International Journal of Scientific Research in Engineering and Management (IJSREM)
Conference - Volume 10 AITCON -2026 SJIF Rating: 8.659 ISSN: 2582-3930
Conducted By: Adarsh Institute of Technology & Research Centre, Vita (An Autonomous Institute)
Organized By: Department of Electronics & Telecommunication Engineering (Poly.)

SMART HELMET

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Abstract - Motorcycle accidents are the most common type of accident in the world. A big problem is that it takes too long to call for help after an accident, especially when the rider is unconscious or can't call for help. The design and building of a smart helmet that can tell when it hits something and send real-time location alerts to a mobile app through a cloud server. The proposed system includes a sensor that can detect impacts, a GPS module for tracking location, and a SIM-based communication module for connecting to the internet.

Key Words: Smart Helmet, Accident Detection, GPS Tracking, Mobile Application, Rider Safety, Cloud Server.

1. INTRODUCTION

Recent advances in wireless communication and embedded systems have made the smart helmet possible. Smart helmet system that can send real-time location data to a remote server and find accidents using mobile internet. After that, the server sends a message to a mobile app, which lets emergency contacts take action.

2. METHODOLOGY

2.1 Accelerometer-Based Accident Detection

An accelerometer is a sensor that measures the acceleration forces that are applied to an object. These acceleration forces may be due to sudden movements, vibration, etc.
In the proposed smart helmet system, the accelerometer continuously monitors the movements of the helmet. If a sudden impact occurs beyond a predefined limit, the system considers it an accident. Then the emergency process is initiated by the microcontroller.
This method helps in the real-time detection of accidents without the involvement of a person.

2.2 System Architecture

The system architecture is the hardware and software components of the project and the interaction between them. The proposed system architecture consists of the accelerometer sensor that continuously senses the motion data and sends it to the microcontroller. On the detection of an accident, the system retrieves the position using the positioning module. The communication module uses mobile internet to send the position data to the mobile application or server. The mobile application will display the position of the accident and alert the emergency contacts.

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The proposed system architecture is as shown in ***Fig-1***

Accelerometer Sensor
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Microcontroller
↓ ↓
Positioning Module Communication Module
↓
Internet
↓
Mobile Application

Fig -1: Architecture

2.3 System Workflow

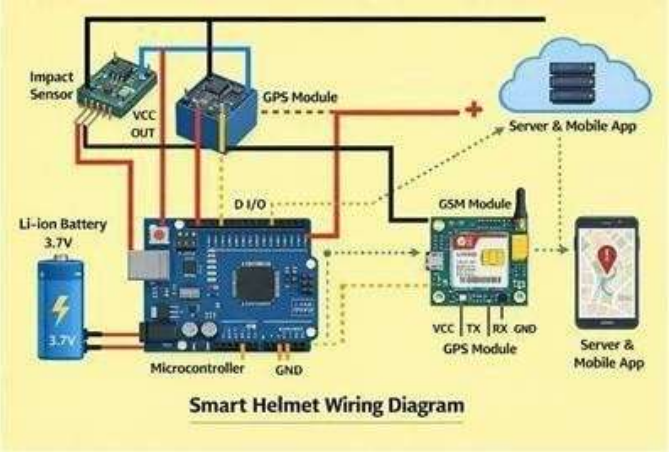


Fig -2: Smart Helmet Wiring Diagram

2.4 System Implementation

The Smart Helmet system implementation consists of both hardware and software components. The hardware components include the sensors, microcontroller, positioning module, and communication module. The accelerometer sensor continuously collects data on the movements. The data is sent to the microcontroller for processing.
When the microcontroller detects abnormal acceleration, which may indicate an accident, the geographical coordinates are retrieved from the positioning module. The coordinates are sent through the communication module via the mobile internet.
The mobile application receives the coordinates and displays the accident location on the map interface. This helps the emergency contacts locate the accident easily.
The working model of the system provides real-time accident detection and sharing of the accident location.

3. CONCLUSIONS

The proposed smart helmet system is a good way to make motorcycle riders safer because it automatically tracks accidents. Because of these factors, there is a growing need for an automated accident tracking system that can automatically find out when an accident happens, tell the right authorities where it happened in real time, and take into account any disciplinary actions that may have happened as a result of the accident.

ACKNOWLEDGEMENT

The authors would like to thank Mrs. S. M. Lokhande from the bottom of their hearts for her valuable help and advice while they worked on this project. The authors would also like to thank the Adarsh Institute of Technology and Research Centre's Department of Artificial Intelligence and Machine Learning for giving them the tools and help they needed.

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