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Anti-Sleep Alarm and Vehicle Control System

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ABSTRACT: Road accidents have become a major concern due to various factors such as rash driving, over speeding, and drowsiness. To address this issue, a Vehicular Safety Device (VSD) has been proposed and developed using advanced technologies such as IoT and DIP. Driving while fatigued is a risky mix. While most people are conscious of the risks associated with drunk driving, they are often unaware of the dangers associated with drowsy driving. Drowsy driving results in more than 1,000,000 collisions nationwide each year, 40,000 injuries, and 1,550 fatalities.
In addition to the anti-sleep alert system, the VSD comprises four main features - anti-dash, anti-rash, anti-over speeding, and Alcohol Detection to ensure the safety of drivers and passengers. The system is equipped with GPS and GSM modules for real-time location tracking and monitoring of the vehicle by authorities. The IR Sensor with digitally tracking movements of the eye architecture autonomously monitors the driver, and the system provides the vehicle's location, Distance Between two Vehicles, and Alcohol percentage report to the users.
The proposed technology has the potential to significantly improve road safety and save human lives.

KEYWORDS: IOT, IRSensor, GPS, GSM, AlcoholDetection

I. INTRODUCTION

Most of the accidents on highways during night occur due to drivers' poor vision caused by the continuous exposure of their eyes to the bright light from the headlamps of approaching vehicles. The poor vision is due to exhaustion of the visual pigment in the eyes, which induces sleep to restore the pigment. This anti-sleep alarm keeps you awake. In modern-times, owing to hectic schedules it becomes very difficult to remain active all the time. Imagine a situation where a person is driving home from work, dead tired after facing all the challenges of the day. His hands are on the wheel and foot on the pedal but suddenly he starts feeling drowsy, his eyes start shutting and his vision blurs and before he knows it, he's asleep. Falling asleep on the wheel can lead to serious consequences, there may be accidents and people may even lose their lives. This situation is much more common then we notice and hence, it is very important to counter this problem. So to address this issue, we have come up with a Driver Anti-sleep Device. This system alerts the user if he/she falls asleep at the wheel thereby, avoiding accidents and saving lives. This system is useful especially for people who travel long distances and people who are driving late at night. Whenever the driver feels sleepy and bends his neck down the sensor detects and drive the buzzer to sound an intermediate beep. When driver comes back to his normal position sensor senses that and buzzer gets switch off.

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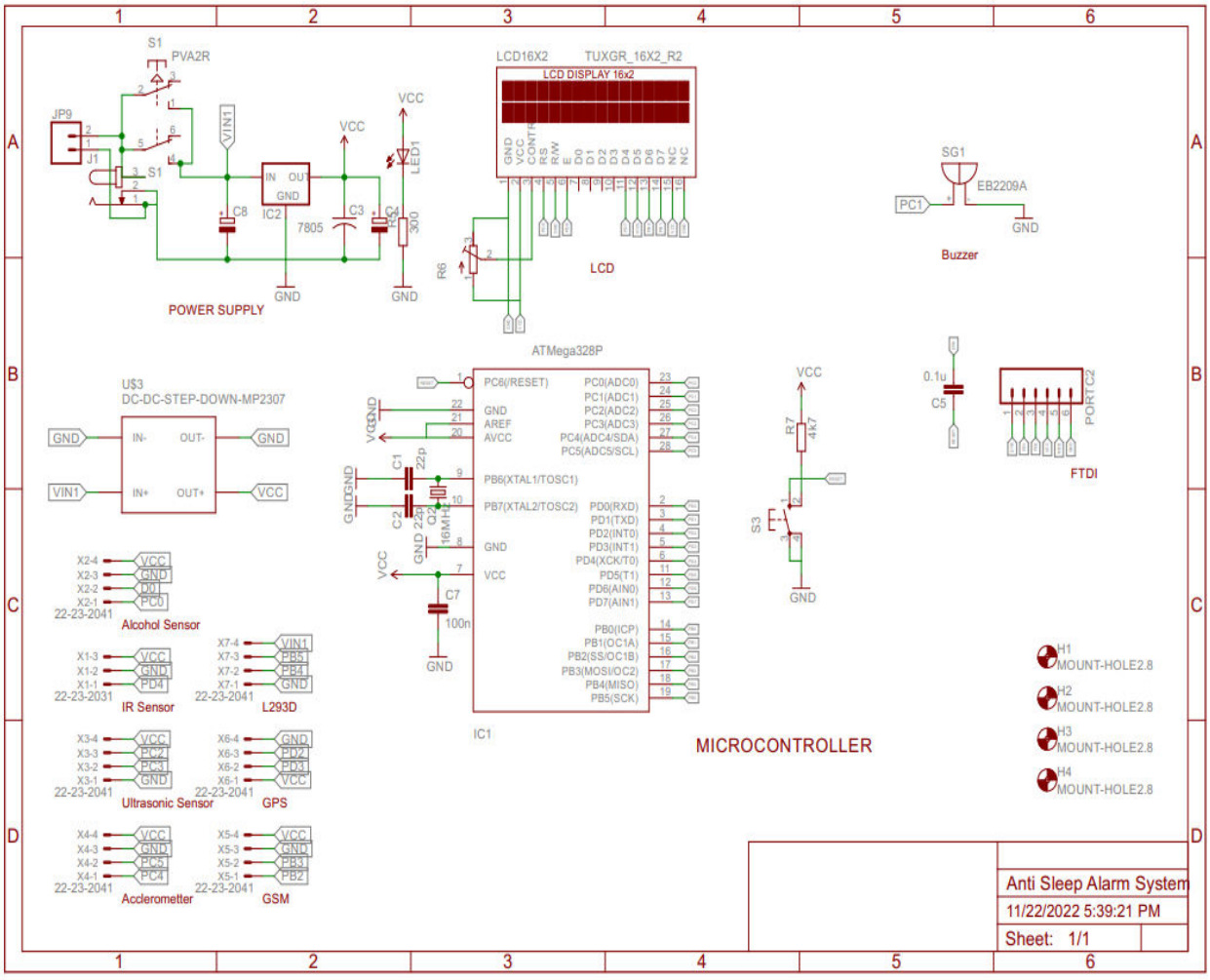
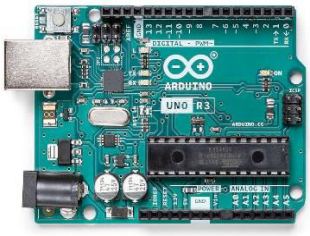
II. CIRCUIT DIAGRAM



COMPONENTS AND SPECIFICATION

COMPONENTS	SPECIFIACATION
 Arduino UNO	• Microcontroller: ATmega328P • Operating Voltage: 5V • Input Voltage (recommended): 7-12V • Inout Voltage (limit): 6-20V • Digital I/O Pins: 14 (of which 6 provide PWM output) • PWM Digital I/O Pins: 6 • Analog Input Pins: 6 • DC Current per I/O Pin: 20 mA • DC current for 3.3V Pin: 50 mA • Flash Memory: 32 KB (ATmega328P) of which 0.5 KB used by bootloader • SRAM: 2 KB (ATmega328P) • EEPROM: 1 KB (ATmega328P) • Clock Speed: 16 MHz • LED_BUILTIN: 13 • Length: 68.6 mm

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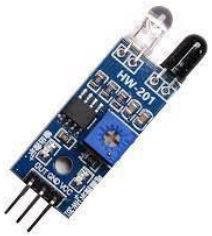
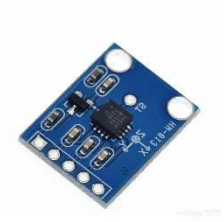
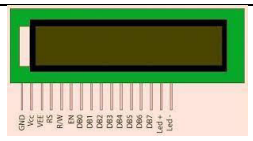
	• Width: 58.4 mm • Weight: 25 g
 MQ3 ALCOHOL SENSOR	• Operating volatage:5v • Load resistance:200kv • Heating consumption:<800mw • Heater resistance:33Ω ± 5% • Sensing Resistance: 1 MΩ – 8 MΩ
 IR sensor	• Board Size: 3.2 x 1.4cm • Working voltage: 3.3 to 5V DC • Operating voltage: 3.3V: ~23 mA, to 5V: ~43 Ma • Detection range: 2cm – 30cm (Adjustable using potentiometer
 ULTRASONIC SENSOR	• Power Supply: DC 5V • Working Current: 15mA • Working Frequency: 40Hz • Ranging Distance : 2cm – 400cm/4m • Resolution : 0.3 cm • Measuring Angle: 15 degree • Trigger Input Pulse width: 10uS • Dimension: 45mm x 20mm x 15mm
 ACCELEROMETER	• An in-plane (x-/y-axis) accelerometer works for an acceleration range of ± 10g, operating at 5 Volts. Simulation results show a sensitivity of 3.83 fF/g with a cross-axis sensitivity of 0.47%
 LED DISPLAY	• Power voltage: 5 v • Screen resolution:16 characters by 2 lines • Module size: 80x36x12 mm • Display size: 64.5 x 16.4 mm

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 Board with GPS sensor GPS SENSOR	• The GPS chipset is Media Tek MT 3318, 51 Channel. • Frequency is L1, 1575.42 MHz; C/A Code. • Protocol: NMEA 0183 v3.01, MTK NMEA Compound.
 GSM	• Operating frequency: GSM 850MHz EGSM 900MHz, DCS1800mHz and Pcs 1900MHz • Operating Voltage Rating:3.2 -4.8 dc • Output pin voltage:5v dc • Output pin current:25mA • Communication mode: UART interface, configured for full-duplex asynchronous mode • Baud rate: Supports auto bauding ,9.6kb/s used

III. BASIC SETUP AND WORKING OF CIRCUIT

The project is titled "Anti-Sleep Alarm and Vehicle Control System" and involves several components including an IR sensor, accelerometer, L239D driver, GPS and GSM, two 7V motors, 16V battery, alcohol sensor, buzzer, and At-mega 328p microcontroller. The project is divided into two parts: the anti-sleep alarm and the vehicle control system. In the first part, an IR sensor is mounted in front of the driver to monitor the closing and opening of their eyes. If the driver's eyes are closed for more than 5 seconds, the sensor activates the buzzer. If the eyes remain closed for more than 10 seconds, the L239D driver slows down or turns off the engine and sends a message with the driver's location indicating they are not fit to drive. Additionally, an accelerometer detects the movement or vibration of Vehicle. If the car turns beyond 30 degrees, the GPS system sends the exact location of the car.GPS, which stands for Global Positioning System, is a satellite navigation system that provides location and time information. A complete GPS system requires at least 24 satellites. The system is used in navigation for airplanes, cars, and trucks. A GPS tracker is a terminal device based on GPS positioning technology that sends the exact location of the car in case of an accident.GSM, which stands for Global System for Mobile Communication, is used to send messages. In GSM, the geographical area is divided into hexagonal cells, with a base station consisting of a transceiver and an antenna at the center of each cell. When both GSM and GPS systems work together, they send the exact location of the car in case of an accident with the help of an accelerometer.

The project also includes an ultrasonic sensor that tracks the distance between two cars and alerts driver if chances of collision and an alcohol sensor to monitor the driver's alcohol consumption. All of the components are controlled by the At-mega 328p microcontroller. Overall, the project is an electronic system designed to ensure the safety of the driver and other road users.

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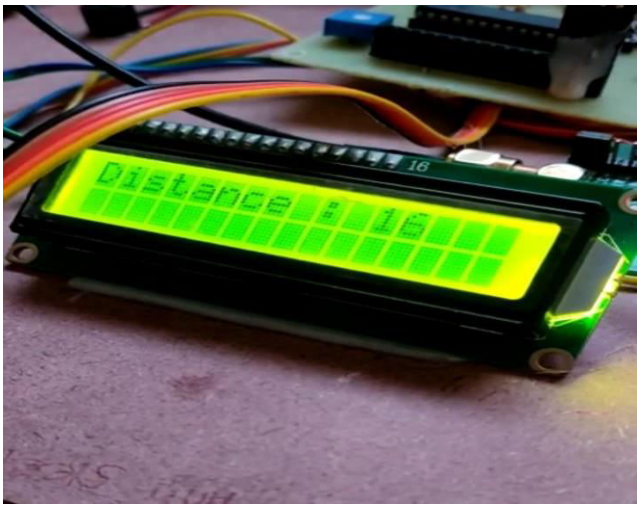
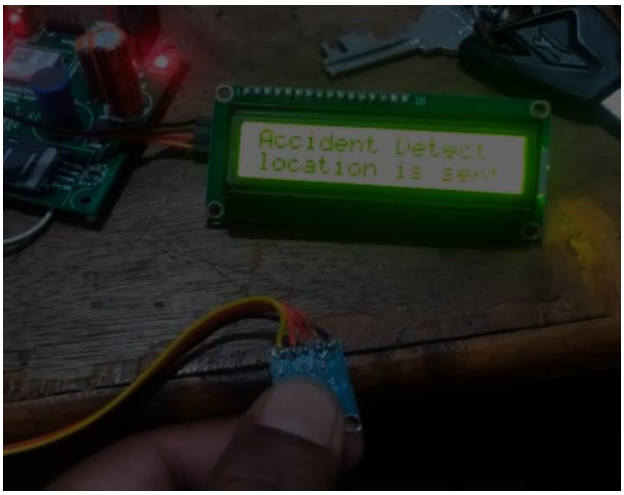
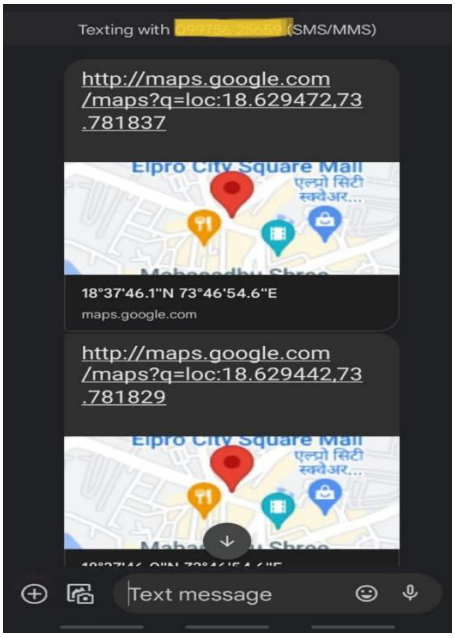
Output

1.The distance between two vehicle



2.Woking of Gps and Gsm





IV. RESULT

The analysis and design of driver drowsiness detection and alert system is presented. The proposed system is used to avoid various road accidents caused by drowsy driving. This project involves avoiding accident to unconsciousness through Eye blink. Here one eye blink sensor is fixed in vehicle where if driver lose his consciousness, then it alerts the driver through buzzer to prevent vehicle from accident. The alcohol, ultrasonic, GSM, GPS & Accelerometer sensor are used for further safety system in the vehicle. Development of a hybrid microcontroller for a vehicle which also consists of an alcohol detector which will sense if the driver is drunk and would not start the vehicle. If accident occurs GPS will get location and send through GSM to the hospital. Ultrasonic sensor detects the collision from back side of the vehicle. A complete study on road safety is going to be the next boom for the automobile industry for it to flourish and survive every human from the risk

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APPLICATIONS

Automobile Industry: The Anti-Sleep Alarm and Vehicle Control System can be used in the automobile industry to prevent accidents caused by driver fatigue. This system can be installed in all kinds of vehicles including cars, buses, trucks, and taxis.

Transportation Industry: The transportation industry can use this system to ensure that their drivers are alert and awake while driving. This will help prevent accidents caused by driver fatigue and improve the safety of the passengers and cargo.

Military and Defence: The Anti-Sleep Alarm and Vehicle Control System can be used in military and defence vehicles to ensure that drivers are alert and awake while operating the vehicles. This will help prevent accidents caused by driver fatigue and improve the safety of military personnel.

Emergency Services: Emergency service vehicles such as police cars, ambulances, and fire trucks can use this system to ensure that their drivers are alert and awake while responding to emergencies. This will help prevent accidents caused by driver fatigue and improve the safety of emergency responders and those they are trying to help.

Commercial Drivers: Commercial drivers such as truck drivers, taxi drivers, and delivery drivers can use this system to ensure that they are alert and awake while driving. This will help prevent accidents caused by driver fatigue and improve the safety of other drivers on the road.

Personal Vehicles: The Anti-Sleep Alarm and Vehicle Control System can be installed in personal vehicles to help prevent accidents caused by driver fatigue. This can be especially useful for people who frequently drive long distances or have to drive late at night.

V. CONCLUSION AND FUTURE WORK

In conclusion, the Anti-Sleep Alarm and Vehicle Control System is an innovative project that can contribute significantly to road safety. By combining various sensors and technologies, the system can detect drowsiness and alcohol consumption in the driver, monitor the distance between vehicles, and provide real-time location information in case of an accident. The project has great potential for implementation in various industries, such as transportation, logistics, and public services. It can also be further developed and enhanced with more advanced features, such as automatic emergency braking and lane departure warning. Overall, the Anti-Sleep Alarm and Vehicle Control System has a promising future in improving road safety and reducing the number of accidents caused by drowsy or drunk driving. Certainly, here are some potential future directions for this project:

1. Integration with autonomous driving systems: As autonomous vehicles become more common, there may be an opportunity to integrate the anti-sleep alarm and vehicle control system into the vehicle's existing safety systems.
2. Improved alcohol sensors: Current alcohol sensors are not always reliable and can produce false readings. There may be an opportunity to develop more accurate sensors that can reliably detect alcohol levels in a driver's system.
3. Expansion to other forms of transportation: The system could potentially be adapted for use in other modes of transportation, such as airplanes, trains, and boats.
4. Integration with smart devices: With the rise of smart devices, there may be an opportunity to integrate the anti-sleep alarm and vehicle control system with other smart devices, such as smartwatches and fitness trackers.
5. Data analytics: By collecting and analyzing data from the various sensors in the system, it may be possible to identify patterns and trends in driver behavior that could be used to improve road safety.
6. Artificial intelligence: The system could be enhanced with the addition of artificial intelligence algorithms that could predict when a driver is likely to fall asleep based on their driving behavior.
7. Cloud connectivity: The system could be connected to the cloud to enable real-time monitoring and reporting of driver behavior.
8. Integration with emergency services: In the event of an accident, the system could automatically alert emergency services and provide them with the vehicle's location and other relevant information.
9. Integration with insurance companies: Insurance companies may be interested in using the data collected by the system to adjust premiums based on driver behavior.
10. Miniaturization: With advances in technology, it may be possible to miniaturize the components of the system, making it more compact and easier to install in a variety of vehicles.

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