

GSM BASED SMART HOME AUTOMATION USING SENSORS

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Abstract – Since last few years technology has developed at certain level it has its own bad effects on environment as well as people and living life style. Now a days the home safety detection system play the important role for the security of people and basically in the household appliances the security of this must be cured. The life style of common people is busy now a days. Earlier the women’s are stay at home and handled the home and home appliances but now a days most of them go to work. So the security of the home appliances is must that is the LPG gas cylinder available at home must be checked regularly whether it has some leakage somewhere. The water is the important aspect of today’s world must be checked and have track on it whether there is any wasting occurring by the overflow. So all the members are out of the home to go there work and now the safety is the important problem. So we developed a system to overcome all the home appliances issues using motion sensor this system is effective efficient above all.

Key Words: MQ6 gas sensor, Water level sensor, PIR Motion sensor, Load cell, Arduino, GSM module, relay, etc.

I. INTRODUCTION

In earlier 60’s to 90’s there was an average demand or low demand of the resource. This demand was low because population was low. Suddenly in 90’s the population starts increasing this leads to tremendous demand for the resources. This directly leads to low quality of service by distributor. The resources used at home must be taken a good care as the safety precaution arises. Now a day’s most of the women’s in INDIA are working in corporative, private, government sector. So most of the times no one is available at home to take care or see whether the gas is leaking or not. Another is related to day to day life that is water. Since we are out of the house the water should not be wasted. So we have developed a system which will be the solution for most of the problems occurring in day to day life. Here in this system we are using a MQ6 gas sensor which will detect the leaked LPG gas. This sensor senses the amount of leak gas present in the surrounding atmosphere, if this gas is leak in more amount and if collected at a large quantity in the surrounding than it will sense it. The water level sensor to avoid the wastage of water. Since people are busy most of the times they forget to refill LPG cylinder so using load cell well connected to the GSM module which will send the message to the user and the user will know the current status of the LPG cylinder and many more. Then in this system we used the motion

sensor which will protect our home from robbery so it is helpful to detect the theft.

II. BLOCK DIAGRAM

This paper consist of following blocks AVR microcontroller Atmega328, LCD, GSM module, gas sensor MQ6, water level sensor, motion sensor, relay and load cell. Arduino is the heart of the system by using arduino IDE software we can implement our program in Arduino in Atmega328 IC using connecting cable then from this IC we can command the various devices.

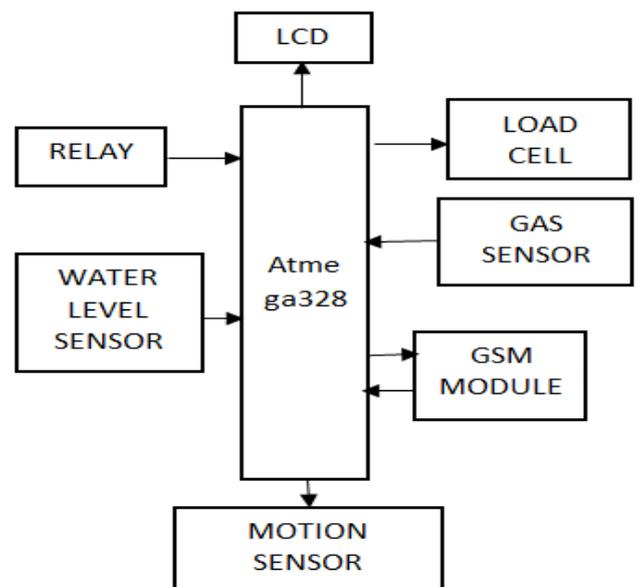


Fig. 1: BLOCK DIAGRAM OF LPG LEAKAGE DETECTION AND PREVENTION SYSTEM WITH GSM ALERT

In various home appliances like LPG gas leakage detection, water level detection and detection of the home from the theft this system will be used. The all the sensors used in this system like gas sensor, water level sensor and motion sensor are used to sense the gas leakage, water level and motion of the door respectively. If any changes in the gas concentration, water level and the motion of the door are show on the LCD and then with the help of GSM module it will send the message to the user.

III. FUNCTIONS OF COMPONENTS

[1] ARDUINO: It is an open source computer hardware & software & software company project & user community

that designs & manufactures single-board microcontrollers & microcontroller kit. Hardware means arduino circuit & software means where we can type our program or command the arduino. So basically it has two sides like programming to control the project & hardware means arduino device.

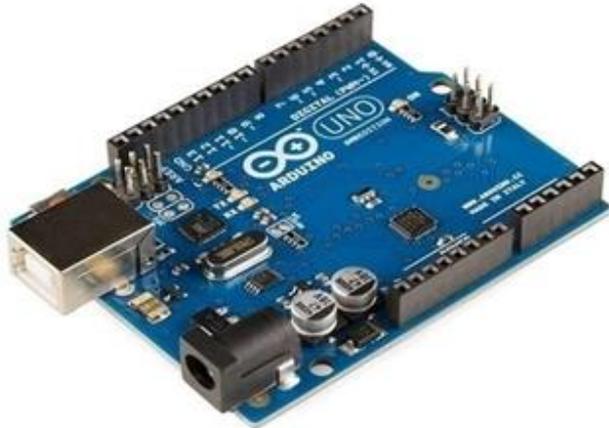


Fig. 2: ARDUINO UNO

It is tool for control the project or give the instruction to the circuit or project. Arduino UNO is very easy to use & it is cost efficient & easily available in the market. The simple c programming language is used & very easy to implement the program like just connect the arduino to computer using connector cable & implement the program.

[2] GSM MODULE: GSM is a mobile communication modem it stands for Global System for Mobile communication. A GSM modem is a specialized type of modem which accepts a SIM card & operates just like a mobile phone. From the mobile operator perspective a GSM modem looks just like a mobile phones. When a GSM modem is connected to a computer this allows the computer to use the GSM modem to communicate over mobile network.



Fig. 3: GSM modem

While this GSM modems are most frequently used to provide mobile internet, internet connectivity many of them can also be used for sending & receiving SMS. It is used for transmitting mobile voice & data service operate at the 850 MHz , 900 MHz, 1800 MHz & 1900 MHz frequency bands.

[3] LCD: Most common LCD's connected to the microcontroller are 16 x 2 & 20 x 2. This means 16 character per line by 2 line & 20 character per line by 2 line respectively.



Fig. 4: LCD

An LCD or Liquid Crystal Display, is a type of screen that is used in many computers, TV's, digital cameras, tablets & cell phones.

[4] RELAY: It is electrically operated switch. Relay are used where it is a necessary to control a circuit by a low power signal or where several circuit must be control by one signal.



Fig. 5: RELAY

Relays with calibrated operating characteristics & sometimes multiple operating points are used to protect electrical circuits from overload or faults. It used to shutting off power supply when due limit is over.

[5]LOAD CELL: Load cell is sensor which is the heart of the electronic scales or weighing machines. This sensor sense the weight of the items and with the help of Arduino and LCD it will show on display.

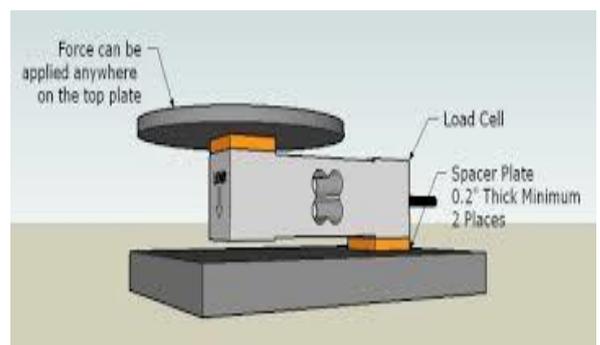


Fig. 6: LOAD CELL

It has different principles like load cell based on fluid pressure, based on elasticity, based on piezoelectric effect, etc. basically it used to sense the weight of the items like fluid pressure.

[6]GAS SENSOR: The MQ6 LPG gas sensor is used in this system. It is easy to use and suitable for sensing LPG. The MQ6 can detect the gas concentration in between 200 to 10000ppm.



Fig. 7: MQ6 LPG GAS SENSOR

The MQ6 gas sensor is a highly sensitive. Basically it used to sense the LPG gas in between 200 to 10000ppm to protect the system from any accident.

[7]WATER LEVEL SENSOR: Name indicates it's working the main working of the water level sensor is used to sense the water level in water tank to detect the water level.

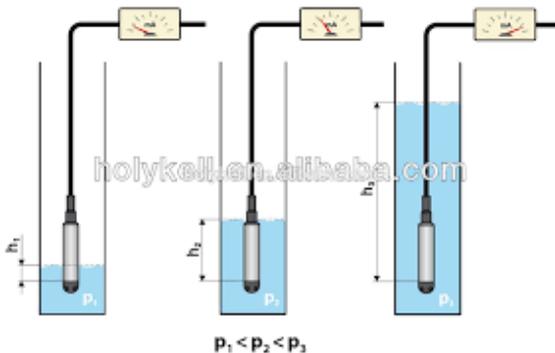


Fig. 8: WATER LEVEL SENSOR

When water level is increases at some limit then the water level sensor will sense the level of the water and gives the command to stop the water supply.

[8]MOTION SENSOR: Name indicates it working. It used to sense the motion of the object.



Fig. 9: MOTION SENSOR

When motion of the object will take place it will sense it and gives the command to the respective device. We used motion sensor to home safety from the theft.

IV. WORKING

In earlier 60's to 90's there was an average demand or low demand of the resource. This demand was low because population was low. Suddenly in 90's the population starts increasing this leads to tremendous demand for the resources. So the quality of the services will be low and the cost will be increases very rapidly. The LPG gases are used in home, it is used in industrial area, also used in motor fuel. So we decided to make a system to prevent all this things like gas, water level and the theft detection will be take place simultaneously. In this system we work on the various home appliances like LPG gas cylinder, water level detection, home safety from theft where human beings cannot give the time from there busy schedule. So just to help the peoples and environment we make this system. In this system we use Arduino Atmega328 IC which is used to command all the devices. We program the IC using connecting cables then it will gives various commands to the respective devices. There are 4 processes that the system will be do. Now the 1st process of the system is to sense the LPG gas leakage by using the MQ6 sensor. When the concentration of the gas will be increases the gas sensor sense it and by using the GSM module it will gives the message to the user and off the main source of the gas. Now the 2nd process of the system is to calculate the weight of the cylinder using load cell. By using load cell it will calculate the pressure of gas cylinder on the load cell and if the pressure is decreases then the load cell gives the message to the user using GSM module. Now the 3rd process of the system is water level sensor. The water level sensor is used to sense the water level when it reaches the mark area then water level sensor sense it and off the main supply of water and send the message to the user with the help of GSM module. Now the 4th process of the system is motion sensor. The motion sensor is connected to the main door of the home when thief want to enter the home and when he open the door the motion sensor will sense it and send the message to the user using GSM module. So with the help of Arduino, GSM module and sensors we can make our home appliances better and it will be a useful system for home appliances.

V. CONCLUSION

At the end of this system we can conclude that the gas leakage, water leakage and theft in household and industries causes risk to life and property. So to protect that and make the solution for this we make the system which will monitor the system and also switch off the main power supplies to prevent the system from any type of harm. Using MQ6 gas sensor it will sense the gas concentration, the water level sensor will sense the water level, the motion sensor will catch the motion of thief and the load cell gives the pressure of the gas cylinder on it. So it will be a very useful system.

VI. ACKNOWLEDGEMENT

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