

## ABSTRACT

Indoor humidity instability in homes in Indonesia can have negative impacts on occupants' health. To address this issue, the Capstone project developed an Internet of Things (IoT) based product using the DHT22 sensor to accurately measure room humidity and temperature. The data is processed using a Decision Tree algorithm to determine the ideal humidity level and control the humidifier or dehumidifier accordingly. Additionally, the product is connected to a mobile application, enabling users to remotely monitor and control room humidity. This smart and efficient solution offers a remedy to the indoor humidity problem in Indonesia.

The Capstone project developed an IoT-based room humidity control system to tackle the issue of unstable humidity in homes in Indonesia's tropical climate. The system employs the DHT22 sensor to measure room humidity and temperature. The Decision Tree algorithm is utilized to classify humidity levels and predict the time to achieve the ideal conditions. The system automatically controls the humidifier and dehumidifier to reach the desired humidity level while granting users the ability to monitor and adjust room humidity through a mobile application. This solution provides a comfortable and optimal indoor environment in tropical regions like Indonesia.

The research encompasses testing an automated humidity and temperature control system using the DHT22 sensor and Decision Tree Classification algorithm. The results indicate that all components operate smoothly without any leakage. Linear regression was conducted to enhance the accuracy of the DHT22 sensor, with an average humidity data difference of 8.50% RH and temperature data difference of 4.73°C. The Automatic Humidity Control achieved an average delay of 1.25745 seconds, with a Decision Tree Classification algorithm accuracy of 0.9976 and a Decision Tree Regression algorithm error of 0.36. The API-based system connects seamlessly with Firestore in real-time, and the mobile application successfully passed the Alpha and Beta testing phases. With these positive outcomes, the system is ready for efficient implementation to address indoor humidity issues in Indonesia.

**Keywords:** Indoor humidity, Internet of Things (IoT), DHT22 sensor, Decision Tree algorithm, mobile application, occupants' health.