Microprocessor and Microcontrollers CSE2016

ALCOHOL DETECTION
REVIEW-0

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Domain-

Internet of Things (IOT)

The Internet of things describes the network of physical objects "things" that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the Internet

Introduction-

The purpose of this work is to avoid drunken driving accident by using alcohol detecting sensor. The uncontrolled many accidents were happened because of influence of alcohol during driving. To avoid such accidents, we have proposed alcoholic sensor in the vehicle ignition system. The alcohol sensor used in this project is **MQ-3** which detects the presence of alcohol content in human breath. Vehicle ignition system gets power from battery through relay switch. The ignition system will operate based on the level of **blood alcohol content (BAC)** in human breath detected by the alcohol sensor and the signal will send to microcontroller, which will supply power to spark plug

THE EFFECTS OF ALCOHOL ON DRIVING

Increased risk-taking:

- speeding
- failure to wear a seat belt
- recklessness

• False sense of confidence and being in control
• Difficulty maintaining a constant speed
• Decreased attention and impaired judgment:

- altered vision and hearing
- decreased concentration
- slower reaction times
- poor physical coordination

Trends-

- The **Driver Alcohol Detection System for Safety** (DADSS) Program is a cooperative research partnership that was initially signed in 2008 and renewed in 2013 between the **National Highway Traffic Safety Administration** (NHTSA) and the **Automotive Coalition for Traffic Safety** (ACTS) that was formed to conduct research on the feasibility of using in-vehicle, passive technology to reduce and/or prevent alcohol-impaired driving.
- Members of ACTS comprise motor vehicle manufacturers representing approximately 99 percent of light vehicle sales in the U.S *(BMW, Chrysler, Fiat Chrysler Automobiles, Ford, General Motors, Honda, Hyundai, Jaguar/Land Rover, Kia, Mazda, Mercedes Benz, Mitsubishi Motors, Nissan, Porsche, Subaru, Toyota, Volkswagen, and Volvo).*
- The success of this program will depend upon driver acceptability ,which means that the system must be reliable as well as unobtrusive and not interfere with driving mechanics. Furthermore, the system must be durable and require little or no maintenance.
- The cooperative agreement's first task was to select the technologies on which to base the program, and then determine if they are consistent with concurrent blood alcohol concentrations (BAC).

Some facts about Dinking and Driving :

- The legal Indian drinking age, which ranges from 18 to 25 (minimum), varying from state to state.(Delhi and Mumbai have the highest legal age, at 25 years.)
- In the US or the UK, one can drink and drive with less than 80mg of alcohol per 100ml of blood.
- In India, the permissible **blood alcohol content** (BAC) is set at 0.03% per 100ml blood. That works out to 30mg of alcohol per 100 ml of blood.
- Figures will vary for everyone, but for ready reference, an average male weighing about 65kg can theoretically stay within the legal limit if he consumes

    1) two pints of beer (equivalent to 660 ml), or

    2) one large whiskey peg (60 ml), or

    3) two glasses of wine (200 ml).
- The body takes about an hour to process 29.5 ml of alcohol. Since every type of liquor has a different alcohol content, to be able to drive again without your reason and coordination being affected by it, you must wait for at least 90 minutes after a pint of beer and three hours after a large whisky or two glasses of win

- For evaluating alcohol consumption habits, the frequency of using strong and light alcoholic drinks during the previous year on a 6-point scale

    i) none,
    ii) some times during the year,
    iii)   one to three times per month,
    iv)   one to two times per week,
    v) three to four times per week,
    vi)   almost every day

Surveys of drink and drive cases:

- The National Crime Records Bureau (NCRB) data also shows that around 2% of the total road accidents that happen in India are due to drunk driving.
- As per the ministry's data, 12,256 road **accidents** occurred in 2019 which were related to **drunk driving**, against 12,000 such cases reported in 2018.
- In 2019 alone, around 3,000 people lost their lives in road accidents that were related to drunk driving, while 6,675 people were left injured in such drunk driving related road accidents.

Location wise some details about drink and drive cases:

- According to data, Uttar Pradesh accounts for the highest number of drunk driving related accidents. In 2019 alone, the state has recorded 4,496 car accidents that were related to drunk driving. In 2018, the state recorded around 3,595 drunk driving related accidents

- The coastal state of Goa, also a party destination for youngsters in India, recorded one of the lowest numbers of drunk driving related accidents in the country. In 2019, the state recorded just six such incidents and in 2018, it was just eight.
- Andhra Pradesh, on the other hand, has been able to reduce the number of drunk driving related accidents significantly in 2019. The state reported over 1,300 accident cases that were related to drunk driving in 2018, it managed to bring this figure down significantly in 2019 when it recorded just 127 such cases.
- A survey in Sri Lanka indicated that for 7% of men, the amount spent on alcohol exceeded their income.

Apart from money spent on drinks, heavy drinkers may suffer other economic problems such as lower wages and lost employment opportunities, increased medical and legal expenses, and decreased eligibility for loans.

<u>Socio Economic Problems because of Alcohol consumption and driving:</u>

- Strong efforts are made in many countries to estimate the overall economic and social costs of alcohol use.
- Social and economic costs cover the negative economic impacts of alcohol consumption on the material welfare of the society as a whole.They comprise both direct costs - the value of goods and services delivered to address the harmful effects of alcohol, and indirect costs - the value of personal productive services that are not delivered as a consequence of drinking.

- Estimating the costs of the impact of alcohol on the material welfare of society is often difficult and requires estimates of the social costs of treatment, prevention, research, law enforcement, lost productivity and some measure of years and quality of life lost.
- Alcohol abuse has an impact on health, health care resources, and the economy.
- Alcohol consumption can have both health and social consequences for the drinker.
- The harmful use of alcohol can also result in harm to other individuals, such as family members, friends, co-workers and strangers.
- Moreover, the harmful use of alcohol results in a significant health, social and economic burden on society at large.
- Social costs are the negative economic impact of alcohol consumption on the material welfare of society. When defining costs, a key distinction is made between direct and indirect costs.The task of estimating the social costs of substance abuse requires an accounting framework, and the choice of a framework is not a technical, scientific issue but rather a matter of political philosophy. This is surely one area where the numbers do not speak for themselves

Mathematical Model-

To calculate BAC, the amount of alcohol in the bloodstream is measured in milligrams (mg) of alcohol per 100 milliliters (ml) of blood.

For example, a BAC of 0.10% means that an individual's blood supply contains one part alcohol for every 1,000 parts blood.

BAC	Standard Drink Equivalent
0.02%	~2 alcoholic drinks
0.05%	~3 alcoholic drinks
0.08%	~4 alcoholic drinks
0.10%	~4 alcoholic drinks
0.15%	~7 alcoholic drinks

Technologies

1. MQ-3 sensor

Alcohol Sensor Module - MQ3. 4753. This module is made using Alcohol Gas Sensor MQ3. It is a low cost semiconductor sensor which can detect the presence of alcohol gases at concentrations from 0.05 mg/L to 10 mg/L. The sensitive material used for this sensor is SnO2, whose conductivity is lower in clean air.

Features of MQ-3 Alcohol Sensor

- Sensor Type - Semiconductor
- Easy SIP header interface
- Compatible with most of the microcontrollers
- Low-power standby mode
- Requires heater voltage
- Good sensitivity to alcohol gas
- Fast response and High sensitivity
- Long life and low cost
- Requires simple Drive circuit

2. MICROCONTROLLER UNIT

- The proposed system is made around ATmega328 Arduino Uno microcontroller board.
- The unit consists of 14 pins which allows inflow and outflow of feeding

- it is feasible to use 6 of these pins as Pulse Width Modulation signal outputs
- 6 continuous signal with time changing quantity,
- 16 megahertz electronic oscillator, a Universal Serial Bus port, an influence connector, an on-board transformer, ICSP header, and a push.
- The Atmega328 has 32 KB non-volatile storage, 2 KB SRAM and 1 KB EEPROM(electrically erasable programmable read-only memory).

Solution:

- The sensors will detect the BAC level and perform accordingly, and if the BAC level is not safe for driving then the vehicle will not be able to start, hence drunk driver will be unable to drive the vehicle.
- The sensors are very accurate and can be configured according to the requirements thereby increasing the efficiency.
- The whole system has an advantage of small volume and more reliability.
- Due to various features implemented, it will be impossible for drunk people to start their vehicle and bring any harm to innocent lives and property as the drunk driver will not be able to even start the vehicle so there will be no chance to hit innocent ones.
- This idea brings innovation to the existing technology in the vehicles, reduces the rate of accidents taking place and improves the safety features, hence providing an effective development in the automobile industry.

- Thus, by implementing this proposed system we can have a much safer world, free of drunk and driving.