SMART HELMET FOR DRUNK & DRIVE DETECTION AND ALERT SYSTEM

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ABSTRACT: - The rise in road accidents in our country is primarily due to the negligence of not wearing helmets, reckless driving, and drunk driving, which can result in serious head injuries or even death if prompt medical attention is not given. To ensure the safety of bikers, it is crucial to have a system that mandates helmet use. This project presents the development of a smart helmet module with sensors that detect alcohol consumption and helmet use. The module also includes a GSM module that sends out an accident alert along with the GPS module for location tracking and Blink sensor is used to check the sobriety of the driver.

Keywords: Alcohol Detection, Drowsiness Detection, Arduino Nano, GSM, GPS

1. INTRODUCTION

A most common incident in a human's life is Accidents. Accidents are getting more common by the day, as seen by the numerous laws and regulations implemented by the government to prevent them. Accidents are defined as an unanticipated event or omission that causes injury or, in extreme situations, death. Two-wheelers have more accidents than other types of vehicles. This survey examines different relevant methods that are design for accident avoidance by developing a Smart Helmet for the Human's safety and security. In this project, we will create a helmet-mounted device that will avoid accidents by detecting whether or not the person driving the bike has ingested alcohol. If alcohol is discovered, it will immediately send a notification to the owner's mobile app. We use MQ3 Alcohol Sensors for alcohol detection. The system will provide a signal if the Rider has ingested alcohol. If, on the other hand, an accident occurs, the system will transmit an alert. Blink sensor use to trace the drowsy driver and produce the buzzer sound to alert the driver from his drowsiness. OBJECTIVES:

Arduino microcontroller is used to control all over system. MQ-3 sensor is used to detect the alcohol consumption. This system is used for drunk and drive accident avoidance using alcohol sensor threshold value. LED on helmet used to indicate outside if driver takes alcohol. SIM card used for GSM and GPS modules also helps to maintain the log-details and message transmission detail. GSM module will send message alert to relatives if the driver took alcohol. GPS module tracks the GPS location if the driver drunk alcohol. A buzzer sound is used to alert the driver of drowsy detected by a blink sensor.

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uses simplified embedded C language code. Nano is popular among the Arduino board. ATmega-328p is preprogrammed with bootloader that allows to directly upload the new Arduino program to the device. The Arduino Nano is a small, complete, and breadboard-friendly board based on the ATmega328 (Arduino Nano 3.x). It has more or less the same functionality of the Arduino Due/Iluminove, but in a different package. It lacks only a DC power jack, and works with a Mini-B USB cable instead of a standard one.

2. **OBJECTIVES:**

   Arduino micro controller is used to control all oversystem. MQ-3 sensor is used to detect the alcohol consumption. This system is used for drunk and drive accident avoidance using alcohol sensor threshold value. LED on helmet used to indicate outside if driver takes alcohol. SIM card used for GSM and GPS modules also helps to maintain the log-details and message transmission detail. GSM module will send message alert to relatives if the driver took alcohol. GPS module tracks the GPS location if the driver drunk alcohol.

**WORKING PROCESS FOR THE MQ3 GAS SENSOR:**

1. **HARDWARE USED: ARDUINO NANO**

   The Arduino Nano is the microcontroller-based electronic programmable board. It free
When the gas sensor consists of the free electrons of SnO2. These electrons interact with the environment exactly to say Oxygen molecules.

2. Because of the presence of the O2, the free electron doesn’t flow in the circuit and stay static.

3. This indeed ensures the absence of the Alcohol.

CASE 2: PRESENSES OF ALCOHOL

1) When person intake alcohol, The Alcohol molecules and the smell interact with the sensor.

2) Due to the presence of OH(hydroxide), which molecules present in any type of alcohol.

3) This makes the free electrons in gas for connecting buzzer. When this result stays high for a particular time frame period (limit), the driver is viewed as sluggish and sleepy. Therefore, a buzzer can be actuated to wake the driver.
sensor to flow in circuit.
4) Therefore the Arduino Nano gets the signal and proceed the further process

BLINK SENSOR

This Eye Blink sensor senses the eye blink using infrared. The Variation Across the eye will vary as per eye blink. If the eye is closed the output is high otherwise the output is low. Eye Blink Sensor EYE Sensor kit 3-pin female header. This product is strictly restricted for hobby projects and not recommended for real-time use.

WORKING PRINCIPLE

Eye blink sensor depends on IR. It comprises of an IR transmitter and IR recipient. The eye blink sensor enlightens the eye with infrared light and screens the progressions in the mirrored light. The infrared light reflected from the eye is used to decide the outcomes. The sensor yield is dynamic high for Eye close and can be given straightforwardly to microcontroller

BLINK SENSOR AND BUZZER

GSM

Global System for Mobile communication (GSM) module is designed for wireless radiation monitoring through Short Messaging Service (SMS). This module is able to receive serial data from Sensor and transmit the data as text SMS. The Arduino GSM module allows Arduino board to connect to GSM send SMS using the GSM library. The GSM Library is included with Arduino IDE. The GSM network provide the connectivity to transmit the SMS message. Whenever Arduino UNO detect the presence of alcohol, the Arduino triggered by the digital signals. Then the uploaded Code onto the Arduino UNO transmit the signals to GSM module. The phone number can be get from the user and utilized in the GSM module then the phone number attached get inspected. Then the GSM module using the SIM card on the Arduino transmit the generated SMS. SIM card also used for GSM modules also helps to maintain the message transmission detail. Through the GSM signal the message is transmitted to the relatives or guardians.
consumption of the vehicle driver GPS navigation device, GPS receiver or simply GPS is a device that capable of receiving information from GPS satellites and calculate the bike geographical position. To calculate 2D position (Longitude & Latitude) and track movement. GPS module is a perfect for applications involving navigation and tracking.

GPS

The system consists of an Arduino Nano board along with an Mq-3 alcohol

LOCATION sensor for detection and a GSM/GPS Module for notification. Warning the nearest authority using GSM module will provide accurate information for a specific vehicle located using GPS tracker. When the alcohol content would be higher than the permissible limit which is detected by the alcohol sensor and the Arduino controller which indicates the public by LED light indication. Also sends an SMS notification to the authorities or family members along with the location of the bikeso that assistance can be provided. To provide 24*7 vehicle tracking and alcohol detection our GPS tracking devices are connected with sensor. Alerts are sent via SMS on the registered mobile number of the vehicle owner regarding alcohol

GPS LOCATION TRACKING

2. PLATFORM:
ARDUINO IDE:
The Arduino Integrated Development Environment or Arduino Software (IDE) contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. Arduino uses a variant of the C programming language. The code is written in C with an addition of special methods and functions. is processed and compiled to machine language.
especially at peak traffic periods. In a bid to address the problem, a vehicle tracking system was developed as a component of an Advanced Public Transportation System to

ADRUINO IDE

3. LITERATURE REVIEW:
R. S. Charran and R. K. Dubey proposed the Traffic violation monitoring and control is a major concern in India due to excess crowd, increasing commuters, bad traffic signal management, and rider mentality. It is obvious that physical traffic police-based monitoring alone is insufficient to monitor such large traffic volumes and simultaneously track violations. This has led to many violators going unnoticed. The violators, in turn, cause more serious mishaps on the road resulting in danger to their own life as well as to other’s life. Thus, there is a need for incorporating Artificial Intelligence (AI)-based techniques to eliminate manual intervention for the detection and catching of violators.[1]

O. D. Jimoh, L. A. Ajao, O. O. Adeleke and S. S. KoloA proposed the vehicle tracking system assists public transportation users in their movements by providing real-time information on the locations of vehicles in transit. Public transportation in parts of developing nations, especially Nigeria is ineffective. The system is chaotic and frustrating, improve commuting in an urban arterial. The developed system is based on wireless technologies of the Global Positioning System (GPS) and Global System for Mobile Communication module. It records and displays real-time vehicle location using a GPS-based greedy forwarding algorithm, computes route distance information using distance-time based algorithm and radar range sensor (RRS). A pseudo-range mathematical model using the Haversine formula was adopted in determining the accurate position of an object during signal transmission from GPS satellites to the receiver message module. The minimum inversion matrix method was used for the GPS-based geometric dilution of precision (GDoP) selection of satellite approximation and distance. [2]

K. Yu, L. Peng, X. Ding, F. Zhang and M. Chen proposed the Purpose - Basic safety message (BSM) is a core subset of standard protocols for connected vehicle system to transmit related safety information via vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I). Although some safety prototypes of connected vehicle have been proposed with effective strategies, few of them are fully evaluated in terms of the significance of BSM messages on performance of safety applications when in emergency. Design/methodology/approach - To address this problem, a data fusion method is proposed to capture the vehicle crash risk by extracting critical information from raw BSMs data, such as driver volition, vehicle speed, hard accelerations and braking. Thereafter, a classification model based on information-entropy and variable precision rough set (VPRS) is used for assessing the instantaneous driving safety by fusing the BSMs data from field test, and predicting the vehicle crash risk level with the driver emergency maneuvers in the next short term. Findings - The findings and implications are discussed for developing an improved warning and driving assistant system by using BSMs messages. Originality/value - The findings of this study are relevant to incorporation of alerts, warnings and control assists in V2V applications of connected vehicles. Such applications can help drivers identify situations where surrounding drivers are volatile, and they may avoid dangers by taking defensive actions.[3]

T. C. Miller, S. D. Morgera, S. E. Saddow, A. Takshi and M. Palm proposed the Electronic nose technology may have the potential to substantially slow the spread of contagious diseases with rapid
signal indication. As our understanding of infectious diseases such as Corona Virus Disease 2019 improves, we expect electronic nose technology to detect changes associated with pathogenesis of the disease such as biomarkers of immune response for respiratory symptoms, central nervous system injury, and/or peripheral nervous system injury in the breath and/or odor of an individual. In this paper, a design of an electronic nose was configured to detect the concentration of a COVID-19 breath simulation sample of alcohol, acetone, and carbon monoxide mixture. After preheating for 24 hours, the sample was carried into an internal bladder of the collection vessel for analysis and data was collected from three sensors to determine suitability of these sensors for the application of exhaled breath analysis. Test results show a detection range in parts-per-million within the sensor detection range of at least 10–300 ppm.[4]

P. -Y. Lai, C. -R. Dow and Y. -Y. Chang proposed by With the rapid development of automatic driving and advanced driver assistance systems, vehicle safety has improved greatly. These systems mainly use sensors installed on the vehicle and help drivers deal with human operation errors. Traffic accidents are inherently unpredictable, and it is difficult to prevent mistakes made by others. Therefore, the concept of defensive driving has attracted much interest. Defensive driving aims to increase drivers’ self-awareness to prevent accidents. Future self-driving vehicles should integrate defensive driving to improve driver safety. This paper proposes a framework based on the risk evaluation value of defensive driving that rapidly transmits information about high-accident-likelihood zones to drivers or vehicles by using Internet of Vehicles technology. This should enable drivers or self-driving vehicles to predict risks and operate vehicles safely. [5]

Blink duration is one of the useful indicators to estimate drowsiness and fatigue. A Doppler sensor could be a key device to realize the non-contact blink duration estimation, which is very useful for the drowsiness and fatigue monitoring in real life. However, none of the blink duration estimation methods has been proposed so far. In this paper, we propose a novel Doppler sensor-based blink duration estimation method based on the analysis of eyelids closing and opening behaviour on a spectrogram. When one blinks, the energies caused by eyelids closing and opening behaviour appears on a spectrogram. Hence, the blink duration can be estimated by integrating such energies and then detecting the timings when the integrated energy caused by the eyelids closing behaviour appears and when the energy caused by the eyelids opening behaviour disappears.[6]

X. Zhou et al proposed the The detection of trace concentration gases is still challenging for portable sensors, especially for the low-cost and easily operated metal-oxide-semiconductor (MOX) gas sensors. In this paper, a widely applicable amplification circuit is designed and fabricated to evidently enhance signal of the MOX sensors by adding a field effect transistor (FET) into the conventional circuits. By optimizing the FET parameters and the loading resistance, this amplification circuit enables the commercial Figaro TGS2602 toluene sensors response effectively to the highest permissible limit (0.26 ppm) of toluene in indoor air of cars, with the detection limit of ~0.1 ppm. Furthermore, this circuit can also make the commercial Hanwei MP502 acetone sensors and MQ3 ethanol sensors response to the 1–2-ppm acetone in breath of diabetes and 2-ppm ethanol for fast and effectively drinker driver screening. The mechanism is investigated to be the gate voltage induced resistance change of the FET, with the highest theoretically estimated and experimentally measured magnification factor of 5–6. This FET amplifier can effectively enable the ppm level commercial MOX sensors response to sub-ppm level gases, promising for MOX sensor integration and also for other kind of resistive sensors.[7]

4. EXISTING SYSTEM:
Provided detection and alerting functionalities. There is no driver alert system. Alcohol detectors are not proposed in any of the vehicles under the current arrangement, therefore anyone can drink and drive. To avoid drunk driving, traffic officers employ alcohol detectors. The Sensor Alcohol detection system used in the breathalyzer. It indicates the
sobriety of the person

5. PROPOSED METHODOLOGY

A smart helmet is a special idea which makes two-wheeler driving safer than before. The main objective of this project is to build a safety system which is integrated with the smart helmet and intelligent bike to reduce the probability of two-wheeler accidents and drunk driver cases. Smart helmet provides help in case of accident by using GSM and GPS technology. The SIM card used for GSM and GPS modules also aids in the preservation of log-information and message transmission details. If the motorist consumed alcohol, the GSM module will send an SMS alarm to family. If the driver has consumed alcohol, the GPS module will monitor his or her vehicle. The eye blink sensor detects movement of the eyeball. The sensor output is linked to an Arduino. If the sensor detects no output from the sensor due to no movement in the eyeball, it sends a signal to the Arduino. The Arduino quickly buzzes the buzzer and emits a warning signal. SIM card used for GSM modules also helps to maintain the log-details and message transmission details. We can utilize a SIM storage and Network providers helps to generate the message log details. This can be used in case of the Denial of Service happened in case of any issues.
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SOME OF THE KEY FEATURES

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6. CONCLUSION:

This paper also discusses the different ways in which drowsiness and alcohol detection can be detected in simulated environments. With the help of the proposed system, different traffic accidents will be prevented, the cause of which is tired driving and drinking alcohol at the wheel. Also, this system used for driver safety warns the driver if any of these occur.

**SIM 900A NETWORK PROVIDERS MESSAGE LOG DETAILS**

prevention and loss of consciousness in the blink of an eye. Here, one blinking sensor is attached to the helmet where when the driver loses consciousness, it will alert the driver with an buzzer sound to prevent the vehicle from having an accident. The main advantage of this paper is the very high accuracy of detecting alcohol using physiological parameters. This would prevent most of his traffic accidents caused by fatigue.
7. FUTURE ENHANCEMENT

This system already able to detect the alcohol presence with help of sensor and also drowsiness of the driver. The system we designed able to avoid the drunken driving to some extent. This can be even more beneficial when the camera monitoring is added on to the system. This will help to detect the overall activity and helps to avoid the lethargic mistake that may cause the accidents.

We already use SIM 900A that able to log details along with the time and location. This can be extended when the dynamic storage like firebase is been utilized and provide the full access to the government and traffic police.

One can also implement the automated ticket/token generator along with the fine amount and regular notification system and monitoring for the drunken and drive. This must include the driver name, Bike plate number, Location of the driver with the time and also additional details of the driver and bike.

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8. REFERENCES:


