

## **ABSTRACT**

*The purpose of this research is to design and develop a smart helmet system equipped with a blind spot detection feature using ultrasonic sensors to improve safety while riding. This system integrates two HC-SR04 ultrasonic sensors to detect objects around the rider, an MPU-6050 accelerometer to measure speed, and an Arduino UNO R3 as the main microcontroller, resulting in a system that can monitor blind spot areas. The helmet software is designed using if-else logic programming, therefore the buzzer will only activate under certain conditions considered dangerous, such as when an object approaches within a specific distance and the motorcycle is moving at a high speed. This is intended to prevent the alarm from activating when the vehicle is stopped, such as during traffic jams, which could disturb the rider. The stages of this research include device design, program code writing, calibration of all sensors, and testing the helmet in a campus environment. Based on the test results, the system has been proven to give accurate warning signals when objects are detected in the blind spot area. With these results, the smart helmet is expected to help reduce the risk of traffic accidents, especially for motorcycle riders, and become an affordable safety technology solution.*

**Keywords:** *Smart Helmet, Blind Spot, Sensor Ultrasonic HC-SR04, Sensor Accelerometer MPU-6050, Driving Safety.*