Smart safety system for motorcyclists using Arduino

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One of the most common and deadly traffic accidents is a motorcycle accident, which is frequently brought on by reckless overtaking and drunk driving. These mishaps may result in fatalities, serious injuries, or financial hardships for families. This project presented a smart cyclists' safety system that combines automatic alert and proactive hazard identification to address these problems. The primary objective was to reduce accidents by increasing rider awareness and enforcing safety regulations. Detecting alcohol use before ignition, monitoring overtaking risks with proximity sensors and rear–facing cameras, and sending out real-time accident notifications to prevent crashes using fall detection and GSM notification are some of the specific goals. The system incorporated sensors into a bike and a helmet. Before starting the bike, it used a gas sensor to detect alcohol and confirmed that the helmet is being worn. The system turned off the ignition if alcohol is detected. Proximity sensors detected surrounding cars during the ride and displayed relevant alerts. When an accelerometer detected unusual motion in the event of an accident, a GSM module initiated an emergency call. To verify accuracy and responsiveness, components were tested in both simulated and real–world settings. The prototype accurately delivered proximity warnings, confirmed helmet use, and recognized the presence of alcohol with high reliability (tested using sanitizer vapour). In the event of an accident, the fall detection system successfully initiated automated calls to pre-specified contacts. Together, these characteristics provided safe riding conditions and quick emergency response. The designed technology offered a dependable and reasonably priced solution to enhance motorcycle safety. Its real-time emergency notifications and risk detection capabilities supported accident prevention and post-incident management. System performance can be improved, and wider adoption can be encouraged with more improvements and user testing.

Keywords: Accident detection; Arduino; Motorcycle safety; Real-time

Underlined is the presenting author.