DRINK AND DRIVE DETECTION SYSTEM

Ms. Rekha. M1, Ms. Bharathi. K2, Ms. Cynthia. A3
Assistant Professor1, UG Scholar2,3
Department of Information Science and Engineering,
Vemana Institute of technology

Abstract- Nowadays most of the accidents in the world are caused due to drink and driving or driving under the influence of alcohol (DUI). It’s proven that more than 70% of road accidents in India is due to drink and driving. In this paper we propose an interlock system technology in vehicles that will prevent the driver from driving if the alcohol content is above the legal limit (0.03% per 100ml in India). This technology will automatically detect the blood alcohol concentration (BAC) by means of two techniques a breath based sensor and touch based sensor and if above the legal limit will not allow car ignition. The breath based system will measure the alcohol concentration in the blood through the driver’s exhaled air. Touch based sensor will read the alcohol level below the skin surface. If the driver chooses to switch off or tamper the system then the RFID tag will send information to the traffic control unit so that they can further take actions so as to prevent him from causing impairment.

I. INTRODUCTION

There has been a significant progress regarding the safety of humans over the past few years. But we have not addressed the drink and drive issue. Regardless of advancement in technology over the past three decades, the International road federation said that the high rate of fatal accidents was an unacceptable price to pay for as drunk driving which claims approximately 10,000 lives each year. About 55 accidents per hour. Approximately 54% of the people who die in India are males in the age group of 20 to 40 years. A Road accident is the 9th leading cause of death. The number of people killed has increased four times from 1990 to 2015. The major reason for it include excessive speed, rude and harsh driving, traffic lane changing, not following the traffic rules and doing improper turns. Nowadays many companies operate call service systems with “How do I drive?” Stickers placed on their vehicle which helps to monitor driver safety. These systems monitors only the drivers who are likely to engage in diversion or unsafe driving however, today these systems are ineffective because of the fact using cell phones while driving leads to accidents. It’s been proven that driving under the influence of alcohol increases the risk of accidents exponentially than sober drivers. This is because the presence of alcohol in blood impairs driving skills and declines the driving performance. It has been proved that alcohol could impair routing and braking control service. Alcohol is a drug that Slows down the activity of the brain and contains zero nutrients. It’s a myth that alcohol helps to relieve tension, induce sleep or solve problems.

The system proposed in this paper focuses on reducing road accidents in future due to drunken driving. This system has to work in high and low temperature extremes and at different altitudes. It has to live in the car until the life of the car. This safety technology can protect you and your family and make the road safe for all. In the below fig.1 we can see the Indian’s alcohol atlas which shows prevalence of alcohol use among men and woman.
II. LITERATURE SURVEY:

BREATHALYZER

Breathalyzer is a device used to detect BAC levels using a breath sample. This instrument was a registered trademark on 13th of May 1954. It was invented by Robert Frank Borkenstein. Breathalyzer is used in various countries to detect drivers who are drunk and driving every time a driver blows breath into the breathalyser using a plastic mouth piece which isn’t considered hygienic. If the driver passes the test he is allowed to move further if the driver fails BAC test then he is taken action legally based on the countries rules and regulations. Breath analysers uses silicon oxide sensor which is also termed as semiconductor sensor which is used to determine the blood alcohol concentration. These sensors are far more inclined to adulteration and interference from substances other than breath alcohol. The sensors need recalibration or replacement every half a year. Higher end private breath analysers’ and professional use breath alcohol testers make use of platinum fuel cell sensors. These too require recalibration but at less frequent intervals than semiconductor devices, usually once a year.

III. IGNITION INTERLOCK SYSTEM

This system requires drivers to blow air into device plugged into the car’s ignition, it measures the alcohol level concentration in a similar fashion as breath analyser. If their breath alcohol concentration exceeds certain limit 0.02 to 0.04% the vehicle engine won’t start.

DRAWBACKS

• If the device is set too low, it can stop someone from driving who has not intake alcohol beyond the limit also. Thus become inefficient.
• In case of IR sensor used in the device, makes it not suitable for portable handheld operation.
• In case of semiconductor, it is unstable sensor and also highly sensitive to the atmosphere which leads to affect the readings produced.
• The driver has to provide breath sample for starting the car always, which is highly inconvenient and it is also time consuming.
• The system is expensive as both Engine Control Unit (ECU) and ignition of the car has to be altered.
MIROID (A MOBILE-SENSOR-PLATFORM FOR INTELLIGENT RECOGNITION OF AGGRESSIVE)

The MIROID system consists of a sensor fusion based on rear-facing camera, accelerometer, gyroscope and GPS and the system can be implemented on a smart phone. The MIROID system needs to be fixed in the center of a vehicle windshield with the front facing rear-camera, the device flush with the dashboard, and a car adapter for power. It uses the data set from the sensors to observe driving actions, movements and behavior.

**DRAWBACKS**
- The system has to be mounted on the windshield of the car which is inconvenient.
- MIROID uses multiple sensors such as gyroscope, GPS, camera etc. for observing the activities which is not accessible for the middle range smartphones in the market.
- The use of multiple sensors deteriorate the efficiency of the system and cannot be implemented practically for daily usage.

**IV. OUR CONTRIBUTIONS:**

Our cars are getting smarter and now a new safety feature can be incorporated to prevent drink and drive. The alcohol detection system measures the amount of alcohol in the blood less than a second. If it is above the legal limit then the vehicle won’t move.

To get a precise and reliable reading, two technologies are developed:
- **BREATH-BASED TECHNOLOGY**
- **TOUCH BASED TECHNOLOGY**

![Architecture](image)

**FIG 4: Architecture**

**V. WORKING OF BREATH BASED DETECTION SYSTEM (BBDS):**

Breath analysers are a system which does not directly measure blood alcohol concentration, which requires the analysis of a blood sample. Instead, this system estimates BAC indirectly by measuring the amount of alcohol in one's breath. The concentration of alcohol is measured by using a sensor where the driver’s exhaled breath is focussed onto that sensor which is present at the steering wheel. The molecules of carbon dioxide and alcohol absorb infrared radiation at specific wavelengths. The infrared light beams directed on the sensor analyses the breath sample and calculates the alcohol concentration accurately.
The device is highly sensitive and able to analyse diluted breath samples at dilutions expected from a driver’s natural breath trail. This sensor is integrated on to the vehicle. To determine how to integrate this system into vehicles we have to fully understand the process of breath stream after exhalation. Some possible locations may be the driver’s side door and the front steering position.

Fig 5: breath based system showing the amounts of light that is absorbed by CO₂ and C₂H₅OH molecules.

VI. WORKING OF TOUCH BASED DETECTION SYSTEM (TBDS):
The touch-based system analyses alcohol found beneath the skin’s surface. The amount of alcohol concentration is measured by shining an infrared light on the driver’s skin which moves into the tissue. A part of the light is reflected back to the skin’s surface, where it is collected by the sensor. This light contains information on the skin’s unique chemical properties, which also contains the information about the concentration of alcohol. There are two discrete wavelength sources that signal the presence of alcohol. The touch based system analyses and focuses only on the wavelength where alcohol can be found. This ensures speed, accuracy and precision of the device. The system will be able to take multiple readings in less than a second. The touch sensor will be integrated in a location that is convenient to the driver, such as the vehicle start button. The touch-based technology will also detect the person touching the button by completing the loop and confirms that the person is in the driver’s seat. If any other person except the driver tries to access the button, then circuit will not be closed and the alcohol measurement will not be considered valid.

Fig 6: touch based technology analysing the alcohol concentration from the driver’s skin.

VII. RADIO-FREQUENCY IDENTIFICATION (RFID):
Radio frequency identification (RFID) tag is a system that has small radio frequency identification device for tracking purpose. RFID tag is used in many industries and automobile for data collection. The system comprise of a small chip, RFID reader and an antenna. RFID tag is integrated into the vehicle which can be tracked in case the driver attempts to force stop the safety system that has been installed. The tag is attached to the antenna. Radio Frequency Identification Reader (RFID reader) is a device used to collect information from an RFID tag, which is used to track individual items. Radio waves are used to transfer data from the tag to a reader. The chip is pre-programmed with a tag identifier (TID), a unique serial number assigned by the chip manufacturer and includes a memory which stores the unique tracking identifier (called an electronic product code or EPC) and other variable information so that it can be read and tracked by RFID readers anywhere. Once it tracks the car that tampers the safety system, the RFID reader takes the information from the chip memory and sends it to the nearby traffic control unit or the police station with the help of gsm technology. The information contains the car number and other related details of driver.
VIII. CONCLUSION:

In this paper, we present a highly sophisticated and a safety system that contains the system interlock technology. This technology detects the amount of alcohol in blood and if it is above legal limit then the vehicle won’t move. Trying to force stop this technology sends the alert notification to the police station. The information can be a car number, driver details etc. This system would be designed to be transparent to the driver so that they would not impose upon non-impaired drivers.

REFERENCES


