ABSTRAK

Sistem *Ventilating and Air Conditioning* (VAC) merupakan komponen penting pada bangunan modern, menyediakan kondisi dalam ruangan yang nyaman dan sehat. Tugas Akhir ini akan membahas point utama sistem VAC dan kontrol nya. Mengeksplorasi bagaimana sistem VAC mengatur kualitas udara, suhu, dan kelembapan, memastikan kondisi optimal bagi penghuninya. System VAC mengontrol ventilasi yang baik dalam suatu ruangan dan pengatur kelembapan udara ruangan.

Pada penelitian ini membahas tentang kontrol kondisi VAC pada ruangan dengan *microcontroller* ESP32 bebasis *Internet of Things* (IOT). Pada rancangan kontrol ini menggunakan sensor suhu dan kelembaban DHT22 dan sensor pendeteksi asap MQ2, dan terdapat relay sebagai penghubung beban dan fasilitas *integrasi* kontrol alarm dimana nantinya akan digunakan sebagai kontrol terhadap sistem *pneumatic tube*.

Pada hasil pengujian didapatkan data pembacaan suhu dan humidity cukup sensitive di sensor DHT22 dengan perbandingan rata rata galat pengukuran sushu di 2.96% dan untuk humidity di 4.35%, perbandingan yang dilakukan antara sensor DHT22 dengan alat ukur *hygrometer*. Dan didapatkan perbandingan hasil kontrol *humidity* lebih stabil dengan adanya penambahan udara segar untuk menjaga kelebaban udara di angka 40-70%.

Kata kunci : Humidity , IoT , ESP 32, VAC, Pneumatic Tube System

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ABSTRACT

Air Ventilation Systems (VAC) are an important component of modern buildings, providing comfortable and healthy indoor conditions. This final assignment will discuss the main points of the VAC system and its control. Explore how VAC systems regulate air quality, temperature and humidity, ensuring optimal conditions for occupants. VAC system is control importance of good ventilation in a room and controlling room air humidity.

This research discusses controlling VAC conditions in rooms with an IoT-based ESP32 microcontroller. This control design uses a DHT22 temperature and humidity sensor and an MQ2 smoke detection sensor, and there is a relay as a load connector and an alarm control integration facility which will later be used to control the pneumatic tube system.

In the test results, it was found that the temperature and humidity reading data was quite sensitive on the DHT22 sensor with a comparison of the average error for temperature measurements at 2.96% and for humidity at 4.35%, a comparison made between the DHT22 sensor and a hygrometer measuring instrument. And a comparison of the humidity control results was found to be more stable with the addition of fresh air to maintain humidity in the range of 40-70%.

Keywords : Humidity , IoT , ESP32, VAC , Pneumatic Tube System