

ABSTRACT

The need for an automatic plant watering system is important, especially in areas with limited water supply such as in Purbalingga Regency. This study aims to design an automatic plant watering system based on the Internet of Things with the Fuzzy Sugeno algorithm. The system is designed using various sensors, including soil moisture sensors, temperature, soil pH, and water flow sensors, which are controlled by an ESP32 microcontroller and connected to the Arduino IoT Cloud platform. Data collected from the sensors is processed in real-time to determine the duration and intensity of watering needed by plants automatically. Using the fuzzy algorithm allows the system to adjust water needs based on changing environmental conditions. The test results show that water usage and the system can also be controlled and monitored via mobile devices in real-time. Therefore, using an automatic plant watering system based on the Internet of Things with the fuzzy sugeno algorithm can reduce water waste and provide convenience for farmers in managing watering intelligently. In this study, the Soil Moisture sensor is used to detect soil moisture levels, the DHT11 sensor for air temperature, the soil pH sensor to measure soil acidity levels, and the waterflow sensor to measure the rate of water used. This system generates watering decisions based on a combination of these inputs through Sugeno fuzzy logic. Testing was carried out on tomato plants that have certain water requirements and pH levels in order to grow optimally. The test results show that this automatic watering system has been tested for five consecutive days, namely from May 25 to 29, 2025, with testing twice a day in the morning and evening to see the system's response to different environmental conditions, and the system records the water discharge used for watering plants for five days using a waterflow sensor with an accumulation method according to the active growth phase that requires higher humidity, in line with the system's goal of making water use effective according to the duration and needs of the plant.

Keywords: *Internet of Things, fuzzy sugeno, automatic watering, Soil Moisture, Arduino Cloud.*