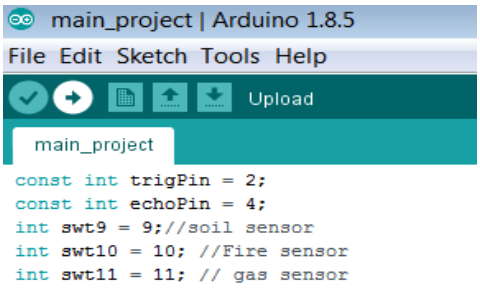

Fig.8 Uploading the code to the kit

7. HARDWARE MODEL

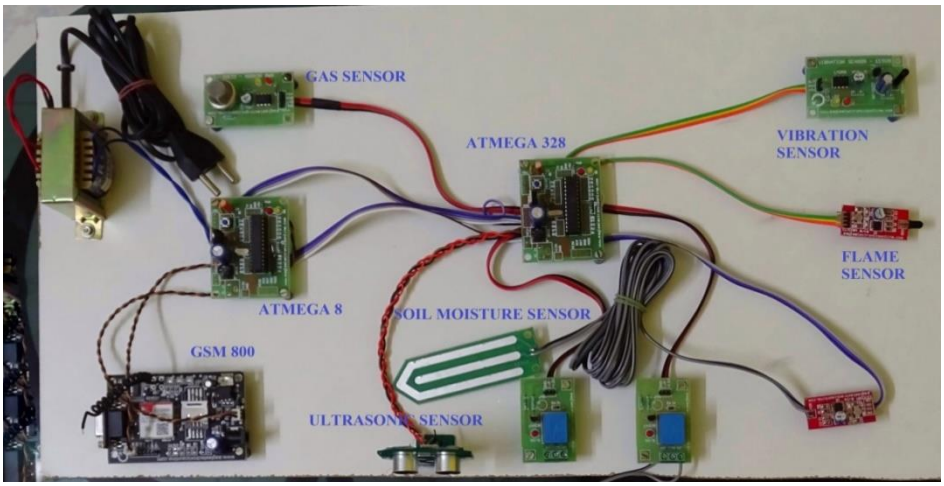

Fig.9 Overall hardware part of the project

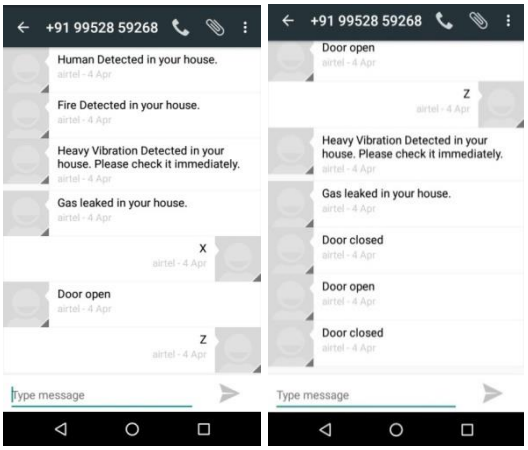

Fig.10 Message received using GSM

The Fig.9 shows the overall hardware part of our project. Each and every module is tested by applying some minimum amount of voltage. After testing each module is connected to the desired pins of the microcontroller. Our

project has a main microcontroller ATMEGA 328P and a sub-microcontroller ATMEGA 8.The main microcontroller takes the responsibility of monitoring the sensor readings and sending the signal to the GSM through the sub-microcontroller, when there is gas leakage, fire, strong vibration on the door or intruders detected by ultrasonic sensor. When the soil moisture sensor senses that the soil is dry, then the main microcontroller sends a signal and turns on the motor to automatically irrigate the plants.Fig.10 represents the message received on the mobile phone through GSM.

8. CONCLUSION

In our project, a GSM based home security and automatic irrigation system which alerts the user by a text message and waters home plants automatically, is proposed and implemented. The door at home can be locked and unlocked by sending a message through the GSM. In case, if the mobile phone is lost, the message can be sent from any mobile number. The user is alerted timely when there is a fire, gas leakage or intruder in the house. A low cost home security system has been developed which does not require a PC as all processing is handled by the microcontroller. The system consumes less power and responds immediately to the user's message. A subsystem is used to manage transmission and reception of text messages. So there will not be any conflict or interruption during the process. The entire system occupies less space while installing at homes. In all aspects, the device will be cost effective and efficient. It will be available at a low cost, which everyone can afford.

ACKNOWLEDGEMENT

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