GSM-Based Alcohol Detection and Accident Alert System Includes Call and Message Alert with Level Identification

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ABSTRACT

As technology advances, addressing road safety issues remains a growing concern. Drunk driving continues to be a leading cause of traffic accidents. Our project introduces a GSM-based alcohol detection and accident alert system that detects alcohol consumption in drivers, identifies the level of alcohol intake, and sends automated call and message alerts to emergency contacts. The system also includes an accident detection module that triggers alerts in the event of a crash. This enhances real-time monitoring and emergency responsiveness.

The system uses sensors to detect alcohol levels in the driver's breath and identify if they exceed the legal limit. A GSM module facilitates instant communication by calling and messaging stored emergency numbers. An accelerometer detects accident events and ensures timely alerts. The proposed system offers a low-cost, scalable solution for improving road safety and reducing accident fatalities. Its integration with vehicles enhances safety, especially in rural and urban transit systems.

1. INTRODUCTION

A GSM-based alcohol detection and accident alert system integrates sensors, microcontrollers, and communication modules to improve road safety. The alcohol sensor monitors the driver's breath to detect the presence and concentration of alcohol. If the alcohol level exceeds a set threshold, the system sends a call and SMS alert via GSM to preconfigured contacts. This system prevents the ignition of the vehicle if alcohol is detected.

Furthermore, the system includes an accident detection mechanism using a vibration or tilt sensor. Upon detecting an impact, the system immediately alerts family members or emergency services with the vehicle’s location. This setup significantly reduces response time during emergencies. The solution is compact and cost-effective, suitable for both personal and public transport systems.

1.1. OBJECTIVES :

The main objective of this project is to design and implement a GSM-based alcohol detection and accident alert system that enhances vehicle and road safety. It aims to reliably detect the presence of alcohol in a driver's breath using a high-sensitivity sensor and prevent vehicle ignition if the alcohol level crosses the safety threshold.The system will identify varying levels of alcohol concentration and initiate alerts accordingly. It will disable the vehicle's engine in unsafe conditions, serving as a preventive measure against drunk driving incidents.

Another major objective is to implement real-time GSM communication to send automated SMS and voice call alerts to pre-registered emergency contacts. These alerts will include vital information such as the alcohol level status and accident notifications.An integrated accident detection module using vibration or tilt sensors will detect crashes or abnormal impacts, immediately triggering an emergency alert. The system will also integrate a GPS module to capture the vehicle's exact location during such events.By combining alcohol and accident detection, the system ensures faster emergency response and minimizes potential damage or fatality. The solution will also log critical data such as time, location, alcohol readings, and incident reports for post- incident review and enforcement purposes.The system is designed to be compatible with different vehicle types and adaptable for public transport or commercial fleets. It will contribute to responsible driving behavior and improve awareness about the dangers of driving under the influence .Future scalability includes integration with IoT platforms and cloud databases to support data analytics, remote monitoring, and centralized fleet control. Overall, the system offers a low-cost, efficient, and scalable approach to enhance road safety and emergency response.

1.2. EFFECTS OF GSM AND SENSORS :

The incorporation of GSM with alcohol and accident detection sensors allows for immediate alert dissemination. When alcohol is detected, the sensor sends data to the microcontroller, which assesses if the driver is in a fit state. If not, the GSM module sends an alert message and places a call. This proactive communication plays a crucial role in minimizing accidents due to intoxicated driving.

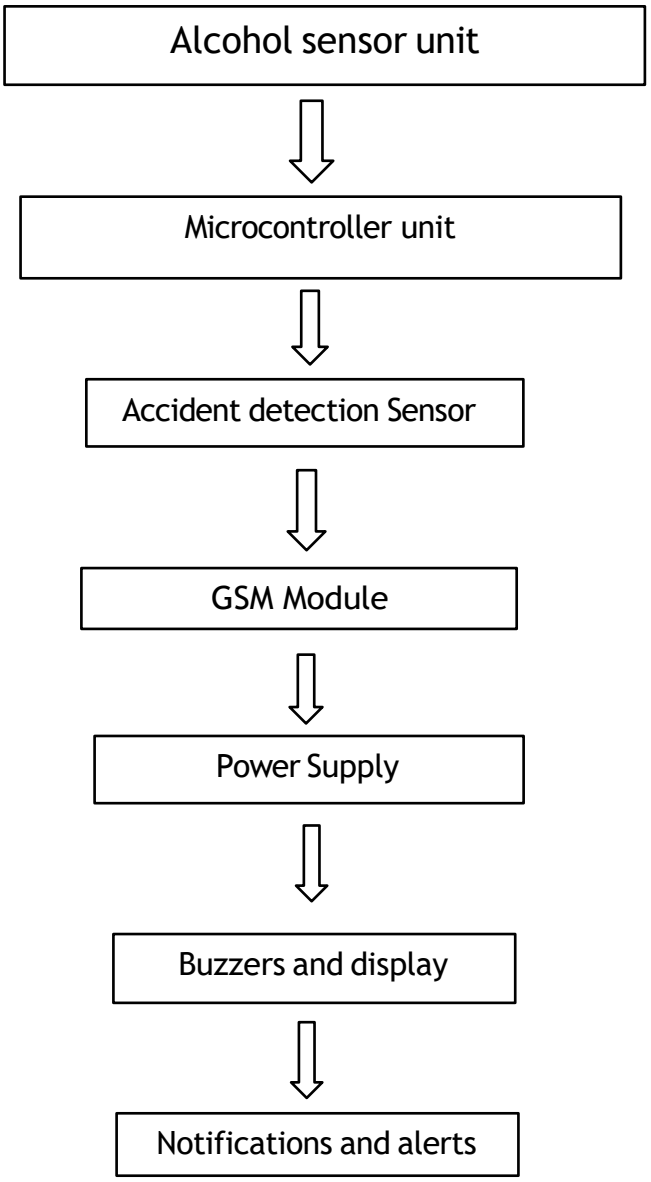
Additionally, sensor-based impact detection triggers alerts during collisions. The GSM module quickly transmits messages with details such as location or accident occurrence. This dual-layer system greatly improves emergency response time and can potentially save lives. The automation of such alerts removes the dependency on manual intervention during critical moments.

1.3. WHAT IS ALCOHOL DETECTION USING SENSORS :

Alcohol detection using sensors involves analzying breath samples to determine the presence and level of ethanol vapours. The most commonly used sensor is the MQ-3 gas sensor, which provides voltage variations in the presence of alcohol. These variations are processed by a microcontroller to determine if the driver is intoxicated.

This process ensures a non-invasive and quick method of alcohol analysis. The system converts sensor outputs into readable values, compares them with preset thresholds, and initiates appropriate responses. Continuous monitoring and real-time evaluation enhance system effectiveness and increase its practical usability in vehicles.

2. BLOCK DIAGRAM



3. WORKING

Alcohol detection

The MQ-3 alcohol sensor continuously samples breath and sends analog voltage signals to the microcontroller, indicating the presence and concentration of alcohol.

Threshold comparison

The microcontroller compares the received signal against a pre-defined legal limit. If the threshold is crossed, it proceeds with the alert mechanism.

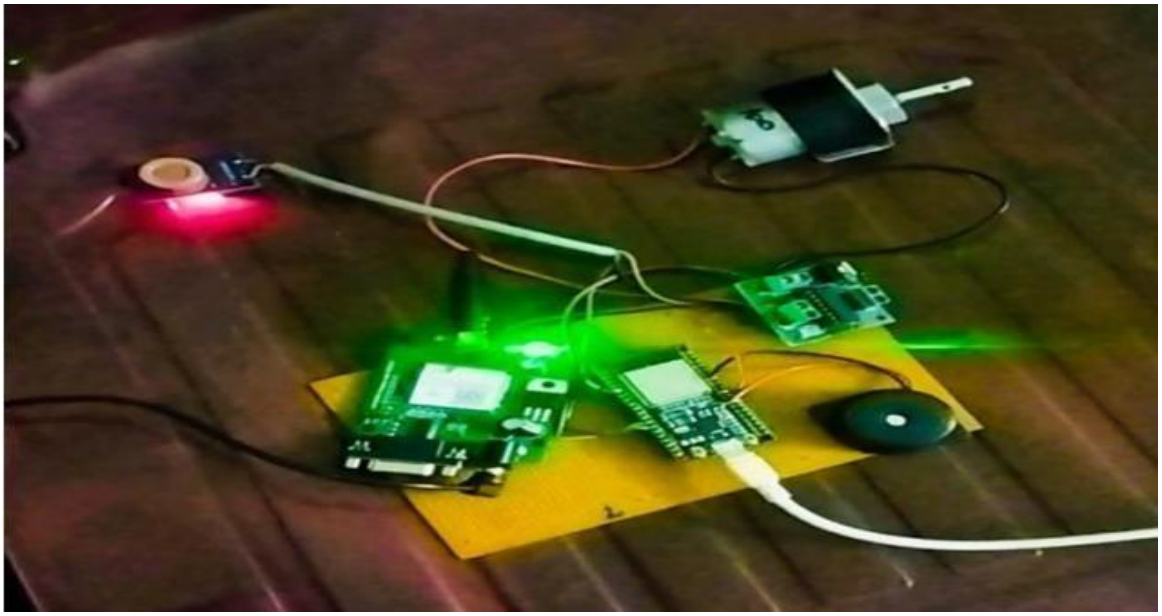
Accident detection

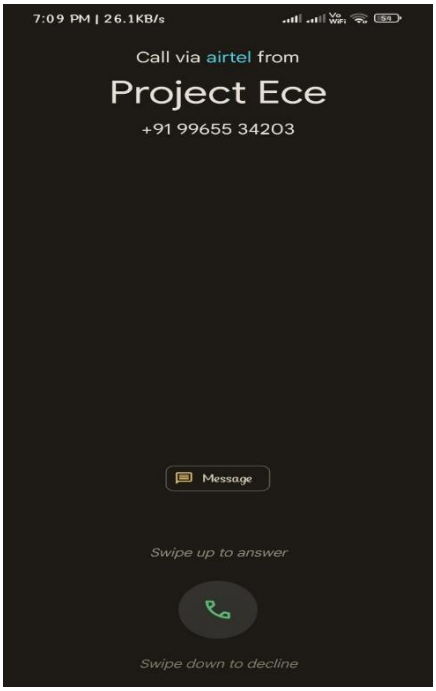
An accelerometer or tilt sensor is used to detect sudden movements or impacts that are indicative of an accident scenario.

GSM alert system

Upon confirmation of alcohol detection or accident, the GSM module sends SMS and calls to emergency contacts. This information may include driver status and location.

OUTPUT :

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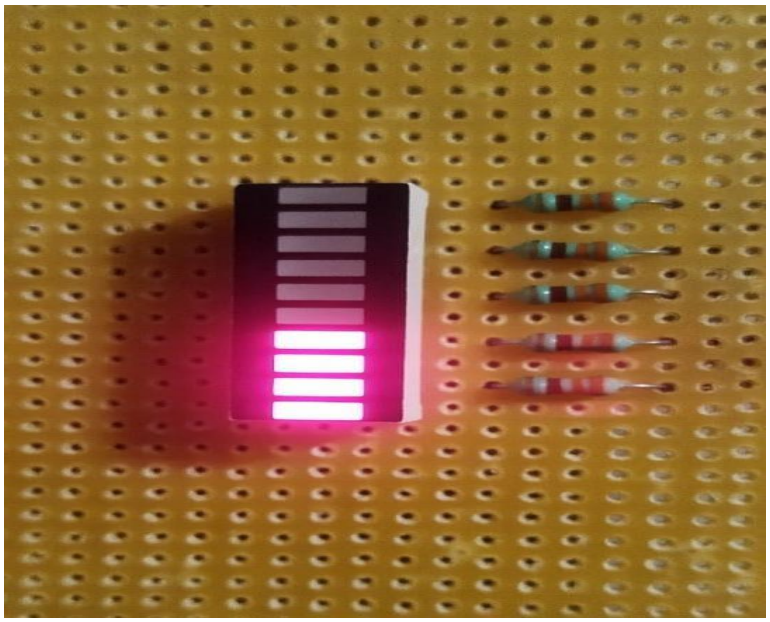

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