ABSTRACT

Agricultural land management still relies on traditional methods, which significantly impact crop productivity, especially in terms of pest control, such as birds and rats, which are major threats to rice plants. Farmers often use natural methods, such as scarecrows, to frighten away sparrows. This study proposes the development of an Internet of Things (IoT)-based system to address these pest problems. The system employs ultrasonic and PIR sensors to detect objects and trigger the movement of a scarecrow via a servo motor, as well as transmit data using RF modules to send information to a web-based monitoring system. The analysis includes measuring distance, detection angles, and the accuracy of displayed information to evaluate Quality of Service (QoS) parameters. Test results show that the ultrasonic sensor can detect objects within a range of 2 cm to 20 cm, while the PIR sensor can detect heat-emitting objects within the same range, regardless of angle. The RF transmitter and receiver modules can communicate effectively within a range of 20 to 200 meters, with data being transmitted efficiently. The QoS of communication between the NodeMCU and the website shows stable results, with an average throughput of 1500.5 Kbps, latency of 0.000124697 seconds, jitter of 0.00001262 seconds, and a packet loss rate of 2.795%. These findings demonstrate that the IoT-based scarecrow control system can enhance pest management efficiency and support agricultural productivity.

Keywords: *scarecrows*, *Internet of Things* (IOT),*Agricultural, pest,Quality Of Service(QOS)*