

Smart Bike Using IoT

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Abstract:- People use different vehicles and mean for commuting around the world, but motorcycles are the craziest vehicle used by the young generation. Among different commuting vehicles, motorcycles dominate the roads in many low- and middle-income countries and at the same time, there is a rapid increase in the injuries and deaths of riders. Recently in October 2022, the World Health Organization [WHO] and its partners launched an updated manual to help policymakers in ending the disaster of road traffic deaths and injuries involving motorcycles and other powered two- and three-wheelers. The report says nearly 30% of all road crash deaths involve powered two- and three-wheeled vehicles, such as motorcycles, mopeds, scooters, and electrical bikes (e-bikes), and the numbers are rising. Key risk factors for motorcycle traffic injuries include drivers not wearing helmets, overspeeding, rash driving, alcohol impairment, mixed traffic conditions, violation of traffic rules, a lack of protection from the vehicle in a crash, and a lack of safe infrastructure for such vehicles such as poor road surfaces and roadside hazards. The authors have proposed a 'smart bike' based on the use of new edge technologies such as IoT and a powered two-wheeled vehicle equipped with sensors, and an SoS alarming system to get help in emergencies. The Global Positioning System (GPS) has become an integral part of a vehicle system and its capabilities can be used to monitor and control the speed of a vehicle. Also, GPS will help to locate the vehicle in case of emergencies which will ensure in-time help of emergency service providers to save valuable human life.

Keywords:- Smart Bike and Estimation, IOT, Accident prevention, Safety Features, Ride Analysis.

I. INTRODUCTION

One of the main problems in rescue operations after accidents is the difficulty of locating victims in a timely and efficient manner. Traditional search methods can be time-consuming and ineffective, leading to delays in medical attention and potentially worsening the victim's condition. This problem can be addressed through the use of smart bikes equipped with accident detection technology that can quickly and accurately locate victims.

The use of smart bikes for rescue accident detection is interesting and important, as it has the potential to save lives and improve the efficiency of rescue operations. By quickly identifying the location of accident victims, rescue teams can provide medical attention more rapidly, which can significantly improve the chances of survival and reduce the severity of injuries.

Developing an effective accident detection system for smart bikes is a challenging task. Naive approaches, such as using basic sensors or relying on manual input, may not be accurate or reliable enough for rescue operations. The system must be designed to quickly and accurately detect accidents, even in challenging and dynamic environments, while minimizing false alarms and maintaining a high degree of usability.

Previously proposed solutions have primarily focused on developing dedicated rescue vehicles equipped with specialized accident detection technology. However, these solutions can be expensive and may not be feasible in all situations. My approach differs by utilizing smart bikes as a cost-effective and versatile alternative to dedicated rescue vehicles. Additionally, my approach will incorporate machine learning algorithms that can adapt to different types of accidents and environmental conditions, increasing the accuracy and reliability of the system.

The key components of my approach will include the integration of multiple sensors and data sources, such as GPS and accelerometers, to detect accidents and locate victims. Machine learning algorithms will be used to analyze sensor data and distinguish between accident events and normal biking activity. Results will be measured through the accuracy and speed of accident detection, as well as feedback from rescue teams and victims. Ultimately, the goal is to improve the efficiency and effectiveness of rescue operations and save lives. This paper's purpose is that it will help to detect accident detection for riders. Section 2 includes a literature survey and section 3 explains the proposed method. The results and discussion are elaborated on in section 4 whereas section 5 focuses on the conclusion and future work.

II. LITERATURE SURVEY

- "A Smart Bike with Accident Detection" by K. Rani and P. Rani, International Journal of Engineering Research and Applications, 2015. This paper proposes a smart bike system with accident detection using an accelerometer and GPS. When an accident occurs, an SMS is sent to the emergency contact with the location of the accident.
- "Intelligent bicycle accident detection system based on Internet of things" by Y. Liang and Y. Wang, 2017 IEEE International Conference on Applied System Innovation (ICASI).
- This paper proposes an intelligent bicycle accident detection system based on the Internet of Things (IoT). The system uses sensors and wireless communication to detect accidents and alert emergency services.
- "Smart Bicycle: An IoT-based System for Bicycle Sharing with Accident Detection" by S. Jana and S. Saha, International Journal of Advanced Research in Computer Science and Software Engineering, 2018. This paper proposes a smart bicycle system for bicycle sharing with accident detection using sensors and GPS. The system can detect accidents and notify emergency services.
- "Development of a Smart Bike System with Accident Detection and Alert Mechanism using Internet of Things" by M. N. Hossain et al., 2019 IEEE International Conference on Advanced Communication Technologies and Networking (CommNet). This paper proposes a smart bike system with accident detection and alert mechanism using the Internet of Things (IoT). The system uses sensors and GPS to detect accidents and notify emergency services.
- "Smart Bike System for Safety, Navigation and Monitoring" by S. Balaji and N. Nivedha, International Journal of Innovative Technology and Exploring Engineering (IJITEE), 2019.
- This paper proposes a smart bike system for safety, navigation, and monitoring using sensors and GPS. The system can detect accidents and notify emergency services.

- This sensor uses infrared signals. for example, if the driver’s eye is closed then the output will be high and vice versa.
- *Temperature Sensor:*
 - The temperature sensor that we are going to use in the device is LM35, which is a small and cheap IC.
 - This IC can measure the temperature between -55 to 150.
 - Alcohol Sensor:MQ-3 module is suitable for detecting Alcohol, CH4, Hexane, LPG, CO
- *Buzzer:*
 - A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric Accelerometer: Accelerometers detect the occurrence of the accident and then send the signal to the microcontroller for further process.
- *GPS Module:*
 - I. A GPS navigation device, GPS receiver, or simply GPS is a device that can receive information from GPS satellites. Then calculate the device’s geographical position.

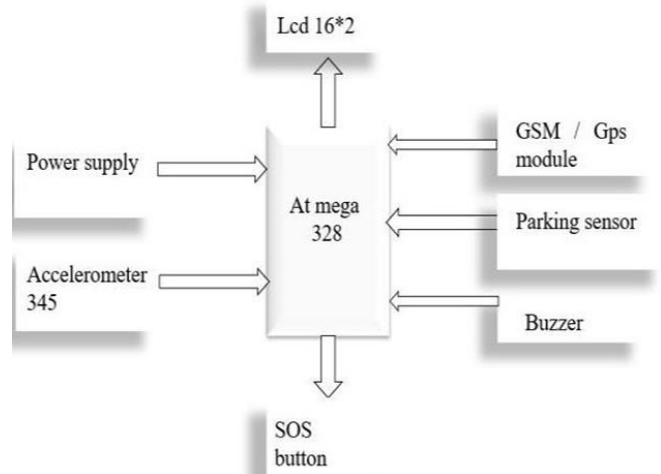


Fig 1 Block Diagram

III. PROPOSED METHOD DESCRIPTION

Today almost every electronic device needs a DC supply for its smooth operation, and they need to be operated within certain power supply limits. This required DC voltage or DC supply is derived from single-phase ac mains. A regulated power supply can convert unregulated AC (alternating current or voltage) to a constant DC (direct current or voltage). A regulated power supply is used to ensure that the output remains constant even if the input changes.

➤ *Eye Blink Sensor:*

- The Eye blink sensor is mainly used to sense the eye blink of the driver.

IV. CIRCUIT DIAGRAM

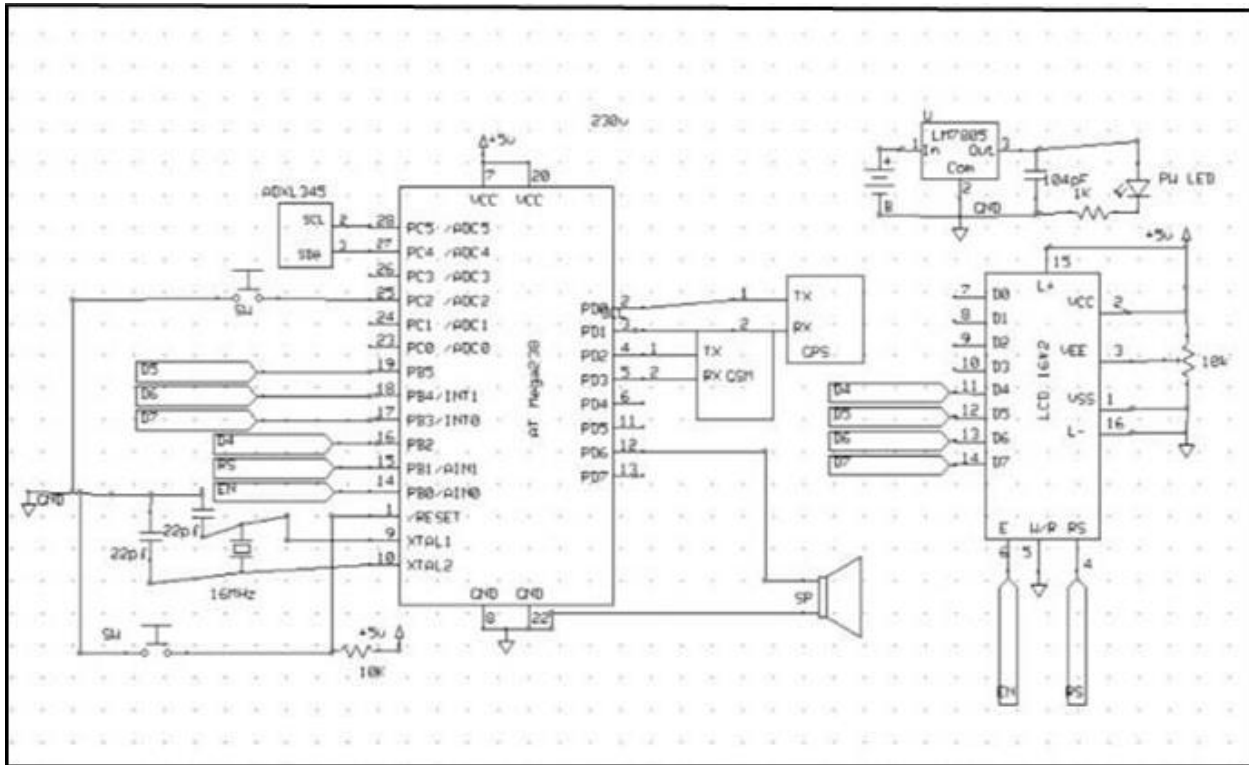


Fig 2 Circuit Diagram

V. WORKING

The smart bike for rescue accidental detection methodology involves the use of sensors and/or cameras on a bicycle to detect accidents or collisions. The sensors and cameras are capable of detecting sudden changes in speed or movement, impacts, or orientation changes, which are all indications of a possible accident. Once an accident is detected, the system sends an alert to the rider's smartphone or another device, which includes details of the location and severity of the accident. In some cases, the system can also automatically contact emergency services such as an ambulance or the police.

The methodology also involves addressing concerns related to privacy and data collection. To protect privacy, the system is designed to collect only the necessary data and store it securely. The system should also comply with relevant data protection regulations.

In conclusion, the smart bike for rescue accidental detection methodology involves the use of sensors and/or cameras on a bicycle to detect accidents or collisions and alert the rider or emergency services. The methodology involves identifying the appropriate sensors and cameras, integrating them into the bicycle frame, connecting them to a microcontroller or single-board computer, and testing the system under various conditions. Privacy and data collection concerns are also addressed to ensure that the system complies with relevant regulations.

VI. RESULTS AND DISCUSSIONS

Before creating the system for smart bikes using IOT, this model focuses on safety for riders through accidental detection. A smart bike with accident detection is a type of bicycle equipped with sensors and/or cameras that can detect accidents or collisions and alert the rider or emergency services. The sensors and cameras can detect sudden changes in speed or movement, impacts, or orientation changes, which are all signs of a possible accident. When an accident is detected, the smart bike can send an alert to the rider's smartphone or another device, which can include details of the location and severity of the accident. In some cases, the smart bike can also automatically contact emergency services, such as an ambulance or the police, to ensure a quick response.

Improved safety: Smart bikes can help prevent accidents by detecting potential collisions and alerting the rider to take action.

Quicker response times: By automatically alerting emergency services, smart bikes can help reduce response times in the event of an accident, potentially saving lives.

Data collection: Smart bikes can collect data on accidents, including location, time, and severity, which can help improve safety infrastructure and policies.

Peace of mind: Smart bikes can give riders peace of mind by providing an added layer of safety and protection.

As per the discussion system was also smart bikes with accident detection have the potential to significantly improve safety on the roads. One major concern is privacy, as smart bikes that collect data on accidents may raise privacy concerns, particularly if the data is shared with third parties. There are also concerns about the reliability of the sensors and cameras, as they may not always accurately detect accidents or collisions, which could lead to false alarms or missed alerts. Additionally, companies and authorities need to ensure that any data collected is stored and used responsibly, with the protection of privacy rights a top priority. Finally, all the conditions put in front of the system for testing the system successfully pass all the conditions.

VII. CONCLUSION AND FUTURE WORK

Smart bikes equipped with accident detection technology have the potential to significantly improve rescue operations after accidents. By quickly and accurately locating victims, rescue teams can provide medical attention more rapidly, increasing the chances of survival and reducing the severity of injuries. Developing an effective accident detection system for smart bikes is challenging, but can be achieved through the integration of multiple sensors and data sources, machine learning algorithms, and a focus on accuracy and reliability. The use of smart bikes for rescue accident detection is a cost-effective and versatile alternative to dedicated rescue vehicles, with the potential to save lives and improve the efficiency of rescue operations.

Future work on smart bikes for rescue accident detection could involve the development of more advanced sensor technology, refinement of machine learning algorithms, integration with emergency response systems, and expansion to other areas of emergency response such as delivery of emergency medical supplies or communication with first responders.

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