Rancang Bangun Sistem Komunikasi Data Berbasis CoAP pada Sistem Monitoring Kenyamanan Termal dan
Visual Ruang Klinik Berbasis IoT
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RANCANG BANGUN SISTEM KOMUNIKASI DATA BERBASIS CoAP PADA SISTEM MONITORING KENYAMANAN TERMAL DAN VISUAL RUANG KLINIK BERBASIS IoT

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INTISARI

Salah satu aspek yang berpengaruh terhadap penghuni suatu bangunan adalah *Indoor Environmental Quality* (IEQ). Seiring kemajuan teknologi, sistem *monitoring* dan manajemen bangunan telah banyak dikembangkan, seperti *Building Management System* (BMS) berbasis *Internet of Things* (IoT). Agar performa sistem monitoring bangunan berbasis IoT baik, diperlukan desain perangkat dan protokol komunikasi data yang tepat. Penelitian ini mengimplementasikan *Constrained Application Protocol* (CoAP) untuk pengiriman data *monitoring* kenyamanan termal dan visual ruang klinik di Rumah Sakit Gigi dan Mulut Universitas Muhammadiyah Yogyakarta (RSGM UMY).

Sistem komunikasi data berbasis CoAP dirancang bangun dengan menggunakan modul NodeMCU berbasis ESP8266 untuk mengakuisisi data sensor dan mengirim data tersebut ke server melalui jaringan internet. Dilakukan uji keandalan dengan menghitung baris data yang berhasil diterima oleh server, uji *real time* sistem dengan pencatatan selisih waktu kirim dan terima data akuisisi sensor, serta analisis hasil pengujian untuk mengetahui performa keandalan dan *real time* sistem komunikasi data menggunakan CoAP.

Hasil pengujian menunjukkan bahwa sistem komunikasi data berbasis CoAP pada sistem *monitoring* kenyamanan termal dan visual ruang klinik yang dirancang bangun dapat mengirim data akuisisi sensor dari *nodes* ke server dan menyimpan data tersebut ke dalam *database* dengan performa keandalan sebesar 99,84% dan rata-rata latensi sebesar 657,80 milidetik.

Kata kunci: *Internet of Things* (IoT), *Building Management System* (BMS), *Constrained Application Protocol* (CoAP), NodeMCU ESP8266

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DESIGN OF A CoAP-BASED DATA COMMUNICATION SYSTEM FOR A CLINIC ROOM THERMAL AND VISUAL COMFORT MONITORING SYSTEM BASED ON IoT

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ABSTRACT

One aspect that affects the occupants of a building is the Indoor Environmental Quality (IEQ). As technology advances, many building monitoring and management systems have been developed, such as the Internet of Things (IoT)-based Building Management System (BMS). In order for the performance of the IoT-based building monitoring system to be good, it is necessary to design the right device and data communication protocol. This study implements the Constrained Application Protocol (CoAP) for sending thermal and visual comfort monitoring data in clinical rooms at the Dental and Oral Hospital, University of Muhammadiyah Yogyakarta (RSGM UMY).

The CoAP-based data communication system is designed to use the NodeMCU module based on the ESP8266 to acquire sensor data and transmit the data to a server via the internet network. The reliability test was carried out by counting the rows of data that were successfully received by the server, the real time system test was carried out by recording the difference between the sending and receiving time of sensor acquisition data, and analyzing the test results to determine the reliability and real time performance of data communication system using CoAP.

The test results show that the CoAP-based data communication system in the thermal and visual comfort monitoring system of the clinical room which is built can send sensor acquisition data from nodes to the server and store the data into a database with 99.84% reliability performance and real-time performance with an average delay or latency of 657.80 milliseconds.

Keywords: Internet of Things (IoT), Building Management System (BMS), Constrained Application Protocol (CoAP), NodeMCU ESP8266

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