AUTOMATIC POWER WINDOW CONTROL FOR EXTRACTION OF VOLATILE ORGANIC COMPOUND (VOC) USING VOC KIT

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Abstract- Nowadays it has become common and necessary for every individuals on this world to get use of vehicles. Recent studies has found that most of the vehicle cabins are covered with organic compound which are considered to be very dangerous for occupant health, the gases like Benzene, NOx are formed inside the cabin due to temperature increase in the atmosphere. In order to prevent these gases we come up with a smart initiative idea where a gas sensor is used which will measure the most dangerous gases. This exhibits the pollution less indoor cabin environment and reduces the harmful effects that are faced by the humans based on the studies.

Index Terms—MQ-135 sensor, harmful gases, vehicle cabin, health of occupant, temperature increase, quality of Air.

I.   INTRODUCTION

With the rapid development of the automobile market, vehicle cabin air quality has become a major concern to public health. It was reported that people on average spend 5.5% of their lifetime in vehicle cabins [1].Volatile organic compounds (VOCs) are among the harmful air pollutants in vehicle cabins, which may both influence human comfort and have a negative impact on human health or perception [2–4]. Therefore, it is crucial to investigate the VOC emission characteristics in vehicle cabins. VOC concentrations in vehicle cabins are strongly associated with the interior materials [5–7]. There are a number of standards that specify the major VOC limits in newly manufactured cars and the VOC emission testing methods for vehicles and the interior materials. For example, according to the ISO standard [8], newly produced cars have to be tested in an environmental chamber at a constant temperature of 23 +- 2 C before going to market. As long as the test results meet the recommended guideline, the in-cabin air quality is considered satisfactory. However, during the daily use of cars, various influential factors, such as temperature, humidity, and usage time, can affect VOC emissions [9–14]. These influences are not necessarily reflected in the chamber tests under a well-controlled constant environmental condition. Thus, it is worthwhile to conduct field measurements to better understand VOC emission
characteristics in vehicle cabins. There are mainly two categories of field studies regarding VOC emissions in vehicle cabins in the literature. The first randomly selects a number of cars of different brands, models, and ages, and then measure the VOC concentrations under uncontrolled environments Zhang et al. [15]

II.   METHODOLOGY

A. Working

This paper introduces fully automatic system in which MQ135 gas sensor is used to detect the quality of air inside the vehicle cabin and send the values to the aurdino UNO if the temperature of atmosphere increase due to that of air and
the different materials like lot of plastic items are placed will take reactions and forms harm full gases such as benzene, oxides of nitrogen that harm full gases when it increase the value the aurdino UNO will send a command to the driver motor to actuate a sliding motor of windows to slide down slightly for a given time period due to the density of harm full gases will be heavier that will be occupied the roof top can easily make them to escape to atmosphere hence this make the reduce of health risks to the occupant. At the same time the AC compressor will be turned off with the help of arduino.
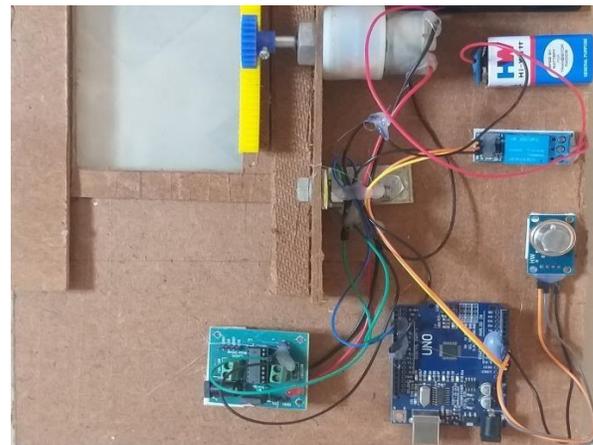

FIG 1 PROTOTYPE

III.   COMPONENTS

A.   MQ135 GAS SENSOR

MQ135 Gas Sensor is an air quality sensor for detecting a wide range of gases, including NH3, NOx, alcohol, benzene, smoke andCO2. MQ135 gas **sensor** has high sensitivity to Ammonia, Sulfide and Benzene steam, also sensitive to smoke and other harmful gases. Ideal for use in office or factory.

FIG 2 MQ-135 GAS SENSOR

FEATURES OF MQ135 SENSOR

- Wide detecting scope
- Fast response and High sensitivity
- Stable and long life
- Operating Voltage is +5V
- Detect/Measure NH3, NOx, alcohol, Benzene, smoke, CO2, etc.
- Analog output voltage: 0V to 5V
- Digital output voltage: 0V or 5V (TTL Logic)
- Preheat duration 20 seconds
- Can be used as a Digital or analog sensor
- The Sensitivity of Digital pin can be varied using the potentiometer.
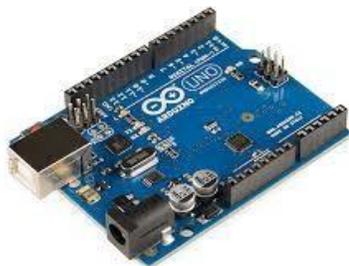
FIG 3 ARDUINO UNO BOARD

FEATURES OF ARDUINO UNO

- The operating voltage is 5V
- The recommended input voltage will range from 7v to 12V
- The input voltage ranges from 6v to 20V
- Digital input/output pins are 14
- Analog i/p pins are 6
- DC Current for each input/output pin is 40 mA
- DC Current for 3.3V Pin is 50 mA

- Flash Memory is 32 KB
- SRAM is 2 KB
- EEPROM is 1 KB
- CLK Speed is 16 MHz.

B.   DC MOTOR

A DC motor is any motor within a class of electrical machines whereby direct current electrical power is converted into mechanical power. Most often, this type of motor relies on forces that magnetic fields produce. Regardless of the type, DC motors have some kind of internal mechanism, which is electronic or electromechanical. In both cases, the direction of current flow in part of the motor is changed periodically.

The speed of a DC motor is controlled using a variable supply voltage or by changing the strength of the current within its field wind rings. While smaller DC motors are commonly used in the making of appliances, tools, toys, and automobile mechanisms, such as electric car seats, larger DC motors are used in hoists, elevators, and electric vehicles. A 12v DC motor is small and inexpensive, yet powerful enough to be used for many applications. Because choosing the right DC motor for a specific application can be challenging, it is important to work with the right company.

FIG 4 12V DC MOTOR

A.   MOTOR DRIVER L293D

The L293D is a popular 16-Pin Motor Driver IC. As the name suggests it is mainly used to   drive motors. A single L293D IC is capable of running two DC motors at the same time; also the direction of these two motors can be controlled independently.
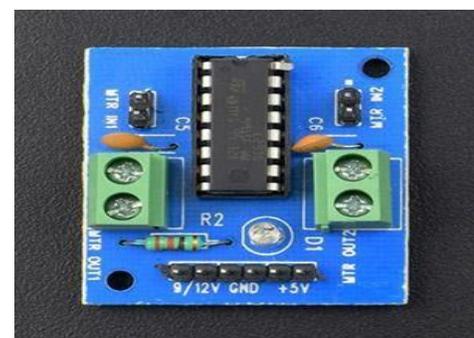

FIG 5 MOTOR DRIVER L293D

FEATURES OF MOTOR DRIVER L293D

- Can be used to run Two DC motors with the same IC.
- Speed and Direction control is possible
- Motor voltage Vcc2 (Vs): 4.5V to 36V
- Maximum Peak motor current: 1.2A
- Maximum Continuous Motor Current: 600mA
- Supply Voltage to Vcc1(vss): 4.5V to 7V
- Transition time: 300ns (at 5Vand 24V)
- Automatic Thermal shutdown is available
- Available in 16-pin DIP, TSSOP, SOIC packages.

IV. CONCLUSION

This examination plans to play a significant role to identify the gases produced inside the vehicle cabin and helps to figure out the problem with suitable solutions while setting up by the sample prototype model to show case the method of extruding dangerous gases with fully automatic system by accompanying conclusion might be drawn from this investigation:

- Measuring the highly dangerous gases such as benzene, NOx etc., present inside the vehicle cabin with the help of MQ135 gas sensor
- Based on the field examination of air flow velocity in chosen sample private use vehicle the time taken to extract frequently produced gases inside cabin is 5 sec.
- This exhibits the pollution less indoor cabin environment and reduces the harmful effects that are faced by the humans based on the studies.

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