ABSTRACT

This Final Task discusses the design and implementation of an IoT-based animal behavior monitoring and classification system using accelerometer sensors and machine learning algorithms. The system is designed to monitor key animal activities such as standing, sitting, and sleeping in real-time using accelerometer data, which is processed to reduce noise using the window moving avarage. Several machine learning models, including Random Forest, K-Nearest Neighbors (KNN), Support Vector Machine (SVM), and Extreme Gradient Boosting (XGBoost), are evaluated to determine the best algorithm for classifying animal activities. The system is implemented on an ESP32 Mini C3 microcontroller integrated into the Internet of Things (IoT) framework, enabling real-time data transmission via Wi-Fi to a web-based dashboard. The testing results show that the Random Forest algorithm provides the highest classification accuracy, exceeding 90%, with minimal latency, making it an effective solution for automatic and efficient animal behavior monitoring. This study highlights the potential of using IoT technology and machine learning to enhance efficiency and productivity in modern livestock management.

Keywords: IoT, accelerometer, real-time monitoring, animal behavior classification, machine learning, precision farming