Automatic PUC Detection System

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ABSTRACT: Vehicles have become an integral part of everyone's life. As we know that a coin has two sides that have their own effects, one of the main side effects is air pollution. Every vehicle is having emission but the problem occurs when it is beyond the standardized level. This emission from vehicles cannot be completely avoided but, it definitelycontrolled. Now a day accidents is a common feature of deaths. The common feature of accidents will be rash driving, drunk and driving, due to minor drivers etc. Rash driving is a nature of driver which causes panic in the traffic and finally leads to accidents. These are critical things to control so we aim to develop a system that reduce rash driving.As a solution to the above problems we aim to build an automated control system for air pollution detection and rash driving prevention in vehicles. This emission of hazards gases can be control by the evolvement of semi-conductor sensor system. Sensors in the system detect the level of pollution gases along with level of CO & CO2. Depending on the value the speed of motor is controlled. In addition to that rain sensor is used in this system.

KEYWORDS: Arduino ATmega328p, MQ3 sensor, MQ7 sensor, DC motor, LCD display, Rain sensor

I. INTRODUCTION

The main source of pollution in cities is due to vehicles. The increase use of vehicles in cities results in vital increase in the emission load of various toxins into air. As a result increase in environmental problems which will affect the human health in urban places. Air pollutants from taxies, cars and buses result in the damage of ground level ozone and other respiratory problem like asthma attacks. Transportation is main source for generating carbon monoxide that contributes 72% of total pollution in the metropolitan cities like Calcutta, Mumbai, and Delhi. At present, the Indian pollution control board has made the fitness certificate as compulsory for public and commercial vehicles once in a year to control the pollution. Pollution Under Control (PUC) certificate for every three months is mandatory for all group vehicles from the date of registration. In order to control the air pollution, the amount of air pollution needs to be monitored and vehicles responsible for polluting should be identified. The incomplete combustion in the engine of a vehicle leads to emission of different gases contributing to increase in the pollution and adversely affecting the environment. Detection and control of these gases is an important area of work. This emission from vehicles cannot be completely avoided but, it definitely can be controlled.

II. LITERATURE SURVEY

1. "Automated Control System for Air Pollution Detection in Vehicles" published by Siva Shankar Chandrasekaran, Sudharshan Muthukumar and Sabeshkumar Rajendran.
   The proposed system is microcontroller ATMEL 89S52based system. In this system the MQ7 sensor is used for the detection of the Carbon Monoxide. When the value of MQ7 sensor gets above the predefined value the GPS will shows the nearby service station for maintenance.

III. **RELATED WORK**

In this project, we are designing an automatic PUC detection systemwhich is more useful to reduce the environmental pollution caused by the vehicles. By using this project we reduce the speed of the vehicle if the values of CO and CO2 sensor goes beyond the predefined value. If the values of the CO and CO2 sensors are maintained within the predefined limit the vehicle moves in the normal speed. The values of the CO and CO2 gases will be continuously display on the LCD. This comes under the car automation so another sensor model is added which is rain sensor. When the water drops on the sensor the motor gets ON and rotate in clockwise and anticlockwise direction.
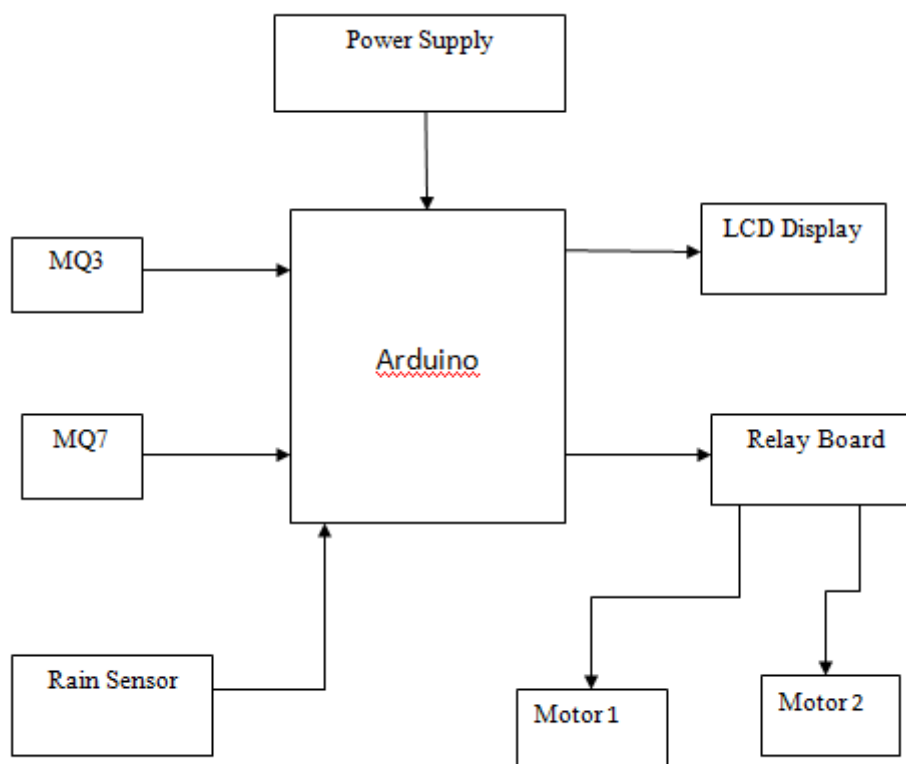
IV. **BLOCK DIAGRAM**

Fig. 1 Block Diagram

This system uses two inputs 1) CO Sensor 2) Alcohol Sensor and for output DC motor and LCD display. DC motor represents the speed of the vehicle. CO sensor is used to detect the concentration of Carbon Monoxide in the air while Alcohol sensor is used to detect the Carbon Dioxide. The output of both the sensors is provided to the arduino controller. The minimum permissible values are fed to the arduino i.e. 500 ppm for both the sensors. The controller will compare these values with output of both the sensors and gives output according to the conditions. 1) If the output is below threshold value then the DC motor 1 will rotate at normal speed. 2) If the output from CO sensor goes beyond

the limit then LCD will display 'CO is high' and the rotation of DC motor 1 decreases i.e. speed of vehicle decreases. 3) If the output from CO2 sensor goes beyond the limit then LCD will display 'CO2 is high' and the rotation of DC motor 1 decreases i.e. speed of vehicle decreases. In addition to it rain sensing module is used for car automation. When water drops on the sensor board the positive and negative lines get shorted and the DC motor 2 gets rotate in clockwise and anticlockwise direction.

V. SYSTEM SPECIFICATION

 The specifications of the components used in this system are as follows:
* ATmega 328P Microcontroller: Arduino is the main controller of the system. It will control all the operations of the system. It is the 28 pin IC operates on 5V supply.
* Liquid Crystal Display(LCD):In this system, 16*2 LCD is used. It will display the values of CO and CO2 gases. The LCD is used for the user convenience.
* MQ7 sensor: It is used to detect CO gas.
* MQ3 sensor: It is used to detect CO2 gas.
* Rain sensor: It is used to detect the presence of rain and if the rain is present then the motor 2 rotate in clockwise and anticlockwise direction.
* Motors: There are total 2 DC motors used in the system is of 1000 RPM and 2 is of 100 RPM.

VI. RESULT

Our project entitled "Automatic PUC Detection System" is successfully completed and the results obtained are satisfactory. Actually this project is based on demo.It will be easier for the people who are going to take the project for the further modifications. This project will help to reduce the environmental pollution due to the gases released by the vehicles. Also the user will get informed by the values of the CO and CO2 gases and if the values are above the predefined value then in our project the speed of motor gets reduced and when the values of CO and CO2 gets controlled then the motor will rotate at normal speed.

Fig. a) Output of CO Sensor goes high

MQ7 sensor is used to detect the presence of the CO gas. When the output goes beyond the 500ppm the LCD will display a message 'CO is High'. The speed of motor1 goes down.
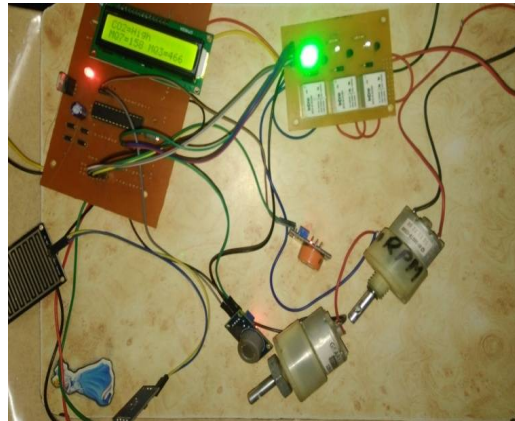
Fig. b) Output of CO2 Sensor goes high

MQ3 sensor is used to detect the presence of the CO2 gas. When the output goes beyond the 500ppm the LCD will display a message 'CO2 is High'. The speed of motor1 goes down.
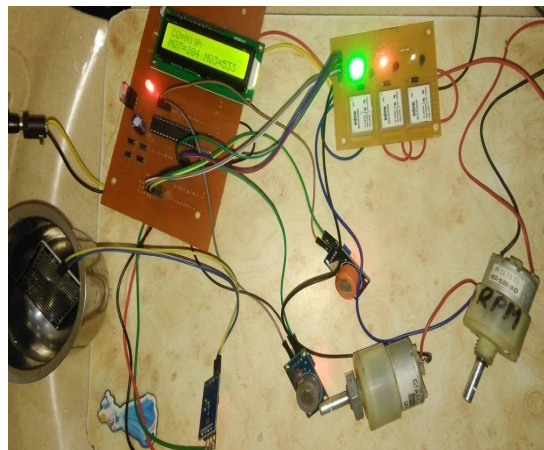

Fig. c) Output of rain sensor

When water drops on the rain sensor then the motor2 will rotate in clockwise direction and anticlockwise direction.

VII. CONCLUSION

There is an increase in the level of air pollution over last couple of decades, leading to several environmental problems. Which are resulted in Ozone layer depletion leading to green house effect. Air pollution also affects the human health causing the lungs and respiratory system problems. The system helps to keep the environment free from vehicular emission. Also this system is just add-on, it does not need to change configuration of engine, will makes easier to employ this system in existing vehicles. Hence this system is highly beneficial to reduce the pollution in environment due to vehicles.

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