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Pram Dynamic Safety Helmet

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ABSTRACT

A smart helmet is a type of protective headgear used by the rider which makes bike driving safer than before. The main purpose of this helmet is to provide safety for the rider. This can be implemented by using advanced features like alcohol detection, accident identification, location tracking, use as a hands free device, fall detection. This makes it not only a smart helmet but also a feature of a smart bike. It is compulsory to wear the helmet, without which the ignition switch cannot turn ON. An RF Module can be used as wireless link for communication between transmitter and receiver. If the rider is drunk the ignition gets automatically locked, and sends a message to the registered number with his current location. In case of an accident it will send a message through GSM along with location with the help of GPS module. The distinctive utility of project is fall detection; if the rider falls down from the bike it sends a message

Keywords

Pram

Dynamic

Safety

Helmet

Impact resistance

Comfort

Ergonomic design

Lightweight

Durability

Adjustable fit

1. Introduction

In recent times helmets have been made compulsory in Telangana State. Traffic accidents in India have been increased every year. As per Section 129 of Motor Vehicles Act, 1988, every single person riding a two- wheeler is required to wear protective headgear following the standards of BIS (Bureau of Indian Standards). Also drunken driving under the influence (DUI) is a criminal offence according to the Motor Vehicle act 1939, which states that the bike rider will get punishment. Currently bike riders easily escape from the law. These are the three main issues which motivates us for developing this project. The first step is to identify whether the helmet is worn or not. If helmet is worn then ignition will start otherwise it remains off. For this, Force Sensing Sensor (FSR) sensor is used. The second step is alcohol detection.lcohol sensor is used as breath analyser which detects the presence of alcohol in rider's breath and if it exceeds permissible limit ignition cannot start. It will send message to the number saying that "Rider is drunk and is trying to ride the bike". MQ-3 sensor is used for this purpose. When these two conditions are satisfied then only ignition starts. The third main issue is accident and late medical help. If the rider has met with an accident, he may not receive medical help instantly, which is one of the main reasons.

2. Methodology

The methodology for developing a dynamic safety helmet, such as the Pram Dynamic Safety Helmet, typically involves several key steps including research, design, prototyping, testing, and refinement. Here's a general outline of the methodology that might be followed:

1. **Research and Analysis**:

Identify existing safety standards and regulations related to helmets, such as those set by organizations like ANSI (American National Standards Institute) or EN (European Norms).Analyze existing helmet designs and their strengths and weaknesses. Conduct market research to understand user needs, preferences, and pain points.

2. **Conceptualization and Design**:

Generate design concepts based on research findings and identified user needs.

Use computer-aided design (CAD) software to develop detailed designs incorporating safety features, comfort elements, and aesthetics.

Consider materials that provide both protection and comfort, such as impact-resistant plastics and padding materials.

3. **Prototyping**:

Create prototypes of the helmet designs using rapid prototyping techniques like 3D printing or CNC machining. Test initial prototypes for fit, comfort, and basic safety features. Iterate on designs based on feedback from prototype testing.

4. **Safety Testing**:

Conduct rigorous safety testing to ensure the helmet meets or exceeds applicable safety standards. Test for impact resistance, penetration resistance, stability, and other relevant factors. Utilize specialized equipment such as drop towers and impact simulators for controlled testing.

Consider testing in various environmental conditions to ensure performance across different scenarios.

5. **User Testing**:

Recruit users ```to test the helmet prototypes in real-world scenarios. Gather feedback on comfort, fit, usability, and overall satisfaction. Use feedback to make adjustments to the design as necessary.

6. **Refinement and Finalization**:

Incorporate feedback from safety and user testing into final design revisions. Finalize materials, finishes, and manufacturing processes. Ensure that the helmet design is optimized for mass production, considering factors like cost-effectiveness and scalability.

Manufacturing and Quality Control:

Select manufacturing partners capable of producing the helmet to the required specifications.

Implement quality control measures to maintain consistency and ensure each helmet meets safety standards.

Establish supply chain processes to source materials and components reliably.

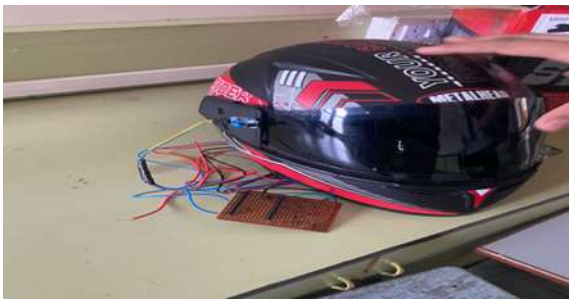
7. **Launch and Distribution**:

Develop marketing materials and strategies to promote the helmet's launch. Identify distribution channels to make the helmet accessible to consumers. Provide training and support to retailers and distributors as needed.

8. **Post-launch Evaluation and Continuous Improvement**:

Monitor customer feedback and safety performance post-launch. Address any issues that arise through post-launch updates or product recalls if necessary.

Continuously iterate on the design based on user feedback and advancements in technology.



3. Working

A smart helmet is a technologically enhanced helmet designed to provide additional features beyond traditional head protection. The specific functionalities may vary depending on the purpose and design of the smart helmet, but here are some common features and technologies often integrated into smart helmets:

- Head Protection:

Smart helmets maintain the primary function of traditional helmets, providing protection to the head in case of accidents or collisions.

- Communication Systems:

Many smart helmets come equipped with communication systems, including built-in microphones and speakers. This allows users to make hands-free calls, communicate with others in a group (especially useful for motorcyclists or team-based activities), and even use voice commands to control other features.

- Heads-Up Display (HUD):

Some smart helmets incorporate a heads-up display that projects information onto a transparent screen in the wearer's field of vision. This can include navigation directions, speed, and other relevant data without the need for the user to look away from their environment.

- Connectivity:

Smart helmets often feature Bluetooth or other wireless connectivity options. This enables seamless integration with smartphones, GPS devices, and other devices, allowing users to access calls, messages, or navigation information without removing the helmet.

- Integrated Cameras:

Some smart helmets include built-in cameras that can record videos or capture photos. This can be useful for recording experiences during activities such as biking, motorcycling, or extreme sports.

- Sensors:

Various sensors may be integrated into smart helmets, such as accelerometers, gyroscopes, and GPS. These sensors can provide data on speed, location, and movement, enhancing safety features and allowing for performance tracking.

- Augmented Reality (AR):

Advanced smart helmets may incorporate AR technology to overlay digital information onto the real world. This can be used for navigation prompts, displaying relevant data, or even enhancing the user's perception of their surroundings.

- Impact Detection and Alerts:

Some smart helmets include impact sensors that can detect if the wearer has been involved in a collision. In such cases, the helmet may send alerts to emergency contacts or emergency services, providing crucial information about the incident.

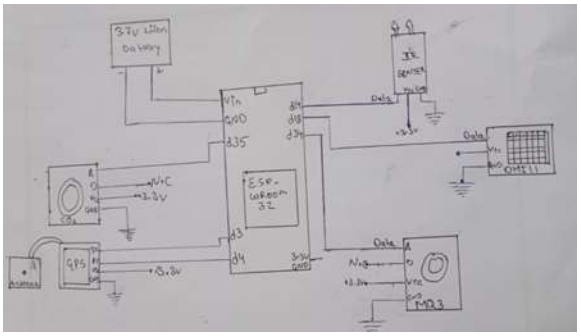
- Adjustable Ventilation and Comfort Features:

Certain smart helmets have adjustable ventilation systems and comfort features. These can include fans, heating elements, or adaptive padding to enhance the overall comfort of the helmet.

- Battery and Charging:

Smart helmets come with built-in batteries to power the various electronic components. They usually have USB ports or wireless charging capabilities for recharging the battery.

The specific features and technologies integrated into a smart helmet can vary widely based on its intended use, whether for motorcycling, cycling, sports, or industrial applications. The goal is to enhance safety, communication, and overall user experience.



4. Scope Of Project

The Specific Scope Will Depend On The Intended Use Case, Whether It's For Motorcycling, Cycling, Industrial Work, Sports, Or Any Other Application. It's Crucial To Consider User Needs, Safety Regulations, And Technological Feasibility When Defining The Scope Of Your Smart Helmet Project.

The future scope of smart helmets is dynamic, and ongoing advancements in technology will likely open up new possibilities and applications. Researchers, engineers, and industry professionals will play a crucial role in shaping the future development of smart helmet technology.

1. Enhanced Safety Features:

Integration of advanced sensors for real-time monitoring of environmental conditions, potential hazards, and biometric data.

Development of AI-driven accident prediction and prevention systems.

2. Communication and Connectivity:

Improvement of communication systems within smart helmets for seamless interaction with other devices, vehicles, and smart infrastructure.

Integration of 5G technology for faster and more reliable connectivity.

3. Augmented Reality (AR) and Virtual Reality (VR) Integration:

Expansion of AR capabilities for navigation, heads-up displays, and enhanced situational awareness.

VR integration for immersive training scenarios or entertainment during idle times.

4. Health Monitoring and Emergency Response:

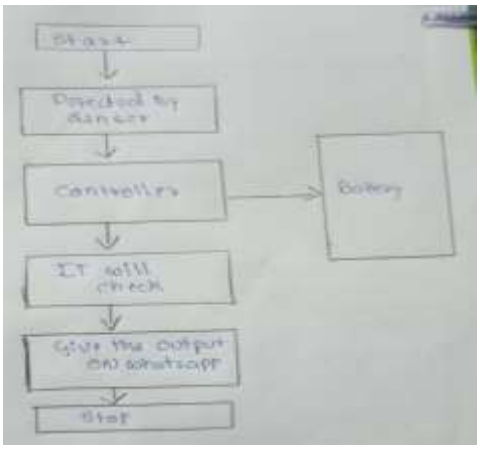
Implementation of health monitoring features, including heart rate, temperature, and fatigue detection.

Integration with emergency response systems to automatically alert authorities or contacts in case of accidents.

5. Customization and User Experience:

Development of modular smart helmet systems allowing users to customize features based on their preferences and needs.

Focus on user-friendly interfaces and controls to enhance overall user experience.



5. Conclusion

In conclusion, a smart helmet designed for motorcycle safety represents a groundbreaking innovation in the realm of rider protection and overall riding experience. By integrating advanced technologies and features, these helmets contribute significantly to enhancing safety, situational awareness, and communication for motorcyclists. The culmination of various elements makes smart helmets a valuable asset in the following ways:

Improved Safety: Smart helmets with collision warning systems, head-up displays, and integrated cameras contribute to a safer riding experience by alerting riders to potential dangers, enhancing visibility, and providing evidence in case of accidents.

Enhanced Connectivity: Bluetooth connectivity and helmet-to-helmet communication systems enable riders to stay connected while keeping their hands on the handlebars, reducing distractions and promoting safer riding practices.

Navigation and Awareness: The integration of GPS navigation and real-time traffic updates directly onto the helmet's display minimizes the need for riders to divert their attention from the road, fostering better route planning and situational awareness.

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