

Safe Home: A Novel LPG Leakage Detection System

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Abstract- Gas outpouring could be a major drawback with industrial sector, residential areas and gas driven vehicles like CNG (Compressed Natural Gas) buses, cars etc. one in every of the preventive methods to prevent accidents connected with the gas outpouring is to put in a gas outpouring detection device at pervious places. The aim of this project is to develop such a tool which will mechanically detect and stop gas leakages in those pervious areas. The system detects the outpouring of the LPG (Liquefied fossil fuel Gas) using a gas sensing element and uses the GSM to alert the person regarding the gas outpouring via SMS. once the LPG concentration within the air exceeds a preset level, the gas sensing element senses the gas leakage and also the output of the sensing element goes LOW. this is often detected by the microcontroller and also the junction rectifier and buzzer are turned ON simultaneously. The system then alerts the client by causing an SMS to the desired mobile-phone.

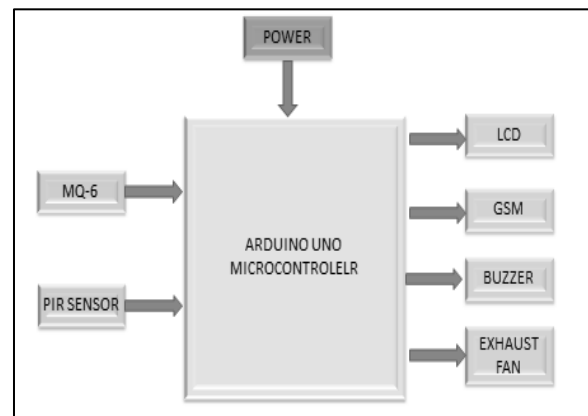
Index Terms- Arduino Uno, MQ-6, PIR, GSM, LPG, LCD TV, LED, Ventilator exhaust.

I. INTRODUCTION

LPG gas is largely a combination of gas and alkane series that are extremely combustible chemicals. it's odorless gas in its wild to that alkyl Mercaptan is side as powerful smelling agent, in order that outflow is simply detected. we are able to discover the LPG outflow within the cars, industrial sectors and residential areas victimization a perfect Gas sensing element. we are able to simply implement the LPG gas outflow detector unit into a unit which will sound an alarm or provides a visual suggestion of the LPG concentration in an exceedingly 16x2 digital display display. The sensing element utilized in this project has each admirable sensitivity and fast time interval. This sensing element also can be accustomed sense different gases like isobutane, propane, LNG and even butt smoke. The output of the sensing element goes LOW as presently because the LPG sensor senses anygas outflow. this can be detected by the

microcontroller and therefore the LED & buzzer are turned ON. once a delay of few milliseconds, the fan is additionally turned ON for throwing the gas out and a "GAS LEAKAGE" message is shipped to a predefined mobile range victimization GSM Module.

II.SYSTEM DESCRIPTION



This projected gas leak detection system encompass Associate in Nursing Arduino uno microcontroller, a GSM module, Associate in Nursing alarm, a PIR device, MQ6 Associate in Nursinging an air extractor, Buzzer, LCD show.

Arduino UNO is employed during this project, it offers a simple interface to put in writing the code in line with purposeful needs, easy to put in writing and simple to implement.

MQ-6 is employed to sight the presence of LPG. the MQ-6 device acts as a sensitive element and may be counted as a sensory organ of the system. This device offers output in concentration analog voltage.

The liquid crystal display monitor is employed to point out output of the result provided by MQ-6 device.

GSM module sends message to the patron if gas leak happens, AT commands are used and a predefined range is given therefore, message sent to it specific client.

PIR sensors detects the human movement. fan is employed to get rid of the gas if gas leak happens.

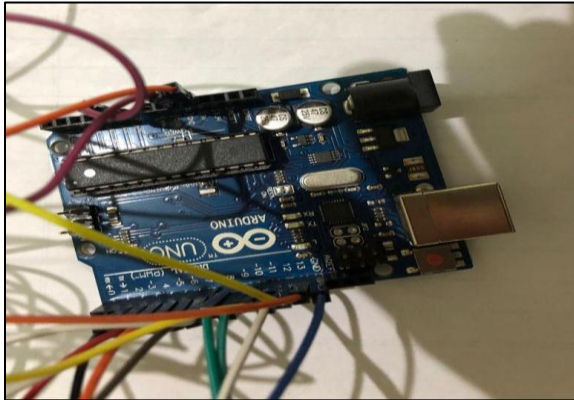


Fig 2:Arduino Uno Microcontroller board

Arduino is an open source that offers a simple to use platform and easy to use microcontroller. The microcontroller is programmed in that way, each time it receives a analog volatgate greater than a predefined threshold value, it activates the buzzer, LCD shows the output,turn exhaust fan ON send message to the consumer by GSM module.[4]



Fig 3:MQ-6 sensor

MQ-6 Sensor is the main component if this system it detects the leakage of LPG gas. It has a quick response,time easy to connect to adruino and a good build quality so that it lasts for a long time .[4]

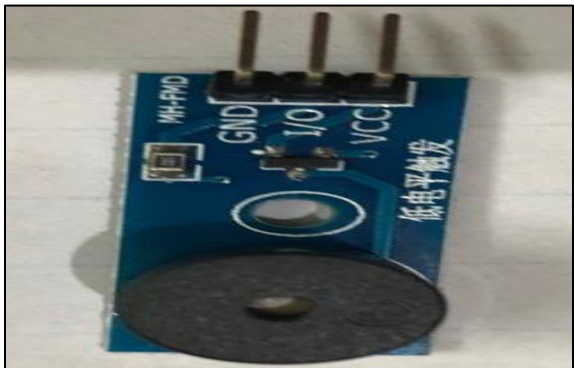


Fig 4:Piezoelectric buzzer

It is a piezoelectric signal that has a piezoelectric diaphragm with three terminals associated GND,I/O and VCC.I/O terminal takes input from the adruino if given value is HIGH then Buzzer get ON if it gets value LOW then buzzer get OFF. [2]

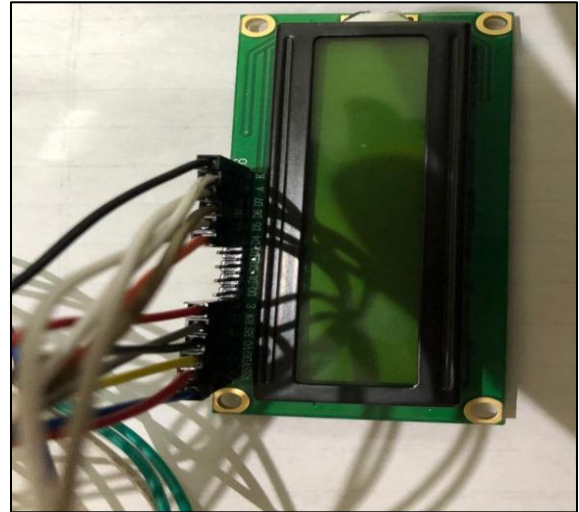


Fig 5:LCD Display

LCD screen is utilized as a visual output for the gas leak. LCD screens are desirable because they are cheap and can be effectively programmed. If MQ6 sensor reach the value greater than predefined threshold value then LCD show “Gas leaking” status else it shows “No leaking”[9]

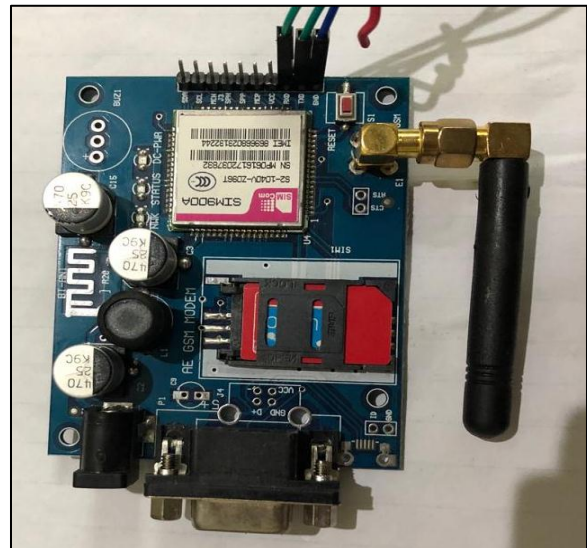


Fig 6 :SIM 900 GSM Module

SIM 900 is a four-band GSM module that works at frequencies of megahertz. The SIM 900 module requires a supply voltage somewhere in the range of 5V. This module is used to send cautioning messages to consumers about the gas leak.[8]



Fig 7:Exhaust Fan

The goal of this Exhaust fan is to remove leak of LPG..[1]



Fig 8:PIR Sensor

The PIR sensors allow detecting the human movements if human gets front of that sensor.

III.RESULT

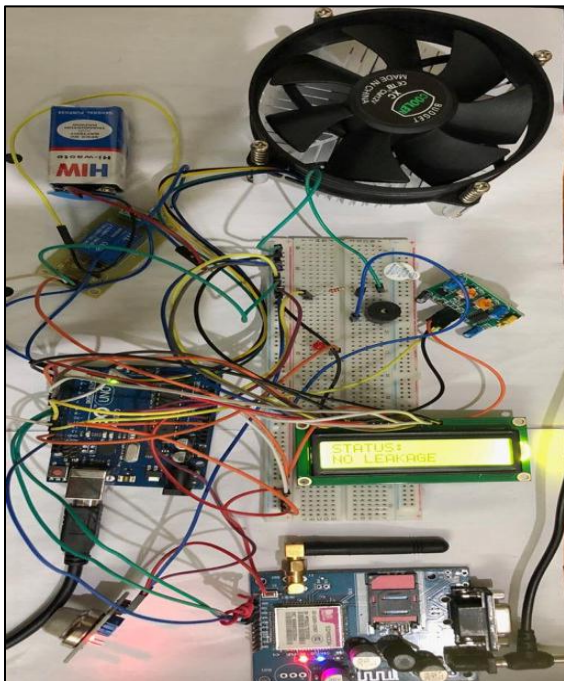


Fig 9: Gas leakage not detected



Fig 10: Gas leakage detected

Arduino uno has fourteen digital pin,6 analog pin(A0,A1,A2,A3,A4,A5),gnd,5 volt,3,3 potential unit power provides. whereas interfacing arduino with gsm module rxd pin of gsm module is connected to eighth pin of arduino uno and txd pin of gsm module is connected to ninth pin of arduino uno and equally ground pin is connected to ground of arduino and external power supply(5volt 2amp adapter) has been provided to gsm module afterward interfacing of mq6 sensing element and arduino has been enforced by connecting A0 of mq6 to A0 of arduino,vcc is connected to 5volt of arduino and ground pin is connected to ground of arduino afterward interfacing of buzzer and arduino has been done by victimisation semiconductor, 220ohm resistance and tenth pin of arduinouno has been connected with buzzer, afterward interfacing of liquid crystal display 16x2 has been through with arduino connecting digital pins two,3,4,5,6 and seven to rs,D0,D4,D5,D6 and D7, k with 5volt,A with ground,vss with five potential unit,vdd with ground and v0 with 5volt.Now interfacing of pir sensing element and arduino has been done connecting five potential unit of arduino to positive,ground to negative and i/o to twelve pin of arduino.Now interfacing fan with arduino has been done by victimisation relay switch,9volt battery.

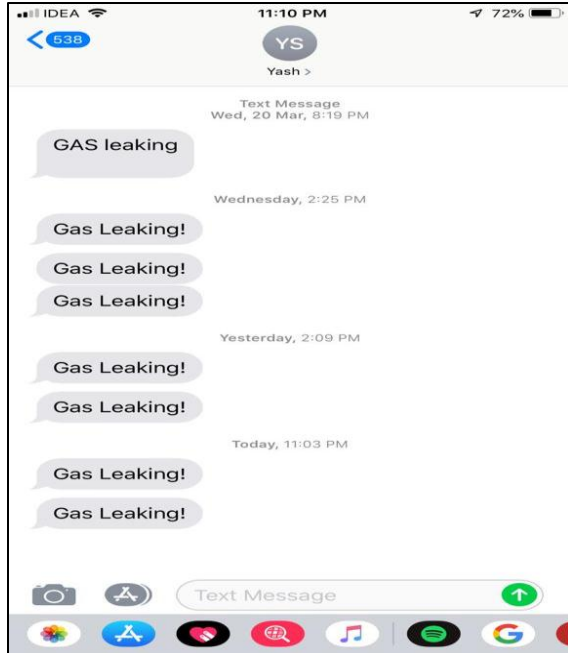


Fig 11. Message after gas leakage

IV. CONCLUSION

The analysis work utilizes IOT innovation to boost existing security benchmarks. This research work utilizes IOT innovation to assemble a gas gift detector with keen cautioning procedures that sends a rapid message to the actual shopper. This method will acknowledge the gas gift in atmosphere if gifted gas is on top of the edge price it'll alert the patron. This system save lives by alerting the patron so explicit actions may be drained time to stop shoppers from the disaster. Additionally, after causing alert message to the patron, it activate the fan to get rid of gas so gas not fill within the atmosphere. PIR sensors is employed to acknowledge movements, very often accustomed establish weather human has stirred within or outside the vary of detector

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