ABSTRACT

The mosque charity box is often targeted for theft due to its conventional security system. Therefore, this research aims to design a security system based on the SW-420 vibration sensor and the SIM 800L module to enhance the security of mosque charity boxes. The system operates by detecting vibrations when the charity box is moved, which then triggers a buzzer alarm and sends an automatic Telegram notification to mosque administrators. Additionally, the system is equipped with a Neo-6M GPS module to track the real-time location of the charity box. The research methodology includes hardware and software design, sensor integration, and comprehensive system testing. The main hardware components consist of the NodeMCU ESP-32 as the microcontroller, the SW-420 vibration sensor, an ultrasonic sensor, a buzzer, the SIM 800L module, and the Neo-6M GPS module. Testing was conducted to measure the effectiveness of the sensors in detecting position changes and vibrations, as well as the system's response speed in sending notifications. The test results indicate that the system operates with high accuracy. The SW-420 vibration sensor reliably detects "vibration" and "static" conditions without errors. The Neo-6M GPS module demonstrated an average accuracy of 7.84 meters across multiple test locations. Notifications sent via SIM 800L were also proven effective and received promptly. With the buzzer as a local alarm feature, the system enhances environmental awareness of potential theft. The designed security system successfully meets the security needs of mosque charity boxes with good accuracy and has the potential for widespread implementation to reduce criminal activity in places of worship. Further development can be carried out by integrating this system with a cloud-based IoT platform for more advanced and efficient monitoring.

Keywords **:** *Security system, Internet of Things (IoT), ESP-32, Sensor, Neo-6M GPS Module, SIM 800 L*