



FEASIBILITY OF USING ARDUINO IN DEVELOPING SMART HELMET WITH THE CRASH DETECTION AND EMERGENCY ALERT SYSTEM

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ABSTRACT

This study focused on the design and development of a smart helmet prototype using Arduino technology to address the critical need for rapid emergency notification following a rider accident. Traditional helmets provide physical protection but lack a mechanism to alert others when a rider is unable to call for help. To overcome this, the study aimed to design and develop a functional prototype that automatically detects a crash and triggers emergency communication using SMS and calling only.

The researchers designed and developed a functional smart helmet prototype utilizing components such as Arduino, an accelerometer/gyroscope sensor (MPU6050), a GSM module (SIM800L), a buzzer, and a lithium battery. The system was programmed to continuously monitor motion patterns. Upon detecting a crash-like impact, it automatically sends an SMS and places a voice call to a predefined emergency contact number. The prototype was tested in controlled simulations to assess its detection accuracy, communication reliability, and response time.

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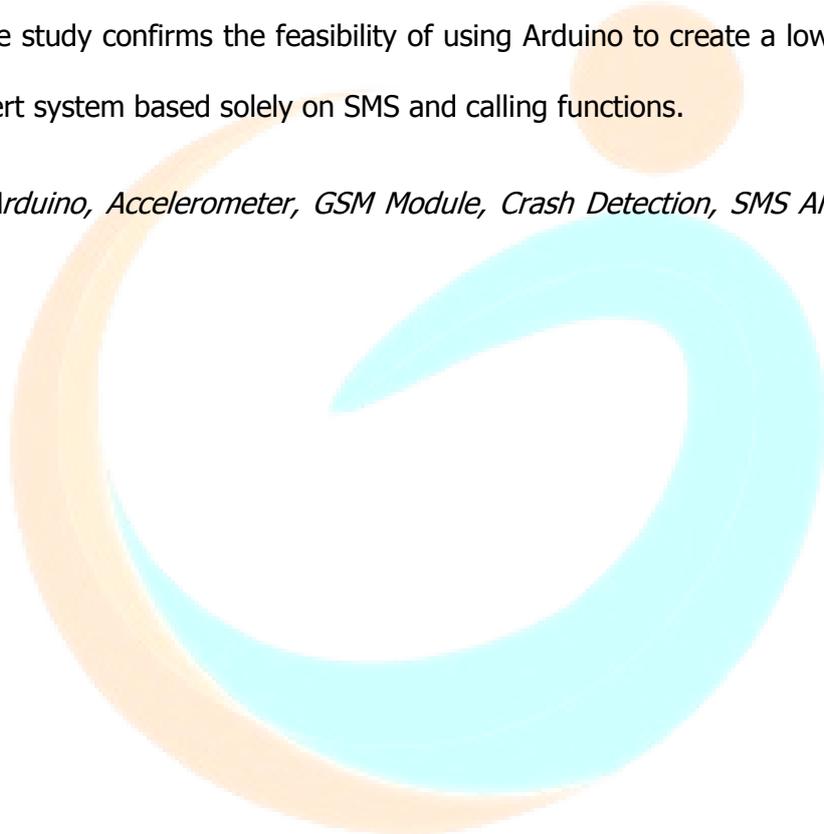
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The testing results revealed that the prototype successfully detected simulated crash events and reliably initiated both SMS and voice call alerts. The system demonstrated a practical approach to ensuring immediate notification without GPS. Key limitations identified include dependence on cellular network availability, the potential for false positives from non-crash vibrations, and the need for manual contact number configuration. Despite these challenges, the study confirms the feasibility of using Arduino to create a low-cost, effective emergency alert system based solely on SMS and calling functions.

Keywords: *Arduino, Accelerometer, GSM Module, Crash Detection, SMS Alert, Emergency Call*



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