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Automatic Vehicle Engine Locked Control System to Prevent Drunken Driving Using Virtual Instrumentation

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***Abstract*— Growing numbers of road users and the limited resources provided by current infrastructures lead to ever increasing number of accidents. The major accidents have a common reason behind them is the drunken driving. Due to the negligence of a single person, many lives get affected. Now-a-days breath analyzers are being used by traffic police to test the drivers whether the person is alcoholic or not. In those types of analyzers only level of alcohol is represented and that information is not stored for further communication. Data is accessed very slowly. Hence, we have designed a novel system to overcome above drawback using virtual instrumentation. The main aim of this work is to design a system that can identify whether the person driving the vehicle, is in complete conscious state or not, when the person is highly alcoholic the engine of the vehicle is switched off and an e-mail is sent to the concerned person through IOT with his details which are saved. This work requires an Arduino, MQ-3 sensor, buzzer, LED, LCD, motor, ZigBee, IOT and LabVIEW software.**

***Index Terms*— MQ3 Sensor, Blood Alcohol Content (BAC), Internet OF Things.**

I. INTRODUCTION

In recent years, it has become a fantasy that the people put their lives in risk. More often, the people consume alcoholic drinks and drive the vehicles. There are more chances that the person can hit the vehicle to any obstacle approaching him in the opposite direction due to unconsciousness caused by drinking. Many a times, we hear this kind of news in the television or read in the news paper and finally, when the situation comes to us, we are not at all concerned with it.

At present, there are few existing systems which help to identify the alcohol content consumed by the person. But, data is no longer available for future analysis. For example, the breath analyzers used by the police men are used to just detect the alcohol content consumed by the person and it is displayed on LCD. But, the data is not stored, due to which the alcoholic person, when he is caught by the police under drunken case, he just pay some money and escapes from the crime. There is no evidence of the data which is collected from the alcohol consumed person is not stored for future analysis, which is a major drawback.

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In order to reduce the accident rate, we have designed a Breath Analyzer using LabVIEW. This application permits detection of alcohol content, if the person found alcoholic the engine of the vehicle is switched off, storing of the data detected and the details of the alcoholic person are sent through an email to the nearest police station person using IOT

II. LITERATURE SURVEY.

The Breathalyzer is a portable device that can determine whether the person being tested is legally drunk. It measures the proportion of alcohol vapors in exhaled air, a proportion that reflects the content of alcohol in the blood. Before widespread use of the device, police officers investigating an accident or noticing a weaving car looked for symptoms like a flushed face, slurred speech and bloodshot eyes. If the suspect then went to sleep in the police station, they might have sufficient basis for charges.

Getting a conviction was harder still. Defense lawyers might say the suspect had been staggering because of the long hours he worked, and bring in friends to say he had had no more than two beers. The defendant might maintain that his eyes had been red as a result of allergies. But the Breathalyzer provided scientific evidence of intoxication. "This technological innovation enabled traffic enforcement authorities to determine and quantify blood alcohol concentrations with sufficient accuracy to meet the demands of legal evidence," the National Safety Council said in naming Mr. Borkenstein to its Safety and Health Hall of Fame International in 1988.

The ratio of breath alcohol to blood alcohol is 2,100 to 1, meaning that 2,100 milliliters of exhaled air will contain the same amount of alcohol as one milliliter of blood. For many years the typical legal standard for drunkenness across the United States was 0.10, meaning 0.10 gram of alcohol per 100 milliliters of blood. Many states have now adopted 0.08 as a standard, and the federal government has pushed others to do so. [1]

After a driver is pulled over and upon completion of a series of standardized field sobriety tests (SFSTs), the police officer may believe there is cause to administer a preliminary breath test (PBT) at the scene. A will inform you that you are not required to take a standardized field sobriety test (SFST); however, this may make the officer want to administer the PBT. This test requires the person to blow into a machine that measures the amount of alcohol on the person's breath and then shows a number on a small screen that is an interpretation of how much alcohol is in a person's body.

The RBT "breathalyzer" is a portable device, which estimates the suspect's blood alcohol concentration (BAC). Coupled with, or in lieu of, the SFSTs the officer will rely upon the PBT results to determine whether to arrest the driver for DUI. Maryland law enforcement agencies use one of two breathalyzer machines in a DUI investigation: the Intoxilyzer and the newer Intoximeter. The Intoxilyzer has been the standard breath-test machine employed by law enforcement since the 1970s. And even newer models have been in use for over 15 years. Intoxolyzers use a different and more accurate process than Intoximeters' to determine BAC. To capture reliable breathalyzer evidence, the suspect must blow into the machine twice within a few seconds of the other. This creates two separate breath sample readings. If the difference between these two readings is larger than 0.02, the machine will request that the suspect immediately provide a third breath sample. [2]

III. BLOCK DIAGRAM AND WORKING PRINCIPLE

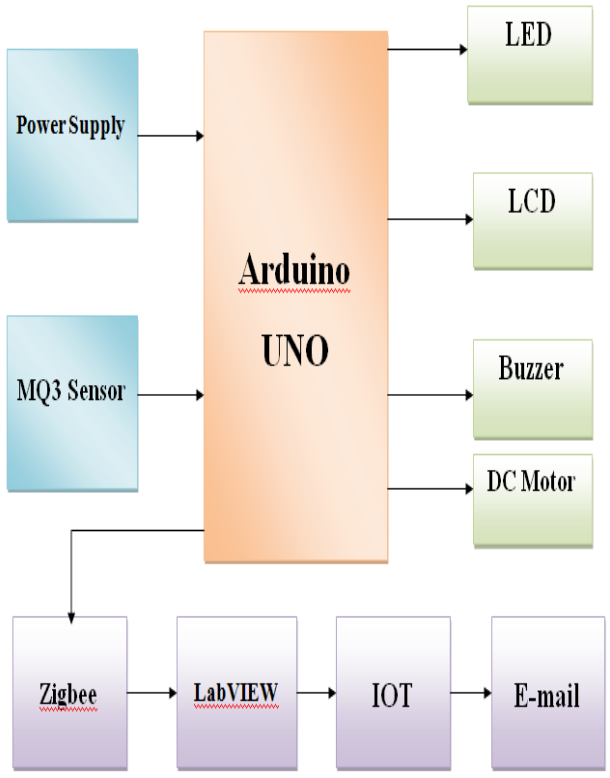

Figure 1: Block diagram

The objective of this project is to design and implement an Alcohol Breath Analyzer Using LabVIEW. We are using Arduino in our system, due to its low cost and high performance; it suits the best for this project. We are using LabVIEW software. The MQ-3 sensor is used to detect the blood alcohol content. The Blood Alcohol Content (BAC) is considered as 100ppm is equal to 1 unit. The LED and LCD are the output devices. Then the buzzer rings.When the alcohol content is above 6 units, the motor is off and an e-mail is sent to the concerned person using IOT.

MQ-3 Sensor

This alcohol sensor is suitable for detecting alcohol concentration on your breath, just like your common breathalyzer. It has a high sensitivity and fast response time. Sensor provides an analog resistive output based on alcohol concentration. The drive circuit is very simple; all it needs is one resistor, 5V DC or AC circuit

Sensitivity Adjustment

Resistance value of MQ-3 is difference to various kinds and various concentration gases. So, when using these components, sensitivity adjustment is very necessary. We recommend that you calibrate the detector for 0.4mg/L (approximately 200ppm) of Alcohol concentration in air and use value of Load resistance that(RL) about 200 KΩ(100KΩ to 470 KΩ). When accurately measuring, the proper alarm point for the gas detector should be determined after considering the temperature and humidity

We have taken NI Lab View back panel from this we can communicate with arduino. In this we are using VISA (virtual instrumentation software architecture) tool box for serial communication with zigbee transreciever. VISA serial tool box is used to connect to the zigbee which is connected to communication port and we are creating a delay of 10000 milliseconds to show the alcohol content detected. It reads the data using the read file and enters into the while loop. The data is analyzed and displayed in the front panel. If it reaches the threshold level, the engine is off and an email is sent to the concerned person through IOT. The level o f alcohol consumed by the person is stored using Lab VIEW.

IV. IMPLEMENTATION STEPS

STEP 1:

When the start button is pressed, LCD will get initialized and Lab VIEW will open. LCD displays "Checking alcohol state". Engine is ON, in this state.

STEP 2:

In this state alcohol detection is done.

CASE 1:

If alcohol is not detected, the STEP 1 will be repeated.

CASE 2:

If alcohol is detected, then the alcohol level will be displayed on LCD screen and LEDs ON (1 LED = 100 PPM).

STEP 3:

If the alcohol detected is between level 1 to level 5,

- Then the level will be displayed on the LCD screen.
- LEDs light with respect to the alcohol content detected.
- Engine will be ON.
- Buzzer will be OFF.

STEP 4:

If the alcohol detected is between level 6 to level 8,

- LCD displays, "engine OFF".
- Buzzer ON and OFF with some delay.
- Engine will OFF.
- LabVIEW displays "engine OFF".
- Mail will be send to the user.

STEP 5:

The system will be stopped.

V. SIMULATION RESULTS

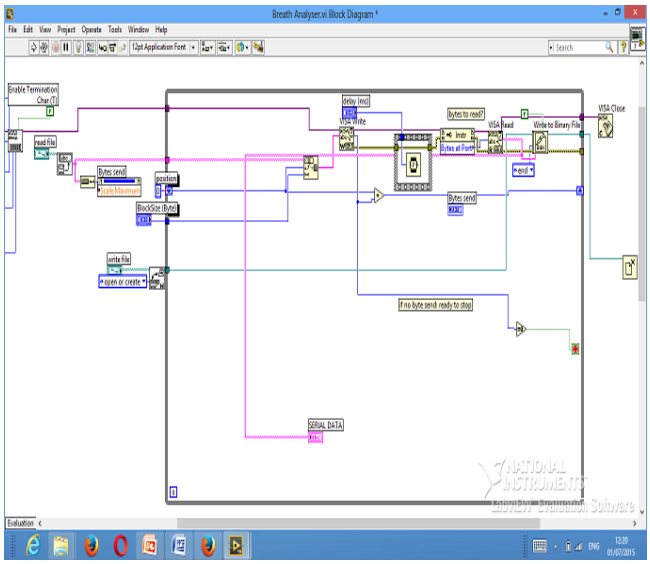

Figure 2: Lab VIEW back panel schematic

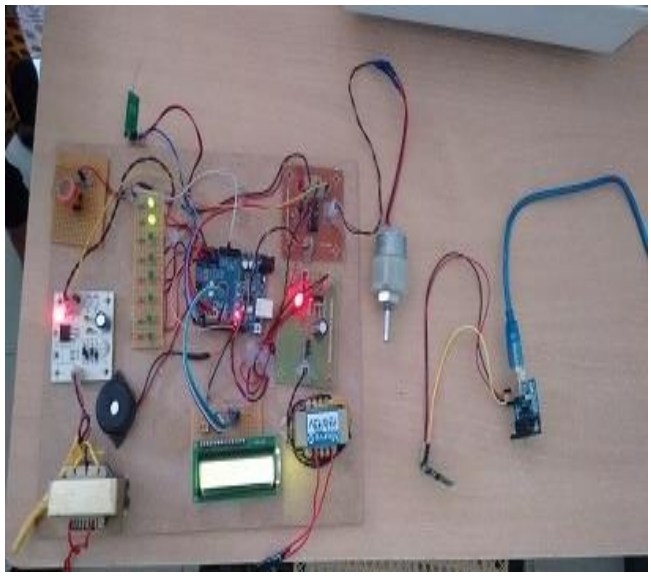

Figure 3:Breath Alcohol Analyzer

Fig.3 shows the working kit of Alcohol Breath Analyzer. It consists of Arduino, MQ-3 sensor, LCD, LED and power supply

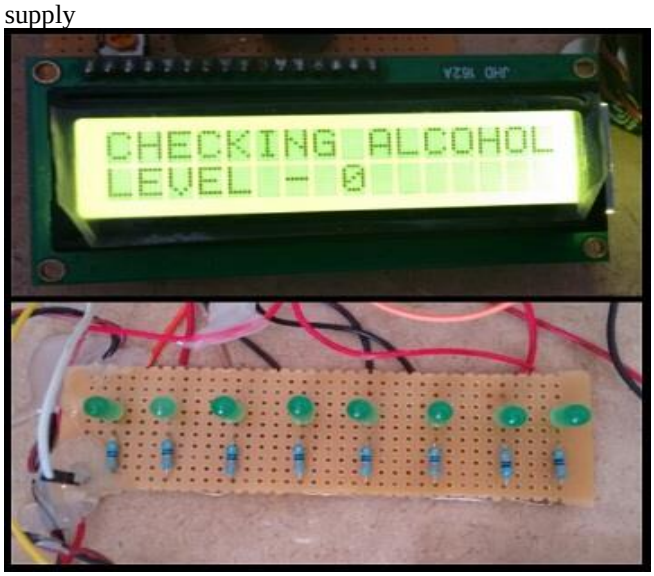

Figure 4:Initial output in LED and LCD

The fig.4 shows that when we first start the system, the LCD displays “Checking alcohol, level – 0” and LEDs will be in OFF state. In this state engine runs.

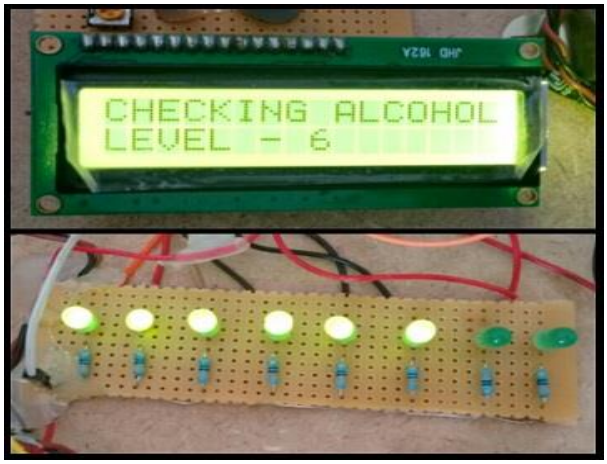

Figure 5: LCD and LED ouput level 6

In this state (fig.5), the level of alcohol content is detected. So, LCD displays the content in form of levels (1level=100ppm) and displayed as above. Same alcohol level can be observed in lab view front panel shown in fig 6.

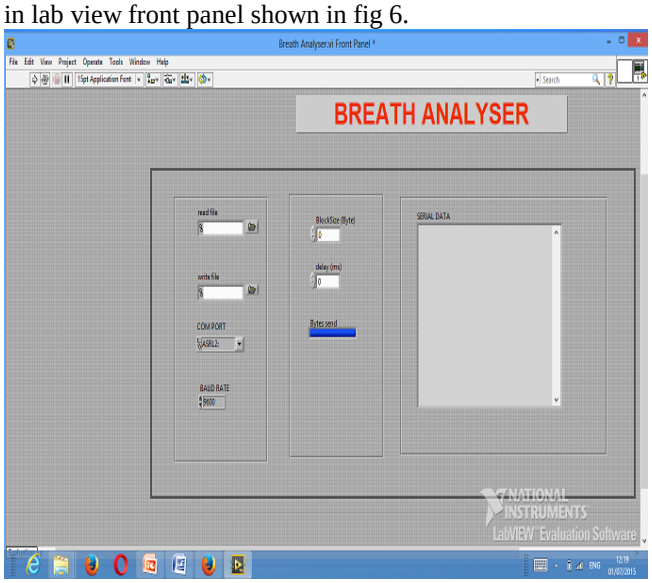

Figure 6: Front panel

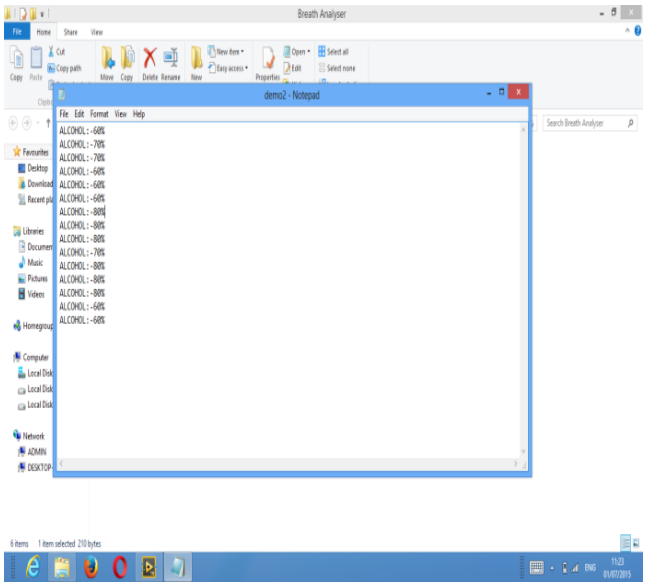

Figure 7: Date stored in Lab View

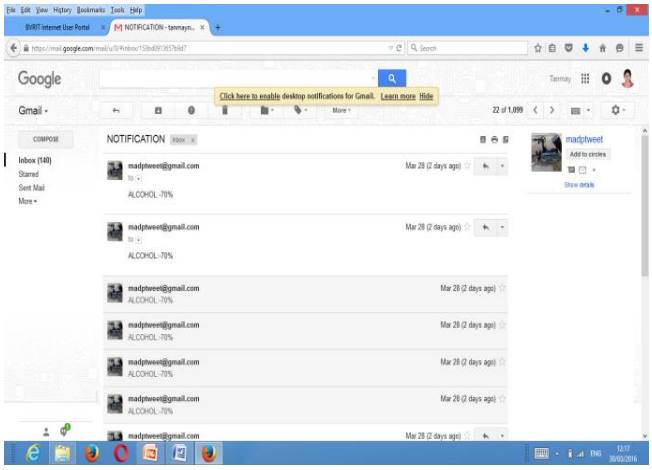

Figure 8: Email sent through IOT

Fig.7and 8 shows the data which is stored using Lab VIEW. The percentage of alcohol consumed by is person which is detected, is stored using Lab VIEW. This data is available at any time and can be used for further communication.

Advantages

1. Alcohol breath analyzer is used to detect the Blood Alcohol Content (BAC) very accurately.
2. Alcohol breath analyzer is very simple to design using LabVIEW

VI. CONCLUSION AND FUTURE SCOPE

In our project, we have used Arduino which has features like ultra low power consumption, low operating voltage, five power saving modes, low cost, etc. With these features, Arduino is being widely used in many embedded applications. Also Lab VIEW is being used widely for many applications like taking the snap shot of the drunken person sent to the concerned person through an e-mail using IOT, a data base is created which includes the details of the person.

Hence, the combination of Arduino and Lab VIEW has proved to be very accurate, efficient and also affordable. Therefore, the Alcohol Breath Analyzer Using LabVIEW can be implemented widely by various people to detect alcohol content and prevents accidents. Further, the data can be linked up with the aadhar card and certain actions can be taken on drunken driving cases

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