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Intelligent Accident Prevention And Detection System

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Abstract: **The usage of vehicles has greatly increased in modern times. Since more people are driving, there is more traffic, which has led to an increase in traffic accidents. Accidents are occurring more frequently now. Every hour, there are about 17 accidents. Due to the lack of immediate preventive measures and immediate preventive and safety facilities, this damages the property and results in human life loss.**

Our project's primary goal is to prevent accidents that result from driver intoxication, sudden sleepiness, Rash driving, and engine overheating. However, even in the unlikely event that an accident results from a different cause, the used electronic devices will be able to communicate a victim's precise location to emergency personnel and send out spontaneous messages. Many car accidents are caused by driving too fast, driving while intoxicated or fatigued, driving recklessly or rashly, and breaking the law.

While cars greatly reduce the amount of time we spend traveling, they also raise the possibility of an accident occurring. To reduce this risk, we can apply extra sophisticated technologies. We are using sensors, electronic modules, and a microcontroller unit in our project. This supports us in providing accident prevention, recognizes the accident if it happens despite the precautions, and alerts the ambulance service.

Keywords: **Accelerometer, GSM Module, GPS module, Ultrasonic sensor.**

I. INTRODUCTION

These hypothetical situations are probably going to become reality within the next couple of years because technological advancements have occurred so quickly. A microcontroller or application-specific integrated circuit is a component of embedded systems or electronic systems that are used to run a particular, dedicated application. It works along with the other parts of the system to accomplish a general function. This project is implemented with the aid of such an embedded processor, which primarily contributes to preventing the loss of human lives as a result of accidents. There are various reasons why accidents happen, but one of the main causes is driver irresponsibility. This project's major goal is to lessen traffic-related injuries by doing more to avoid accidents. The sufferer should always be saved and treated as quickly as possible after an accident.

II. LITERATURE SURVEY

Although there are many research works on online/intelligent accident prevention and detection system, here in this chapter we have critically analyzed and summarized several research works and projects, which are more recent and relevant, and similar to the project. This literature survey will logically explain the system.

1. Accident-Avoidance System Using IR Transmitter

This method is said to try to prevent accidents by determining the driver's state, or whether the driver is feeling drowsy or not in a fit state to operate a vehicle. This technology offers a very effective means of reducing such incidences because tiredness is a significant contributor to accidents. Even though the system offers a means of preventing accidents brought on by tiredness, there may be other causes that are not identified, and since the system does not offer damage detection and notification of emergency contacts, this could be a significant disadvantage.

2. Accident Detection & Alert System

In this paper, a system with an HDy Copilot, an Android app with integrated multimodal warning dissemination for accident detection, was proposed. A DENM alert, as well as SMS and audio calls to the emergency number, are sent to all adjacent vehicles when an accident is detected. But, the main issue remained the same: smartphone breakage or signal loss, which renders the system useless.

3. Accident Alert System using Face Recognition

According to this paper, the major causes of road accidents are inattention, drowsiness, and drunk driving. The system will give a false alarm if the driver has a medical condition or blinks at an abnormal rate despite not being drowsy. In the worst-case scenario, the driver is involved in an accident, and the system fails to detect the impact and notify the appropriate authorities. Finally, because the system constantly monitors the driver, it consumes power and drains the power supply. As a result of not being able to identify the actual accident scenario, we rejected the idea of incorporating face recognition into our system because it would be costly, power-consuming, and inefficient.

4. An efficient vehicle accident detection using sensor technology

They have demonstrated a system in this that uses MEMS sensors to identify accidents and send the information as input to the controller for processing. To examine journey time and traffic flow for various time frames, this calculation can be kept. This study suggests a method that would be effective and simple to use, but it doesn't offer a switch or other device to guard against a false alarm.

5. Smart Vehicle Accident Detection and Alarming System Using a Smartphone

They claim that smartphones are now a need of modern life, and this study consequently suggests a gadget that uses a smartphone to detect whether a mishap involving a smartphone's sensors has taken place. For this device to function properly, there must always be an internet connection. With cell phones, which are now an everyday requirement in modern life, the approach utilized in this study can provide systematic results and protect the driver's safety. As the smartphone's sensors occasionally potentially offer inaccurate information, this system also includes a switch that the driver could deploy in the event of inaccurate readings. This system's functional downside may be that it requires a constant internet connection, which may not be viable in remote locations. The system might malfunction in such a circumstance.

6. Accident Detection and Alert System

They suggested a system in which car accidents are one of the most common causes of fatalities. the time interval between an accident and the dispatch the availability of emergency medical care at the scene of the accident is essential to accident survival rates. The vehicle will have an accident detection and messaging system installed, which will be useful in the event of an accident because hospitals, police, and emergency contacts may be notified right away. The system operates with the aid of GSM and GPS. They proposed a system in which one of the most frequent causes of fatalities is automobile accidents. the period between a crash and a dispatch For accident survival rates to be high, emergency medical care must be accessible at the location of the event. The car will be equipped with an accident detection and messaging system, which will be helpful in the event of an accident because it might alert the hospital, police, and other emergency contacts immediately away. The use of GSM and GPS allows the system to function

II. PROBLEM STATEMENT

Based on the distance between the vehicles, the existing model used an Infrared sensor for prevention. In this model, when the distance between the cars is very close, the threshold levels automatically increase and the infrared rays are transformed into electrical signals. which will recognize the occurrence of the accident and notify the public by sending SMS messages over GSM to certain phone numbers and sharing its location via GPS. The IR sensor was the sole preventive discussed in this paper. These IR sensors have many drawbacks, including the inability to function in sunlight due to the infrared rays and also it does not provide any preventive methods for the prevention of accidents.

III. PROPOSED MODEL

By utilizing an alcohol sensor, an eye blink sensor, an ultrasonic sensor, a seat belt sensor, a DHT11 sensor, and an ADXL 335 accelerometer for detection, we have added five preventative measures to the model. We use an MQ3 alcohol sensor, and if the driver is drunk means that we apply some quantity of alcohol to the sensor then the threshold value goes high, it will automatically shut off the engine and Seat belt sensor, it acts as a switch when we press the seatbelt sensor the engine will start otherwise it does not allow to start the engine. DHT11 sensor is used to identify heat in the engine as a prototype we checked the room temperature, if the temperature is high it gives a warning to the driver. Eye blink sensor for determining whether the driver is sleepy. If the eye is closed for longer than 4 seconds, an automatic warning will sound., and an ADXL 335 accelerometer is used to determine the accidents. When an accident has occurred send it will automatically SMS messages to nearby hospitals and family members, sharing the location of the event.

IV. SYSTEM ARCHITECTURE

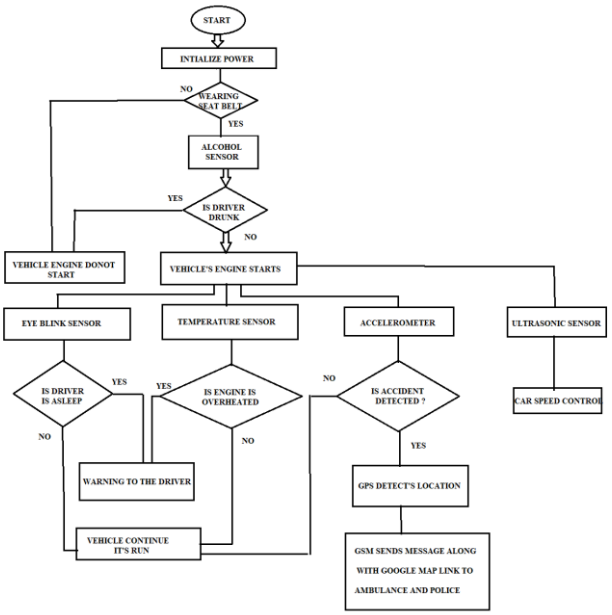

FIG 1: ARCHITECTURE

V.BLOCK DIAGRAM

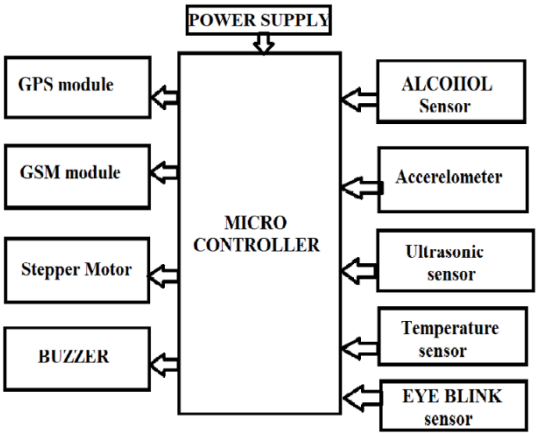

FIG 2: BLOCK DIAGRAM

VI. ALGORITHM

1. Start
2. The system is initially powered by the appropriate amount of power supply.
3. .Later, the system checks to see if the driver is wearing a seatbelt; if so, the engine will turn on; otherwise, the engine will never start.
4. The alcohol sensor in the car determines if the driver is intoxicated or not when the engine starts. When a driver is too intoxicated, the device issues a warning and the car's engine shuts off.
5. If no alcohol was detected, the vehicle starts or continues to run normally.
6. Eye blink sensors detect whether the driver is drowsy or not. If the driver falls asleep, the system alerts him with an alarm and a red light alert. A continuous temperature sensor detects engine heat and, if the engine is overheated, the driver receives a red light alert or continues to drive.
7. As a prototype engine, we used a stepper motor. We also proposed vehicle-to-vehicle communication using an ultrasonic sensor. If the car is very close to the system, the engine will automatically slow down.
8. If an accident occurs, the accelerometer detects it and sends the signal to the microcontroller for further processing.
9. The GPS module determines the location, and the GSM module sends a message with the latitude, longitude, and a link to Google Maps to ambulance and police emergency numbers.
10. When the system is activated, an AT mega processor is used to conduct all of the prevention, detection, and reporting functions.

VII. Hardware Setup

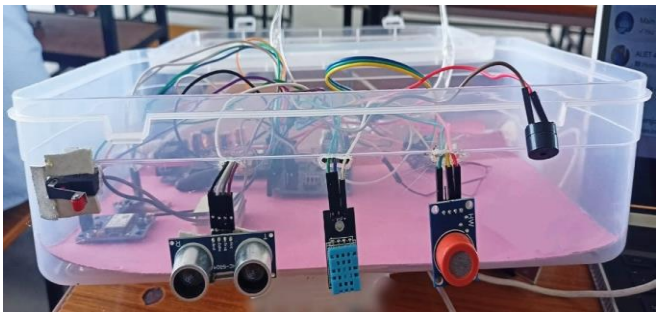

FIG.3: -HARDWARE KITS

VIII. RESULTS

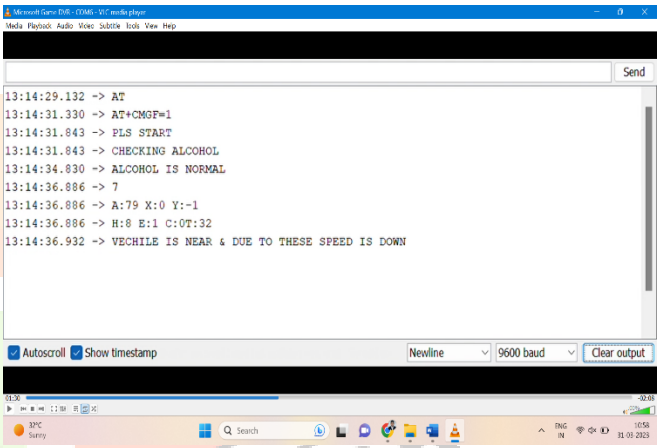

Fig 4: Results recorded in Serial Monitor

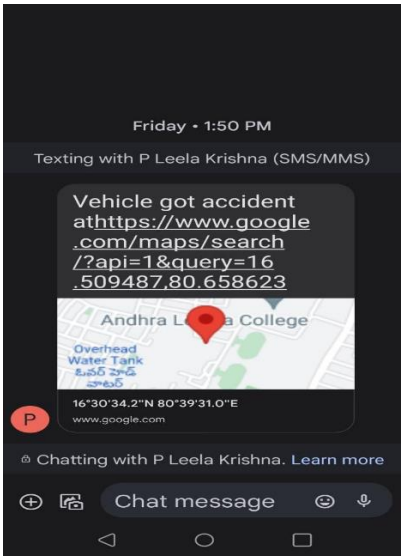

Fig 5: Message sent when the accident is detected

IX. CONCLUSION

The primary goal of our project is to prevent accidents caused by drunk driving, falling asleep suddenly (drowsy), Rash driving, and overheating engines. Vehicle to vehicle communication we are using ultrasonic sensor if the vehicle is very near it will automatically slowdowns the engine, if an accident occurs due to another cause, an accelerometer will be used to detect the collision and a customized GSM module will be used to send out spontaneous messages and GPS, for example.

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