



**UNDERGRADUATE THESIS**

**IMPLEMENTATION OF INTERNET OF THINGS  
AND TYPE-2 FUZZY LOGIC FOR AUTOMATED  
TEMPERATURE AND HUMIDITY CONTROL IN  
OYSTER MUSHROOM CULTIVATION HOUSES**

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2026**

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## ABSTRACT

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Oyster mushroom cultivation requires stable temperature and humidity conditions, while environmental control is still commonly performed manually. This research aims to implement an Internet of Things (IoT) system and Interval Type-2 Fuzzy Logic for automated temperature and humidity control in a mini oyster mushroom cultivation chamber.

The system was developed using an ESP32 microcontroller, SHT31 sensor, intake fan, exhaust fan, peltier module, and PTC heater. Monitoring was conducted through the Blynk mobile application, while experimental data were automatically stored using spreadsheets for data logging.

Testing was carried out using the cold start method under morning, afternoon, and night conditions, as well as disturbance conditions such as WiFi Off, PLN Off, and WiFi & PLN Off. The results showed that the system was able to achieve the temperature set point of 26°C and humidity set point of 85% within approximately 4–5 minutes during morning and night tests, and 7–8 minutes during afternoon tests. The system also obtained a Mean Absolute Error (MAE) of 0.0638°C for temperature and 0.1433% for humidity.

Based on the test results, the designed system was able to control temperature and humidity automatically and stably according to the defined set point values.

**Keywords:** Internet of Things, Interval Type-2 Fuzzy Logic, ESP32, Oyster Mushroom Chamber, Temperature and Humidity Control.

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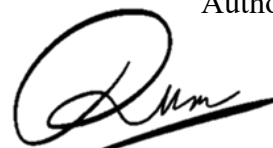
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Surabaya, 06 May 2026

Author,



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