

**Penerapan LSTM Pada Sistem IOT Untuk Prediksi Penyiraman Otomatis
Bonsai Sancang** *(Implementation of LSTM in an IoT System for Automatic
Irrigation Prediction of Sancang Bonsai)*

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ABSTRACT

Sancang Bonsai (Premna microphylla) requires proper soil moisture management to achieve optimal growth. Inappropriate irrigation may cause drought stress or root rot, which can negatively affect plant health. This study aims to develop an ESP32-based Internet of Things (IoT) system with the implementation of the Long Short-Term Memory (LSTM) method to predict automatic irrigation requirements for Sancang Bonsai. The system utilizes a soil moisture sensor, DHT22 sensor, and rain sensor to collect real-time environmental data, which are then stored in Firebase and displayed through a monitoring website.

The LSTM model was trained using historical data with intervals of 2, 4, 6, 8, and 10 minutes. The training results showed that the 4-minute interval achieved the best performance, with an accuracy of 99.59% and a weighted F1-score of 99.59%. The developed system is capable of monitoring environmental conditions, controlling automatic irrigation, and operating an automatic roof-cover mechanism when rainfall is detected. The results indicate that the implementation of LSTM in an IoT system can help maintain optimal environmental conditions for Sancang Bonsai more effectively while reducing dependence on manual irrigation practices.

Keywords: *IoT, LSTM, ESP32, Sancang Bonsai, Automatic Irrigation, Soil Moisture Prediction.*