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ACCIDENT INTENSITY DETECTION AND TRACKING USING IOT

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ABSTRACT

Accidents in our lives are bad situations that we all want to avoid. As the number of cyclists increases and the frequency of accidents increases, the importance of the safety of two-wheeler drivers has become even more important. This project will take an in-depth look at underground infrastructure designed to improve the safety of cyclists and provide immediate assistance in the event of an accident. The system aims to significantly reduce the impact of accidents by combining the latest technology with a practical approach.

1.INTRODUCTION

According to a 2015 report, the total number of registered vehicles in India is over 21 million. In 2017, the number of car users in India was 22,536,000 and approximately 17.6 million two-wheelers were sold to customers. Conflicts happen every day. Of all deaths due to traffic accidents, 25% are due to accidents involving two-wheelers. A recent study found that Tamil Nadu accounts for the maximum number of injuries due to road accidents. Figure 1.1 shows the reports of accidents on Indian roads in 2016. In India, one person dies from a traffic accident every four minutes [1].

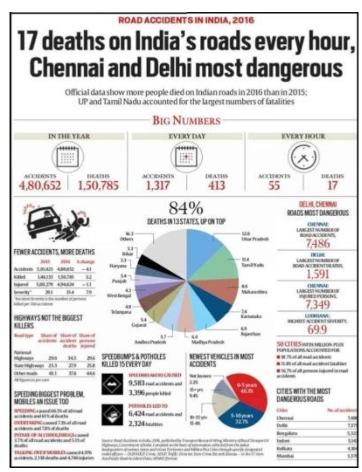

Figure 1: Road accident report in India

According to a survey released by the Indian government's Transport Research Department of the Ministry of Road Transport and Highways, more people died in traffic accidents in 2016 compared to 2015. According to data, 413 people die every day in 1,317 traffic accidents. Data also shows that road traffic accidents kill at least 17 people every hour [2].The use of electronic and digital devices has increased by more than 13 billion, equivalent to two devices per person.

A suitable example of the Internet of Things is SMART HOME. Most smart devices are developed using programmable devices with remote control capabilities. Future growth of IoT will be observed in almost all sectors of the economy, including commerce, industry, healthcare, and public safety [3].

Utility components and all other everyday objects are combined with Internet connectivity and powerful data analytics capabilities that are transforming the way we live and work. Therefore, the term Internet of Things is defined as extending network connectivity and computing capabilities not only to computers but also to everyday items, creating data exchange and consumption with minimal human intervention [4].Despite wearing helmets, many lives were not saved due to lack of immediate medical attention. The goal of our project is to provide faster communication with those close to victims, allowing them to receive faster medical care. Smart Helmets for Motorcyclists is a project aimed at improving road safety for motorcyclists.

2. LITERATURE SURVEY

The helmet operation scenario is described in [5]. If a rider has an accident and the helmet falls to the ground, a sensor detects the vibration and sends it to the microcontroller board (P89V51RD2). The controller then uses the connected GPS module to determine location information. If the vibration exceeds the minimum load limit, the GSM module (SIM300) automatically transmits information by sending a message to emergency services. The authors proposed a new helmet model in case of an accident [6]. The cloud service is used to send alert messages with detailed information to your contacts in the event of an emergency. The vehicle's location is determined by the GPS module. The system was built using a BMA222 accelerometer, a Wi-Fi enabled processor (TI CC3200), sensors, and a cloud computing platform.

The authors developed a helmet for riders with additional features such as listening to music while riding and sending SOS messages with location through a microcontroller (ATmega328P) in case of emergency [7]. This helmet is equipped with the latest Bluetooth technology (HC-05 module) and can connect to the driver's smartphone using Arduino software (IDE) to answer calls while driving. The helmet has been upgraded with a Peltier module for rider comfort.[8] Peltier module (TEC-12706T125) that retains heat inside the helmet due to the thermoelectric effect. A temperature sensor (LM35D) is used to measure the temperature. In the event of an accident, the exact location can be delivered to emergency contacts through the GPS module, and in the event of bleeding, the risk can be reduced by using the thermoelectric module. Smart helmets work using GPS and GSM technologies [9]. Accidents are identified by the potential vibration experienced by the helmet. Here we place a vibration sensor on the helmet to record the vibration and transmit it to a microcontroller board (P89V51RD2).

The controller then uses the GPS module to determine your location and uses the GSM module to automatically send a message to a predetermined number. To prevent accidents, developers **introduced** a GSM-based helmet model that acts as an intelligent system [10]. The developed system checks whether the driver is wearing a helmet before boarding the bicycle and also checks for the smell of alcohol. When this happens, the transmitter in the helmet sends a signal to the bike receiver via the RF transmitter.

These signals prevent the bike from starting and are detected by the MQ-6 switch and alcoholsensor.The signal and microcontroller (AT-89S552) are decoded by the receiver and then the message is sent to the corresponding pins using the GSM module (SIMCOM SIM900A) respectively. To detect the rider's head movement and determine the speed of the motorcycle, the authors used a power resistor (FSR) and a BLDC fan [11]. For communication between the transmitter circuit and receiver circuit, a 315 MHz RF module is used as a wireless communication link. All system components are controlled by a PIC16F84a microcontroller. The motorcycle will not start unless the rider wears and secures a helmet. If the speed limit exceeds 100 km/h, the driver is warned and the LED lights up. This project [12] describes a two-module helmet attached to a bicycle and the MQ-3 alcohol sensor used to detect whether a cyclist has been drinking. You can also use the GSM module (SIM 900A) to detect incidents and report them to the nearest police station. Drivers can avoid sending messages by pressing the cancel button if the accident is not serious.

In this project [13], a smart helmet can be used to control a microcontroller (Intel Edison on Arduino board) embedded in the helmet along with an accelerometer (MPU6050), headset (Intex) and camera (Logitech). When a rider falls, his helmet falls to the ground. Based on the knockdown accelerometer readings, the microcontroller records events and transmits the information to the phone via Wi-Fi. Finally, the smart helmet connects to a smartphone via Bluetooth to provide audio navigation instructions and notify the driver of emails and phone calls. The concept of a smart helmet was proposed by the authors in [14] with a control system inside the helmet consisting of an RF transmitter and an RF receiver system via pin 17 of the HT12E. You cannot ride a bicycle without a helmet. When the user puts on the helmet, the transmitter emits a radio frequency signal that is received by a receiver in the bicycle ignition switch, causing the bicycle to start moving.To communicate with the bicycle of the proposed helmet model [15], an ultrasonic sensor (HCSR04) is used at the start of the ride to always detect whether the person is wearing a helmet, and the cyclist uses voice password encryption

3. SYSTEM DESIGN

3.1 Category Diagram

Use diagrams to get more accurate information and detailed information about planning standards. Group charts use data to match actors into groups. Each group can have "one" or "one" link. Each campaign category will have different capabilities. These are the features of the "Road" category. Additionally, each group will have a special "element" that distinguishes them from others.

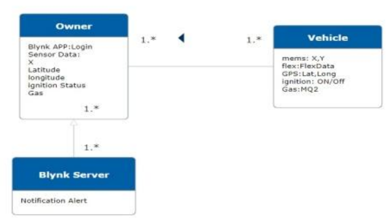

Figure-3.1 Class Diagram

3.2 Activity Diagram:

The process steps of the system are shown in the diagram. The state diagram includes activities, actions, transitions, beginning and ending, and emergent events. The graphics are the same.

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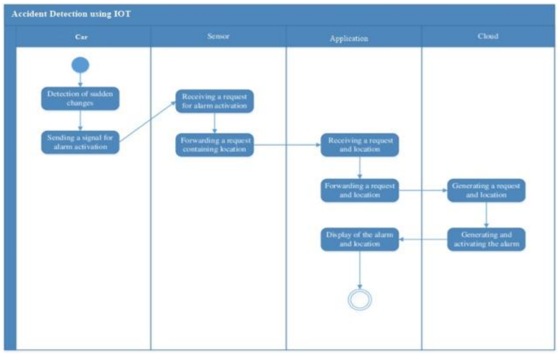

Figure-3.2 Activity Diagram

4. OUTPUT SCREENS

The project is well prepared and is operating properly (including all hardware and software) in accordance with the original specifications and requirements of the project. Because the cost of this project is enormous.

The actual representation on the experimental board is as follows:

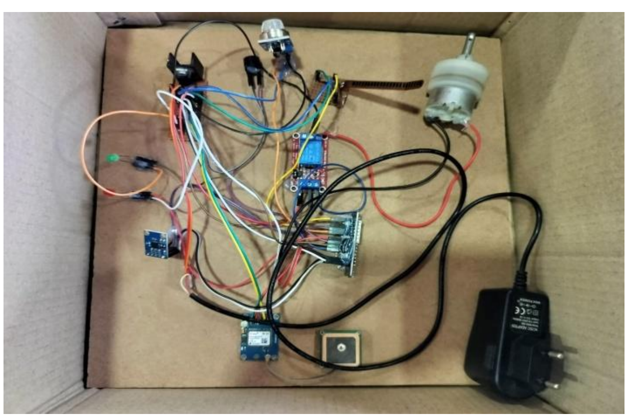

Figure-4.1 Experiment Board

Turn on the system through the blynk application during drive startup. If an accident occurs and the driver falls to the ground, the flexibility and memory sensors recognize the threshold frequency, and if the value exceeds the voltage limit, the GPS module retrieves the exact location of the point. Information about the rider and his location in the form of latitude and longitude data is immediately transmitted to the registered emergency contacts. The map shows the exact location of the incident along with important details included in the report.

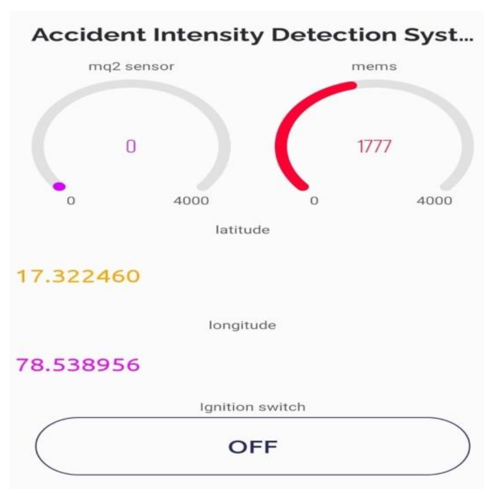

Figure-4.2 System Turn On

After implementation, the incident detection and notification systemwas tested in various

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locations. The system uses Google Maps to transmit information to first responders, including results of the rider's geolocation with latitude and longitude values to help pinpoint the exact location. You can receive a warning message if gas or smoking occurs.

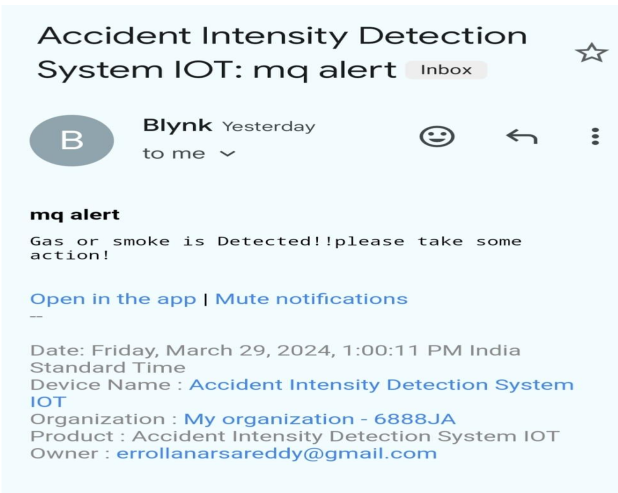

Figure-4.3 Mq Alert Message

You may receive an alert if a dent appears on your vehicle.

Figure-4.4 Dent alert message

If an accident occurs in your vehicle, you can receive a warning message.

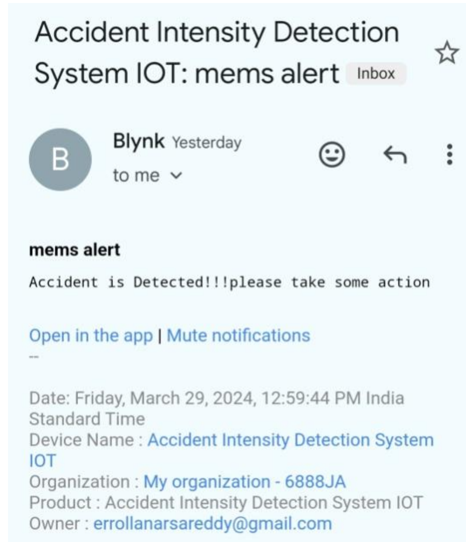

Figure-4.5 Mems Alert message

5.CONCLUSION

Nowadays, most accidents involve motorcycles and cars. This alarming increase in motorcycle and automobile accidents is leading to the loss of many lives. Failure to receive timely treatment is a major cause of many deaths. The main reasons may be that the ambulance arrives late or that there is no one on site who can provide information to the ambulance or the family. The proposed work proposes a solution to this problem by implementing an accident detection and reporting system that aims to save more than half of the lives lost due to bicycle accidents. In the future, this system may be implemented for lock protection and

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other security purposes. It can also be implemented to send information to the driver's family to control the vehicle's speed and prevent the driver from speeding. Early detection and warning can help save many lives.

6.FUTURE ENHANCEMENT

Enhancing accident intensity detection and tracking using IoT involves integrating advanced technologies to improve accuracy, speed, and response. Here's a roadmap for future enhancements:

Real-time Data Fusion: Incorporate data from multiple IoT sources such as vehicle sensors, traffic cameras, weather stations, and emergency service reports. Use machine learning algorithms to fuse this data for more accurate accident detection and severity assessment.

Predictive Analytics: Implement predictive analytics models to forecast potential accident hotspots based on historical data, traffic patterns, weather conditions, and other relevant factors. This can help preemptively deploy resources and alert drivers to potential hazards.

Sensor Fusion and AI: Combine data from various sensors like accelerometers, GPS, LiDAR, and cameras for a comprehensive understanding of the accident scene. Employ AI algorithms to analyze this data in real-time, distinguishing between minor incidents and severe accidents.

Edge Computing: Utilize edge computing devices installed in vehicles or roadside infrastructure to process data locally and reduce latency in accident detection and response. This can enable faster decision-making and communication with emergency services.

V2XCommunication: ImplementVehicle-to-Everything (V2X) communication protocols to enable vehicles to share information about accidents, road conditions, and hazards with each other and with infrastructure. This can facilitate collaborative accident detection and improve overall road safety.

Integration with Emergency Services: Develop seamless integration with emergency response systems, enabling automatic alerts to emergency services in the event of a severe accident. Include features such as automated notification of accident location, severity, and potential injuries to expedite response times.

Crowdsourced Data: Integrate crowdsourced data from mobile apps and connected vehicles to enhance accident detection and tracking. Engage with the community to report accidents, road closures, and other incidents in real-time, supplementing IoT sensor data.

Blockchain for Data Integrity: Employ blockchain technology to ensure the integrity and tamper-proof nature of accident data collected from various IoT devices. This can enhance trust in the accuracy of accident reports and streamline insurance claims processing.

User Feedback and Iterative Improvement: Gather feedback from users, emergency responders, and other stakeholders to continuously improve the system's accuracy, reliability, and usability. Employ agile development methodologies to iteratively enhance the platform based on real-world usage and evolving requirements.

Ethical and Privacy Considerations: Prioritize privacy and data security by implementing robust encryption, anonymization techniques, and access controls to protect sensitive information collected by IoT devices. Adhere to ethical guidelines and regulatory requirements governing the collection and use of personal data in accident detection systems.

10.REFERENCES

[1] Road accidents statistics in India. (2016).sites.ndtv.com.

[2] Road accidents in India.(2017).Indianexpress.com.

[3]An Introduction to the Internet of Things. (2016), ULLLC.

[4]The Internet of Things: An Overview. (2015).www.internetsociety.org.

[5] Manjesh, N. and Sudarshan Raj. (2014). Smart Helmet Using GSM & GPS Technology for Accident Detection and Reporting System. *International Journal of Electrical and Electronics Research,122-127.*

[6] Sreenithy Chandran, SnehaChandrasekar and Edna Elizabeth, N. (2016). Konnect: An Internet of Things (IoT) based Smart Helmet for Accident Detection and Notification. *IEEE Annual India Conference*(INDICON).

[7] Mohammed Khaja Areebuddin Aatif, Ainapurapu Manoj. (2017). Smart Helmet Based on IoT Technology. *International Journal for Research in Applied Science and Engineering Technology*,409-415.

[8] Prudhvi Raj, Sri Krishna Kanth, Ch. Bhargav Aditya, A. and Bharath, K. (2016).

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Smart-tec Helmet. *Advance in Electronic and Electric Engineering*,493-498.

[9] Manjesh, N. and Sudarshanraju. (2015). Safety measures for Two wheelersby Smart Helmet and Four wheelers by Vehicular Communication. *International Journal of Engineering Research and Applications,*15-20.

[10] Anshu Singh Gautam, Gulshan Kumar Dubey, Mayank Mishra and Mohita Prabhat. (2015). Smart Helmet System. *Journal of Emerging Technologies and Innovative Research*, Vol. 2 (4),1165-1168.