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Alcohol Detection with Vehicle Controlling System

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Abstract – *Previously, there were no technologies to lock the engine of the vehicle after sensing the alcohol intake by the driver, which is considered to be the main cause of accidents. There was manual checking after certain distance on the roads or the highways but still these checks were not sufficient to stop the happening of the mishaps. So, to avoid these problems, this project of alcohol detection with vehicle controlling system by locking engine is developed.*

The main objective of this project is to reduce road accidents, to provide automatic safety to the vehicle, driver and passengers. It is also aimed to make people use public transport instead of their private ones when they are not in their sense to drive.

***Key Words*: Alcohol Sensor (MQ3Sensor), DC Motor, Microcontroller (8051), LCD, Motor Driver (L293D) Buzzer driver (BC547), Buzzer**

1. INTRODUCTION

We usually encounter drink and driving cases where drunk drivers crash their cars under the influence of alcohol causing damage to property and life. So here we develop an innovative system to avoid such cases. Our system would be constantly monitoring the driving force breath by placing it on the steering wheel or at place where the driver's breath is often constantly being monitored by it. So, if a driver is drunk and tries to drive the system detects alcohol presence in his/her breathe and locks the engine in order that the vehicle fails to start out .In another case if the driving force isn't drunk while he starts the vehicle and engine is started but he/she drinks while driving the sensor still detects alcohol in his breath and stops the engine in order that the car wouldn't accelerate any longer and driver can steer it to roadside. In this system we use an 8051-microcontroller interfaced with an alcohol sensor along with an LCD screen and a dc motor to

2. METHODOLOGY

In this system we use an 8051-microcontroller interfaced with an alcohol sensor along with an LCD screen and a dc motor to demonstrate the concept. So here the alcohol sensor is employed to watch user's breath and constantly sends signals to the microcontroller.

The microcontroller on sensing alcohol percentage from the alcohol sensor beyond a threshold limit, displays alcohol detection note on LCD screen and also stops the dc motor to demonstrate as engine locking is done successfully. The system needs a push button to start the engine. If alcohol is detected at the time of starting the engine the engine doesn't start. If alcohol is detected after engine starting, the system locks the engine at that point.

3. SYSTEM REQUIREMENTS

The basic components required to design the circuit are:

3.1. Alcohol Sensor (MQ3 Sensor)

MQ3- Alcohol Gas Sensor is a semiconductor based low cost sensor. It is used to detect the presence of alcohol vapour gas at concentrations from 0.05 mg/L to 10 mg/L. It has high sensitivity to alcohol vapour and has a good resistance to disturbances due to smoke, vapour and gasoline.

Pin Out
1. VCC – Input Power Supply
2. DO – Digital Output
3. AO – Analog Output
4. GND-Ground [1]

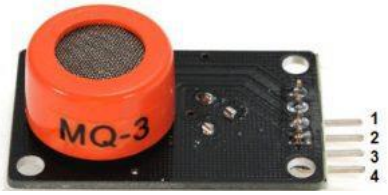


Fig-1: MQ3 Alcohol Sensor

3.2. Microcontroller (8051)

8051 is an 8 – bit Microcontroller i.e. the data bus of the 8051 Microcontroller both internal and external are of 8 – bit wide. It is a CISC based Microcontroller with Harvard Architecture i.e. it has a separate program and data memory. It is the major part of the system. It maintains the temperature, humidity and light intensity to the desired value. The 8051 has one port for serial communication. Transmission and reception can take place simultaneously in 8051. The four communication modes possible with 8051 provide the system designer and programmer with opportunities to conduct very easy data communication network. It is called the heart of the system because is used to control all the inputs and the controlling action to be taken at the output. Microcontroller used in our project is the AT89S51[2].

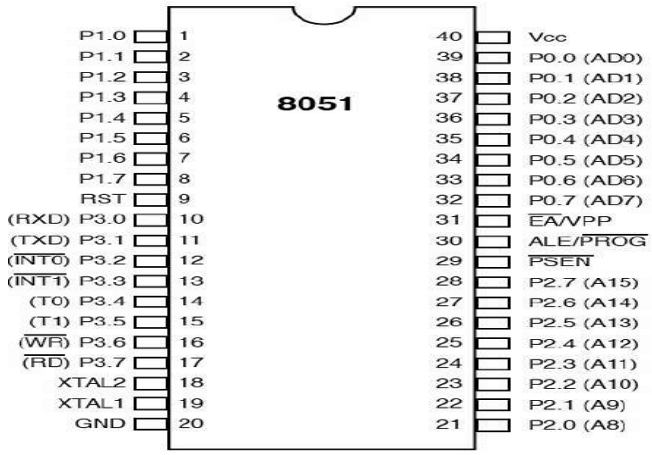


Fig-2: Microcontroller (8051)

3.3. LCD (16X2)

LCD is abbreviated as liquid crystal display. It is an alphanumeric display i.e. it can be used to display alphabets, numbers and special symbols as well. Thus, LCD is a user-friendly device various unlike seven segment display which can display only numbers and some of the alphabets. The only disadvantage of LCD over seven segments is that seven segments is robust display and be visible from a longer distance as compared to LCD. It can work on both 8-bit and 4-bit mode. Here we have used 16 x 2 Alphanumeric Display which means on this display we can display two lines with maximum of 16 characters in one line [3].

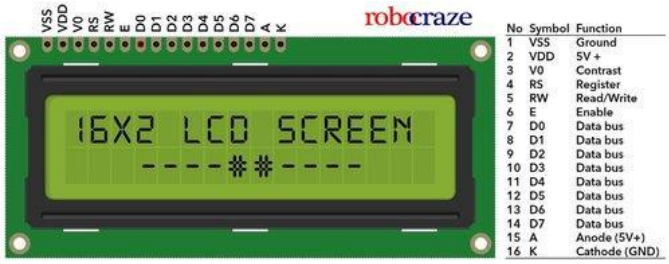


Fig-3: LCD (16X2)

3.4. Motor Driver (L293D)

L293D IC generally comes in standard form as 16-pin DIP (dual-in line package). This motor driver IC can control two small motors in either direction; forward and reverse with just 4 microcontroller pins simultaneously. (if you do not use enable pins) [4].

Fig-4: Motor Driver(L293D)

3.5. DC Motor

A DC motor is a mechanically commutated electric motor operated from direct current. In DC motor, operation is based on the principle of simple electromagnetism. The principle of electromagnetism states that a current-carrying conductor generates a magnetic field; when this is then placed in an external magnetic field, it will experience a force proportional to the current flowing through the conductor, and to the strength of the external magnetic field. Opposite (North and South) polarities of magnet attract, while like polarities (North and North, South and South) repel. The internal organization of a dc motor is designed to tackle the magnetic interaction between a current-carrying conductor and an external magnetic field so as to produce the rotational motion.

The speed of a DC motor is directly proportional to the voltage supplied. If we reduce the supply voltage from 12 Volts to 6 Volts, the motor will run at half the speed [5].

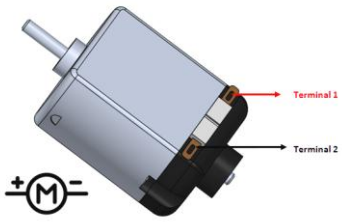


Fig-5: DC Motor

3.6. Buzzer Driver (BC547)

When the input voltage is applied at the terminals of buzzer driver, some amount of current starts to flow from base to the emitter and controls the current at collector. The smaller amount of current at the base is used to control the larger amount of currents at collector and emitter as well. Its basic applications are switching and amplification [6].

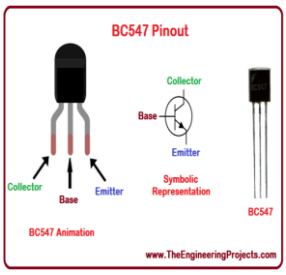


Fig-6: Buzzer Driver (BC547)

3.7. Buzzer

Buzzer is an audio signal device. Works on electromechanically or piezoelectric circuit. An active buzzer will generate a tone using an indoor oscillator placed inside, so all that is needed may be a DC voltage. A passive buzzer requires an AC signal to form a sound. It is like an electromagnetic speaker, where a changing input produces the sound, instead of producing a tone automatically. Buzzer gives the signal that the motor vehicle has started, the vibration of metal plate causes a sound [7].

Fig-7: Buzzer

4. IMPLEMENTATION

Real time circuit is developed to verify the existence of the circuitary , it is important to implement it on the general purpose PCB board which is used to connect all the electronic components using pathways drawn using the software named proteus and complete itching process is done on PCB board and the components are further soldered properly so that the circuit would be fixed and ready to be used. As of now it is done with zero PCB and working model of circuit is shown in figure [8].

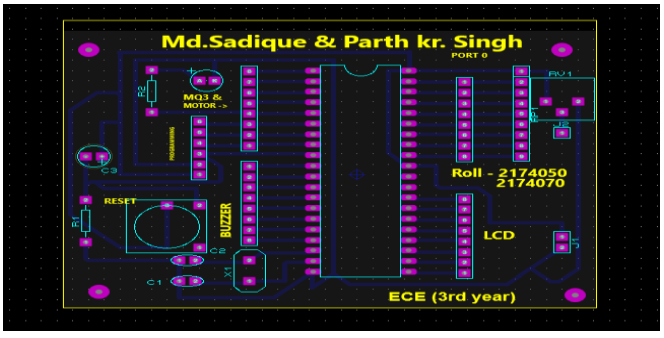
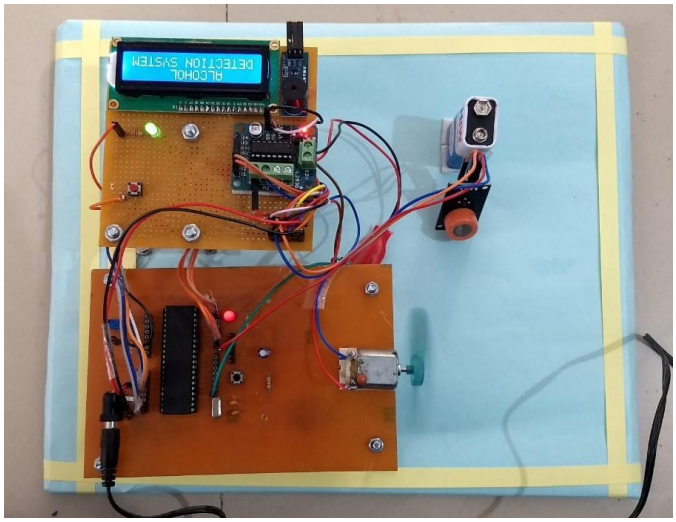


Fig-8: PCB Layout

5. RESULT

On supplying power, the microcontroller gets started and displays your system get started and dc motor also started and providing user to understand that system is now ready to start and sense is there any alcohol is present or not. In this we check for the condition that whether the driver has taken alcohol or not. If not then the process of rotating motor continues. If the alcohol is found then it triggers the engine to stop and buzzer to beep along with the message displayed on LCD that alcohol is present and provide safety to the driver [9].



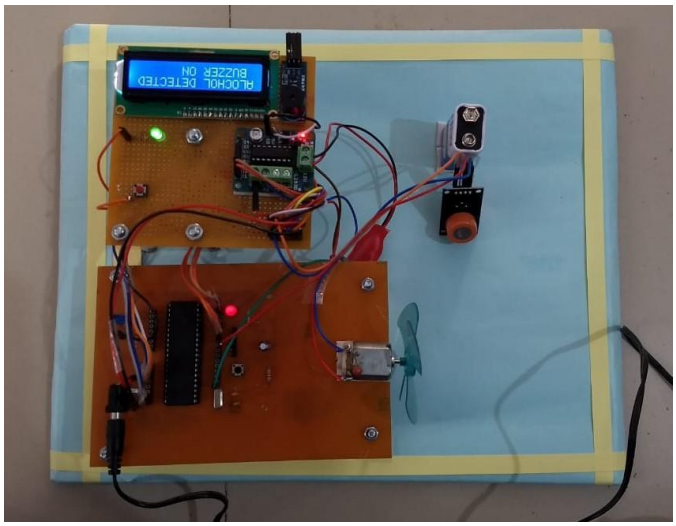


Fig-9: Prototype Model

6. CONCLUSION

In this project we have developed a true time model which will automatically lock the engine when a drunken driver tries to drive a car. Now-a-days car accidents are mostly seen. By fitting this alcohol sensor into the car, we will save guard the lifetime of driving force and also the remaining passengers. It is very simple

application. The life time of the project is high. It has low or zero maintenance cost and in fact low power consumption. This is a developed to efficiently check drunken driving. By implementing this design, a secure car journey is feasible decreasing the accident rate. Government must enforce laws to put in such circuit in every car and must regulate all car companies to preinstall such mechanisms while manufacturing the car itself. If this is accomplished the deaths due to drunken drivers can be brought to minimum level.

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