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Vehicle Speed Controlling with Alcohol and Gas Detection

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Abstract - *In Indian scenario, due to more population and vehicle traffic rule breakers we are in distinction of having more number of road accidents, even though, the Road Transport and Highways ministry is set to approve several amendments to the act to make the Indian roads safer, in addition to that, Drinking and driving is already a serious public health problem, which is likely to emerge as one of the most significant problems in the near future. Another serious factor in this area is leakage control of LPG in vehicles also the Gas leakage tragedies and accidents have lead to heavy losses over the years. So to prevent accidents it is very important to detect any gas leakage and alcohol presence in the vehicle. And the another severe critical factor is vehicle speed control in sensitive areas like, village circles on highways, school and college zones due to vigorous drive of the drivers without caring the traffic signals. Leakage of gas in LPG vehicles is going to detect by the use of combustible gas detector. The control of vehicles over speed, alcohol detection inside the vehicle and LPG leakage is possible through the low cost automation system, which is very much useful to prevent road accidents in efficient manner is the main motive of this work .*

Key Words*: *Gas Leakage system, Vehicle Control system, Alcohol detection system

1. INTRODUCTION

Automation of the driving control of vehicles is one of the most vital needs of the hour. This technology can very well implement what was absent before, controlled lane driving. Considering the hazards of driving and their more pronounced effect on vehicles our Automatic Vehicle Speed Control System is required. in India more number of accidents are occurring in the area of over speed, drunk and drive and Leakage of LPG in vehicles. Which is likely to emerge as one of the most significant problems in the near future.The advanced Mechatronic System implementation will be the more considered factor to reducing the road accidents in near future. An overview of Road Accidents in India. In 2015, there were about five lakh road accidents in India, which killed about 1.5 lakh people and injured about five lakh people. India, as a signatory to the Brasilia declaration, intends to reduce road accidents and traffic fatalities by 50% by 2022 through the high end automations to vehicles. The continuing evolution of automotive technology aims to deliver even greater safety benefits and Automated Driving Systems (ADS). In future, fully automated vehicles that drive us, instead of us driving them, will become a reality. Automation of the driving control of vehicles is one of the most vital needs of the hour. This technology can very well implement what was absent before, controlled lane driving. Considering the hazards of driving and their more pronounced effect on vehicles our automatic vehicle speed control system is exactly what is required. India had earned the dubious distinction of having more number of fatalities due to road accidents in the world. Road safety is emerging as a major social concern around the world especially in India. Drinking and driving is already a serious public health problem, which is likely to emerge as one of the most significant problems in the near future. The system implemented by us aims at reducing the road accidents in the near future due to drunken driving. The system detects the presence of alcohol in the vehicle and immediately reduces speed of the engine vehicle. At the same time an SMS is send to pre-selected contacts. Hence the system reduces the quantum of road accidents and fatalities due to drunk driving in future with gas sensing.

2. LITERATURE REVIEW

Vinod Rao et al [1], has worked on vehicle's speed control using IR, detection of obstacle and prevention of accidents. Whenever the vehicle enters within the speed limit zone, the speed of the vehicle is controlled by the receiving of signal, i.e.., each and every time the speed of the vehicle is decreased to some cut off value and is kept constant to that speed until the vehicle moves outside of the speed limiting zone, and then the vehicle's speed is accelerated automatically. It detects the Obstacles in between and prevents the Accidents by Stopping of the Vehicle.

Swapmil Kadam et al [2] presented a paper titled "Microcontroller Based LPG Gas Leakage Detector

Using GSM Module". In this paper they used gas sensor, GSM module, microcontroller, if the gas concentration is increasing the gas sensors will sense the leakage of the gas and then send to the microcontroller. Then the GSM module is connected to the microcontroller which will gives the command to stop the main supply. The system is highly reliable, tamper-proof and secure. In the long run the maintenance cost is efficient. It is highly accurate.

Dr. Pikesh Bansal et al [3] presented a paper titled "Alcohol Detection and Accident Avoidance Using Locking with Tracking". In this papers GSM Alert and GPS was used to send location and alcohol detected related message to relative of driver. Location was normally in longitude and latitude which was difficult to locate. Ignition system directly turn off when detected alcohol. IR LED 894 was used. It produces high intensity IR ray's, which means it absorb alcohol of only high content from air, so this symbolize that this mechanism will work only when driver is over drunk for lower concentration of alcohol it was detected accurately.

3. BLOCK DIAGRAM OF THE SYSTEM

This paper consist of following blocks microcontroller Atmega328, LCD, GSM module, gas sensor MQ2, alcohol sensor MQ3, DC motor, buzzer and RFID sensor. The heart of the system is Arduino which is consist of Atmega328 IC by using Arduino IDE software we can make a program for our system and implementing it with the help of connecting cable.

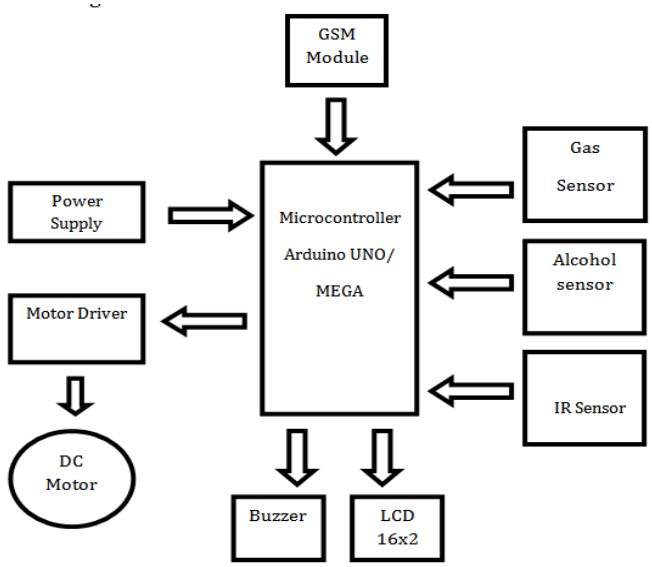

Fig 1 Block Diagram

The gas sensor sense the gas concentration and if any changes in the gas then it will show on LCD and buzzer will be buzz then by using the GSM system the command will be gives to the system and then it will work normally. The alcohol detecting sensor when connected to an Arduino detects the level of alcohol content by analyzing driver's breath. Hence the system reduces the quantum of road accidents and fatalities due to drunk driving in future with gas sensing.

4. FUNCTIONS OF COMPONENTS

A. *ARDUINO*: The Arduino board is the central unit of the system. All the components are interfaced to the board and programmed as per their functionality to operate in synchronization.

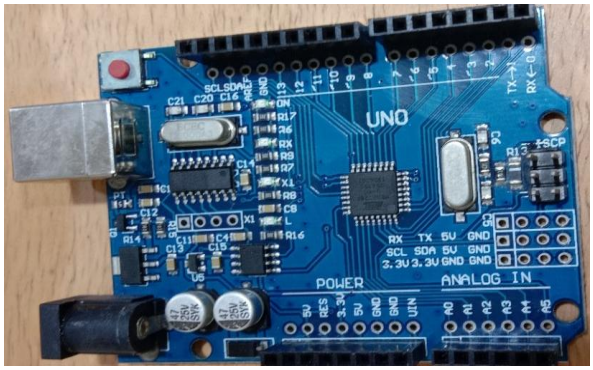

Fig 2 ARDUINO UNO

B. *ALCOHOL SENSOR (MQ3):* It is used to sense the alcohol. The analog output of which is applied to the Arduino board.

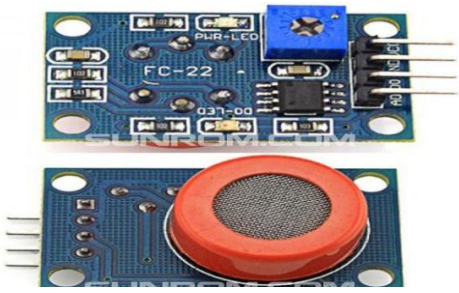

Fig 3 ALCOHOL SENSOR MQ3

C. *GSM:* It is used to send an SMS to the contacts of the user about the location of the vehicle. It is beneficial in emergency situations.

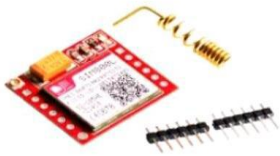

Fig 4 GSM MODEM SIM800L

D. *LCD:* If alcohol is detected it displays the message indicating "ALCOHOL DETECTED".

Fig 5 LCD DISPLAY

E. *GAS SENSOR (MQ2):* It detects combustible gasses and smoke. The Grove -Gas Sensor (MQ2) module is useful for gas leakage detection (in home and industry). It can detect combustible gas and smoke.

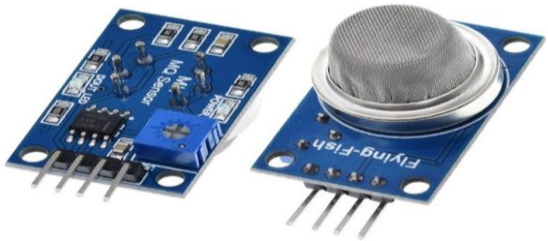

Fig 6 GAS SENSOR MQ2

F. *BUZZER:* A buzzer or beeper is an audio signalling device, which may be mechanical, electromechanical, or piezoelectric.

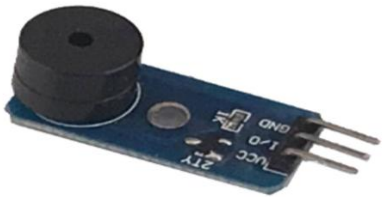

Fig 7 BUZZER

Software Requirement:
ARDUINO IDE: Arduino IDE is an open-source cross-platform application that make user easy to write code and upload the code to the Arduino board.

5. WORKING

The working system for a vehicle speed control represents the below circuit diagram for the proposed work, many accidents at high-ways are occurred due to the close running of vehicles, all of sudden, if the in front vehicle driver reduces the speed or applied breaks, then it is quite difficult to the following vehicle driver to control his vehicle, resulting accident. To avoid this RFID RC522 sensor tag is used to detect the vehicle speed, it controls the speed of the vehicle. The circuit is designed in such a way that, when first sensor touches it reduces the speed of the vehicle and when second sensor touches it moves with the normal speed and displayed in the LCD. The alcohol sensor is connected to Arduino. The system is fed with the code about what operation should be performed with different data received from the sensor. The Arduino board is the central unit of the system. All the components are interfaced to the board and programmed as per the functionality to operate in synchronization and MQ3 alcohol sensor is used to sense the alcohol. The analog output of which is applied to the Arduino board. The GSM module sends an SMS to the contacts. If the alcohol is detected it displays the message indicating "Alcohol detected" and the MQ3 High sensitivity to alcohol and has good resistance to disturb of gasoline, smoke and vapor. The sensor could be used to detect alcohol with different concentration. It is with low cost and suitable for different application. The LCD display gives indication of alcohol level detected by alcohol sensor, this also provide warning message to drives to stop car or vehicle. The LPG gas sensor is the process of detecting potentially dangerous gas leaks. When the temperature exceed above threshold then automatically buzzer will on. The MQ2 gas sensor senses the gas concentration and if any changes in gas then it will show on LCD and buzzer will be buzz then it will work normally. Apart from sound alarm, an SMS alert will be sent. A GSM module is used to send SMS if gas leakage is detected and status is displayed on an LCD. The microcontroller carries out all the processing of the signal received from the MQ2 gas sensor and active the GSM module and LCD to inform

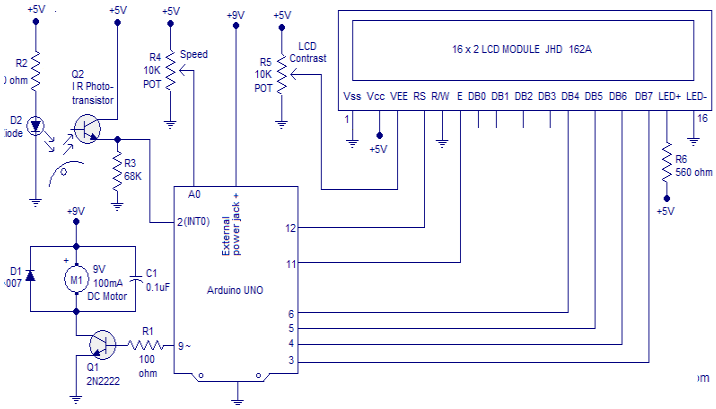

Fig 10 Circuit diagram

6. FLOW DIAGRAM

The system flow of this project will be represented in a flowchart form. From the flowchart, it emulates a situation where the start RFID reader will scan the vehicle every time the vehicle passes through it. Then, the time count will start until the vehicle pass through the stop RFID reader. The time count will not stop if the vehicle does not pass through the stop RFID reader. With the calculated time difference and pre stored constant distance the speed of the vehicle is calculated. Then, the calculated speed and the pre stored speed will display on the LCD screen. If the vehicle exceeds the speed limit, the buzzer will sound up and a text message will send to the driver to inform them about the speeding violation.

Operating Limit Values:

When controller starts comparing the practical count to default count, there exist two conditions:

Condition 1:- default count < practical count, if the vehicle speed is more than the condition 2 will exist.

Condition 2:- default count > practical count, then the speed of vehicle is normal.

In condition 1, since the speed of vehicle is more than anticipated, speed of vehicle need to be lowered down. In order to control the speed of vehicle, the controller signify either by continuous beep or any other mean to driver, if driver doesn't respond then controller take over the control from driver and it automatically neutralizes the speed of vehicle with the help of PWM in Arduino MEGA. After some duration of time controller automatically resets. In condition 2, since the speed of vehicle is normal so there is no need to control the speed by controller.

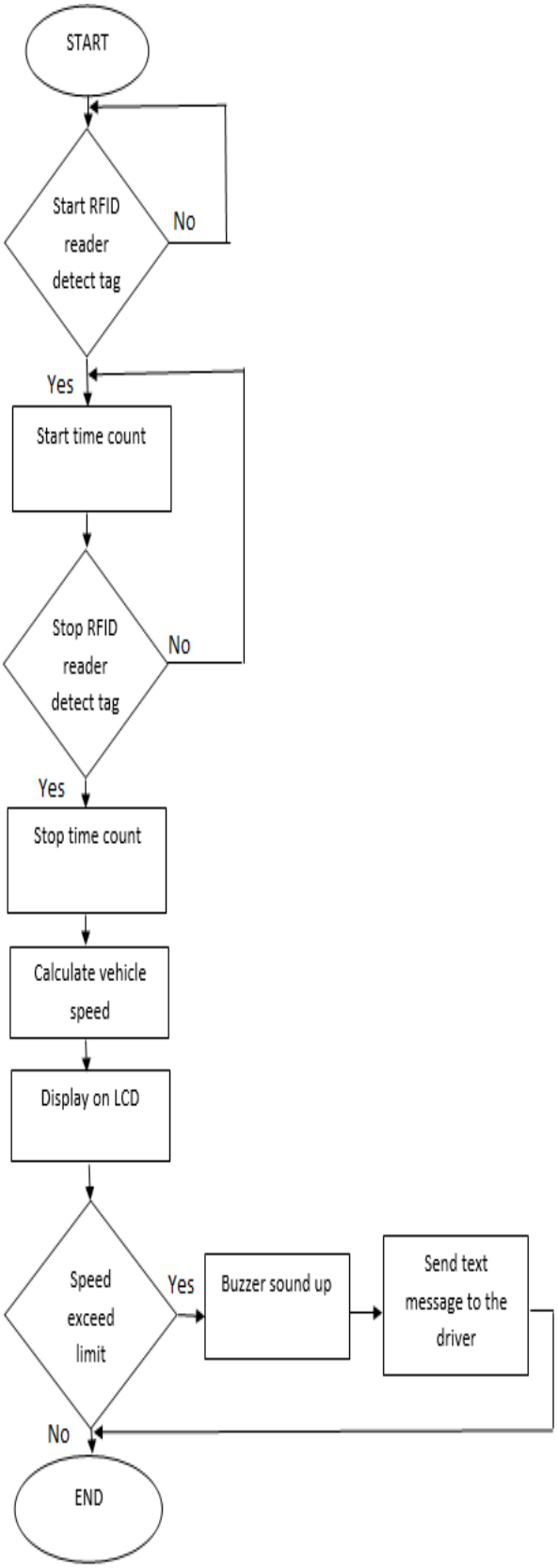

Fig 11 FLOW DIAGRAM

7. RESULTS AND DISCUSSION

When controller starts comparing the practical count to default count, there exist two conditions:

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Condition 2:- default count > practical count, then the speed of vehicle is normal.

In condition 1, since the speed of vehicle is more than anticipated, speed of vehicle need to be lowered down.. In condition 2, since the speed of vehicle is normal so there is no need to control the speed by controller.
LCD shows the speed. LCD displays "vehicle entered zone 50km/h" before the car passes and "vehicle entered school zone 30 km/h" after the car passes. If the speed exceeds, the buzzer will be alarmed and LED 3 will be blink.

In this system, RFID Sensors are the main part of circuit design that detects the speed of the vehicles.

The MQ2 gas sensor senses the gas concentration and if any changes in gas it displays the message indicating "Gas detected" and buzzer will be buzz then it will work normally. Apart from sound alarm, an SMS alert will be sent. A GSM module is used to send SMS if gas leakage is detected and status is displayed on an LCD. If the alcohol is detected it displays the message indicating "Alcohol detected" and the MQ3 High sensitivity to alcohol and has good resistance to disturb of gasoline, smoke and vapor. The LCD display gives indication of alcohol level detected by alcohol sensor, this also provide warning message to drives to stop car or vehicle.

8. CONCLUSIONS

As the number of accidents on highways increases day by day, so it is necessary to check speed of the vehicles on highways so as to remove accident cases and to provide a safe journey by controlling high speed of the vehicle. It also minimizes the difficulties of traffic police department and make ease to control the rash driving on highways. The police can perform their duties while sitting in control room and can provide their service with more ease and accuracy.

Gas Leakages in households and industries cause risk to life and property. This system is capable of detecting gas leakage and if leakage exceeds certain level this system automatically alert the people by sending the message and alert the people by activating the LED Buzzer. To reduce the rate of accidents taking place due to drunken driving. This system brings innovation to the existing technology in the vehicles and also improves the safety features, hence proving to be an effective development in the automobile industry.

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