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RESEARCH ARTICLE

Alcoholic Detection System using Arduino Uno

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ABSTRACT

It is now simpler than ever to be involved in an accident because to developing technologies and high end vehicles with more horse power and usable speed. Driving carelessly can compromise the safety of regular people. Road accidents still occur every day, despite the implementation of speed limits and other preventative legislation. Over-speeding, reckless driving, and drunk driving are some of the major causes of car accidents. The proposed effort aims to create a tool that prevents accidents brought on by excessive drinking while driving. This device will be able to recognize excessive speed and be setup to send an SMS alarm. When alcohol intake is detected, an application on the device prevents the vehicle engine from starting. The Global System for Mobile Communication (GSM), the Global Positioning System (GPS), and alcohol sensors were used in the construction of the gadget model.

Keywords: Motor vehicles, Reckless driving, Speed limits, Prevention laws, Drunk driving, SMS, GPS, Alcoholic Sensor.

INTRODUCTION

The most frequent hazards to their life and the lives of others today are drinking and driving. Although we cannot prevent people from drinking, we can prevent accidents by inspecting the person drinking and by keeping such modest gadgets in the car to ensure that no one is drinking and driving. Today, we're building a straightforward alcohol detector. It has a wide range of applications that we can employ. As a result, this is a brief demonstration of a straightforward alcohol detector built with an Arduino and a MQ3 sensor. Arduino, LEDs, and a MQ-3 Alcohol sensor will all be used in today's project to create an alcohol indication. Although there are various MQ-X sensors on the market for a variety of applications, we will pick MQ-3 in this instance because it is the most effective at

detecting alcohol. The majority of MQ sensors operate similarly. Each one of them has a heating element that uses heat to warm a layer of conducting material whose resistance is constantly monitored. As alcohol vapours or odours come into touch with the MQ-3 sensor, its resistance changes. The sensor outputs data digitally and analogly. In contrast to the analogue signal, which transmits a wide range of values from 0 to 1023 and measures the amount of alcohol in the immediate surroundings, the digital output simply transmits high or low values, which equate to either 1 or 0, to a microcontroller. The LM393 IC used to construct the sensor features an internal amplifier that boosts the voltage signal to the detectable level. Voltage comparators are also included for effective amplification. Potentiometers located on the sensor can be used to modify the amplification level.

RELATED WORK

[1] This paper's objective is to create a system. that checks to see if the driver's Iris is open before taking the picture. person is intoxicated, and creating a trustworthy algorithm to recognise iris. This document is made up of hardware. a com- puter programme and system that emphasises the application of a Gabor Filter-based algorithm. The system is made from with Analog-to-Digital Converter and CCD Camera included into a MATLAB programme and used to replicate the collected which subsequently sends a signal to the image To control the car, use a microcontroller and a relay circuit. ignition. If the MATLAB software determines the driver is While intoxicated, a bypass system comes into play. through a password that MATLAB recognises. then the car or other vehicle starts.

[5] Alcohol-impaired driving is one of the main causes of motor vehicle accidents, according to risk analyses of being involved in an accident. Keeping drunk drivers off the road might potentially save a lot of lives. This study suggests a simple in-vehicle alcohol detection system that uses an optimizable shallow neural network to analyse data from six MQ-3 alcohol sensors (O-SNN). The experimental assessment results demonstrate a high-performance detection system, with a detection accuracy of 99.8percent with a 2.22 s inferencing time. The driver alcohol detection system for safety (DADSS) system aims at the widespread deployment of alcohol-sensing systems, which has the potential to save thousands of lives every year. As a result, the proposed model can be effectively deployed and used to discover in-vehicle alcohol with high accuracy and low inference overhead. [3] An accident is a particular, unforeseen, external action that is unusual and unintended and occurs in a specific moment and location, without any obvious and intentional cause, but noticeable repercussions. Carelessness The primary cause of these collisions is driver error [1]. The traffic authorities issue the drivers a variety of directives, driving professionals. Yet, many of them disregard the rules. Currently, the majority of nations are imposing the motorcyclists must wear a helmet and refrain from using the cars while under the influence of alcohol. But Nonetheless, users continue to break the regulations.

In this project, an alcohol detection system with engine locking for automobiles is designed and put into practise utilising an ultrasonic sensor and an Arduino UNO as the MCU (Master Control Unit). The technology will continuously check the alcohol detection sensor's concentration level and shut off the vehicle's engine if it rises above a certain level. Also, the model will use SIM900A to transmit information on the location of the car. The concept offers a practical way to reduce accidents caused by intoxicated driving.

The suggested method makes use of a number of inex- pensive alcohol MQ3 sensors that are installed inside the car. The data from these sensors are then saved, normalised, time- adjusted, and converted into 5 s window samples. Each sam- ple's statistical features are extracted, and a genetic algorithm, along with a forward selection and backwards elimination approach, are used to carry out a feature selection strategy. An SVM classification model that can identify the presence of alcohol was built using the four features that were obtained from this method. 7200 samples were produced by the tests, and the model was trained on 80 percent of those samples. The remaining data were utilised to assess how well the model performed, and it did so with an area under the ROC curve of 0.98 and a sensitivity of 0.979.

LITERATURE SURVEY

The following are some major ideas and sources for a review of the literature on alcoholic detection using car locking systems: Automobile alcohol detection devices can stop drunk driv- ing incidents and save lives. Systems of various kinds, in- cluding as breathalysers, touch-based sensors, and biometric sensors, have been created and put through testing. The most popular kind of alcoholic detection device uses a breathalyser to measure the driver's blood alcohol concentration (BAC). On the other hand, touch-based sensors and biometric sensors can identify alcohol through the skin or other physiological fluids. According to one study, a breathalyzer-based system that locked the car if the driver's blood alcohol content (BAC) was higher than the permitted level 0.08 percent proved successful in lowering the incidence of drunk driving. The study also suggested that increasing incident reductions might be achieved by integrating the system with other treatments, such as public awareness campaigns and harsher punishments for drunk driving. Another study assessed the performance of a biometric de- vice that may detect alcohol through the skin of the driver. The system demonstrated a high level of accuracy in identifying alcohol, but the study also identified room for improvement in the system's response time. For the purpose of detecting alcohol in cars, touch-based sensors have also been created and tested. These sensors are capable of detecting alcohol through physiological fluids like sweat or blood on the driver's hands or fingers. A touch-based device that locked the car if alcohol was found on the driver's hands, according to one research, was successful in reducing incidences of drunk driving.

SYSTEM CIRCUIT DIAGRAM AND COMPONENTS

System Circuit Diagram

Components

Arduino Uno

It is the brain of our project. It has the ability to give all orders to its dependant parts that should be controlled by human behaviour. And it also sends feedback to the other components and humans. In order to facilitate communication between humans and robots as well as vice versa. It has a specification of 8-bit CPU, 16 MHZ clock speed, 2KB SRAM 32KB flash memory, and 1KB EEPROM.

DC Motors

Any form of energy can be transformed into mechanical energy by a DC motor, which also affects motion. In designing a robot, the motor usually plays a significant part by delivering movement to the robot. Here DC motors are used to control the vehicle.

MQ3 Sensor

For detecting gas leaks, the Grove - Gas Sensor (MQ3) module is helpful (in the home and industry). It is suitable for detecting Alcohol, Benzene, CH4, Hexane, LPG, and CO. Owing to its great sensitivity and short response time; measurements can be obtained as soon as possible.Here the MQ3 sensor is used to detect the alcoholic smell from the driver.

Buzzer

A buzzer or beeper is a mechanical, electromechanical, or piezoelectric audio signalling device (piezo for short). Alarm clocks, timers, training aids, and confirmation of user input like a mouse click or keystroke are common uses for buzzers and beepers.Here the buzzer is used to beep the sound when the system detects the alcohol.

Led Bulb

LEDs are perfect for many industrial uses because to their high efficiency and directed nature. Street lights, parking garage lighting, walkway and other outdoor area lighting, refrigerated case illumination, modular lighting, and task lighting all use LEDs more and more frequently. Here the led bulb will blink when alcohol is detected.

WORKING AND DESIGN

Dataflow Diagram

Our system uses a MQ3 alcoholic sensor to determine whether the driver or passenger has consumed alcohol. If this happens, a buzzer will sound, a led will blink, and the vehicle will come to a slow stop in the middle of the road. After a few hours or until the alcohol scent has subsided, the system will email the family members the GPS location and alarm message. Further warnings will be sent to the cops/police station registered with the city after the first and second warnings; only cops/police are authorized to open the Vehicle. An accelerometer is also part of our system, which we use to identify irregular driving. The system will warn the driver via the buzzer and LED if it detects erratic driving, which may be a sign of alcohol or distraction. The technology will also notify the cops/police station registered with the city of the irregular driving and the location of the car via an alert.

We have programmed the microcontroller to carry out self- checks and calibrations periodically in order to guarantee the precision and dependability of our system. This makes it easier to spot and fix any faults or discrepancies in the sensor readings, ensuring the system runs efficiently and precisely. Furthermore, our system contains a GSM module that may be used to text messages or alerts to the registered police officers and family members as well as other law enforcement agencies. In the event of an emergency, such as a collision or mechanical failure, this feature may be helpful in giving the driver and passengers prompt support.

MODELLING

The presence of alcohol can be detected by the gas sensor MQ-3. The microcontroller can then start different outputs, such as LED lights, buzzers, or motors, when the sensor detects alcohol. The MQ-3 sensor can be used to make an alcohol detector by connecting it to a microcontroller, like an Arduino board, and programming the board to react to sensor readings. The microcontroller can then start different outputs based on the amount of alcohol detected. For Example, the microcontroller may operate a buzzer to sound an alert, a red LED bulb to show a high alcohol level, and a motor to slow down or stop to prevent the individual from operating the vehicle. The desired functionality and the specific components utilised will determine the programming and circuit design for an alcohol detector employing the MQ-3 sensor. It is crucial to remember that alcohol detectors like the MQ-3 that use gas sensors are not always reliable and shouldn't be used as the only tool for figuring out how drunk someone .

Alcoholic Detection System Prototype Model

The Fig.3.shows the Alcoholic Detection System Prototype Model.

Alcoholic Detection Model

The Fig.4.shows the Alcoholic Detection Model.

RESULTS

Alcohol-related fatalities are on the rise nowadays, and breaching the law can result in a lifetime in prison or fines of thousands or even millions of dollars. To solve this issue, we created a straightforward model that detects alcohol from the driver or passenger. If the sensors detect alcohol from the person, a buzzer will sound and the led will blink, and the vehicle will slowly come to a stop in the middle of the road. Cops and police will need to check every person to see if they are drunk or not. After a few hours or until the alcohol scent has subsided, the system will email the family members the GPS location and alarm message. For further health protection, we have integrated smoke detection to our system in addition to alcohol detection. Smoking is not permitted inside the car, and if smoke is found, the buzzer will sound and the LED will blink to let the driver and passengers know. The technology will also provide the family members with an alarm message and the GPS location of the car. This feature helps reduce potential fire hazards brought on by smoking inside the car in addition to fostering a healthier environment for all passengers. Our system's combination alcohol and smoke detection functions are meant to encourage safe and responsible driving habits and guard against accidents brought on by intoxicated driving or vehicle smoking.

APPLICATIONS

We can use Alcohol detector projects in offices, industries, and colleges. It increases workplace safety of all co-workers in companies. This alcohol detector with SMS alerts project is easy to use and is very cost-effective This project can be advanced and can be used in vehicles to shut down engines. Reducing road accidents: The alcohol detection system can help reduce road accidents by preventing drunk drivers from operating a vehicle. Law enforcement: The system can assist law enforcement officers in detecting drivers who are under the influence of alcohol, allowing them to take appropriate action. Personal safety: The system can help individuals monitor their alcohol consumption and prevent them from driving while under the influence. Commercial fleets: The system can be useful for commercial fleets, such as taxis or buses, to ensure that their drivers are not driving while under the influence. Insurance: The use of an alcohol detection system in vehicles may help to reduce the risk of accidents, which can lead to lower insurance premiums for drivers. Preventing underage drinking: The alcohol detection system can be used in homes to prevent underage drinking by alerting parents if their children have consumed alcohol.

Productivity at work: By preventing employees from being inebriated while at work, which could cause accidents or mistakes, the system can increase workplace productivity. Safety in public transportation: The method can be used to check that drivers are not operating vehicles while under the influence of alcohol on buses or trains. DUI prevention: Using an alcohol detection system in a car can deter people from operating a motor vehicle while intoxicated, lowering the incidence of DUI (Driving Under the Influence) cases. Applications in medicine: The technique can be utilized in medicine to monitor patients receiving alcohol rehabilitation and to stop relapses. Sports and athletic contests can employ the alcohol detection technology to make sure that competitors aren't drinking before or during tournaments, which could affect their performance and safety.

FUTURE ENHANCEMENT

Our ability to build intelligent automobiles with cutting- edge features like GPS tracking, which allows us to share our location with others, is made possible by modern technology. One can send an alert message to their contacts in an emergency informing them of their whereabouts and GPS co- ordinates. This function is especially helpful in circumstances where someone may be missing or in danger and needs rapid assistance. Also, we may use this technology to increase our driving safety. If we are driving carelessly or disobeying the law, a smart vehicle can be designed to send warning or alarm messages to our family members. The first and second warnings can be sent to our contacts to let them know about our activity, and the third warning can be forwarded to the police station if we still don't alter our driving habits. The police will then be able to remotely unlock the car and take the required steps to ensure the driver's and other drivers' safety. The combination of these elements has the potential to dramatically increase our safety both behind the wheel and in other emergency situations . In conclusion, the incorporation of cutting-edge technology into automobiles has created new opportunities for enhancing road safety. In the event of an emergency, we can broadcast our location and inform our contacts using features like GPS tracking and automated alarms. Also, the warning and alert system can be utilised to discourage irresponsible driving and guarantee the safety of both the driver and other road users. Automatically alerting family members and the police station can help avoid accidents and deliver aid quickly in an emergency.

CONCLUSION

Drunk driving is still a serious issue that causes many accidents, injuries, and fatalities. The suggested technology is created to detect alcohol in the driver's breath or bloodstream and stop the operation of a vehicle if alcohol is found. An Arduino microcontroller board, an alcohol sensor, an LCD, a buzzer, and a led bulb make up the system. The working principle of the system is straightforward. If the sensor detects alcohol, the system will send warnings to the driver and their family members via SMS and display an alert on the LCD. The vehicle will gradually slow down until it stops, and its location will be sent to the family members. If the driver continues to ignore the warnings, the police will be notified, and only they can unlock the vehicle remotely and take necessary action to ensure the safety

of the driver and other individuals on the road. Future improvements might integrate GPS tracking with smart vehicle technology, send warning and alert messages to family members, and lock and unlock vehicles remotely for law enforcement. These features can improve overall road safety and prevent accidents caused by reckless or drunk driving.

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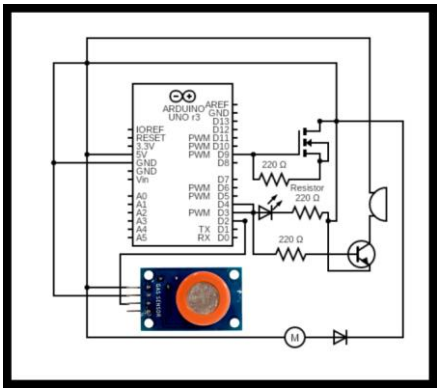

Fig.1.Circuit Diagram

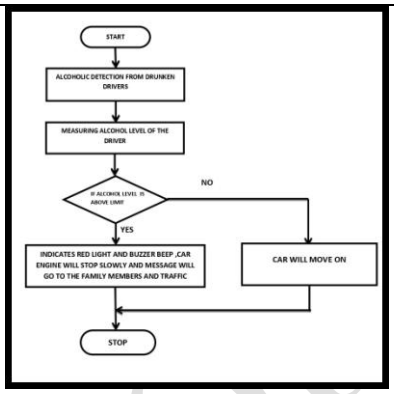

Fig.2. Data flow Diagram

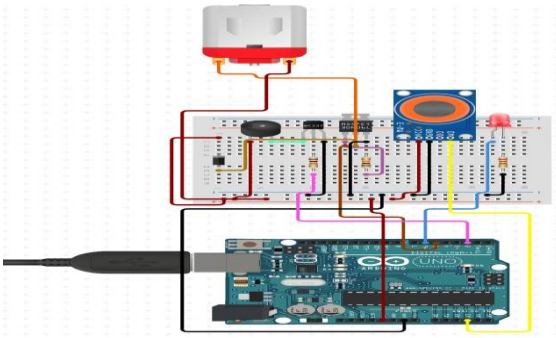

Fig.3. Prototype Model

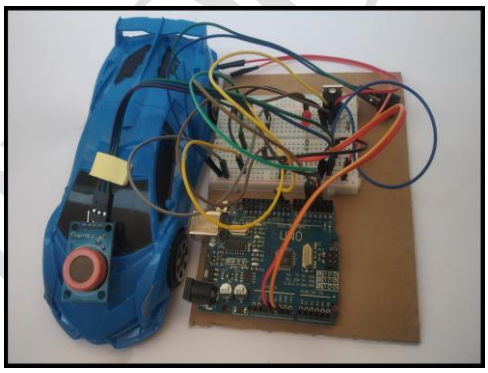

Fig.4. Prototype Model