

ABSTRACT

The maintenance of white rats (Rattus norvegicus) as reptile feeder animals requires an efficient system for automated feeding and cage condition monitoring. Manual procedures are considered less stable and may lead to delays and inconsistencies. This study aims to design and develop a prototype of an automatic feeding and monitoring system based on the Internet of Things (IoT) to support the optimal development of laboratory rats. The system was built using an ESP32 microcontroller, a DHT22 temperature sensor, an HC-SR04 ultrasonic sensor, and an SG90 servo motor, all integrated with the Blynk application as a monitoring and control interface. The research method includes hardware and software design, sensor accuracy testing, system latency evaluation, and actuator performance assessment. Results show that the sensors operate within acceptable accuracy limits (<5%), but the Blynk cloud connectivity produced an average latency of 487ms, which exceeds the real-time threshold based on ITU-T G.114 standards. Nevertheless, the system is considered effective for non-critical applications due to its ability to improve operational efficiency, consistency, and enable remote automatic monitoring of cage conditions.

Keywords: *Internet of Things, Automatic Feeding, Temperature Monitoring, Rattus Norvegicus, Blynk Application.*