Rancang Bangun Sistem Monitoring dan Kendali Generator Set Menggunakan Internet of Things (IoT) Berbasis LoRaWAN = Design and implementation of Genset Monitoring and Control System Using LoRaWAN-based IoT

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Abstrak

Generator Set yang sering di singkat menjadi genset, merupakan sebuah alat yang berfungsi untuk menghasilkan energi listrik dari beragam jenis bahan bakar. Penggunaan genset biasanya diperlukan ketika terjadinya pemadaman saluran listrik atau ketika ada kebutuhan listrik di tempat terpencil yang tidak terjangkau distribusi listrik negara. Kemampuan untuk mengawasi kondisi genset serta mengoperasikan genset dari jarak jauh dapat menjadi hal yang penting dan memudahkan pengoperasian genset terebut. Pada skripsi ini, telah dilakukan rancang bangun sistem untuk mengendalikan genset dan mengawasi parameter genset yang berupa suhu, level bahan bakar, tegangan aki, serta tegangan yang dihasilkan genset. Dari hasil penelitian telah didapatkan bahwa sistem dapat menyalakan dan mematikan genset melalui protokol komunikasi LoRaWAN melalui antares. Dari penelitian didapatkan bahwa sensor AC memiliki persentase kesalahan sebesar 7,9%, sensor DC sebesar 9,02%, sensor suhu sebesar 11,11%, dan sensor ultrasonik sebesar 13,79%. Dari penelitian didapatkan juga parameter transmisi SNR dan juga RSSI telah bernilai di dalam batas rentang yang dapat diterima LoRa dengan nilai SNR terkecil sebesar -18,5 dB dan terbesar 5 dB dan nilai RSSI terkecil sebesar -120 dB dan tertinggi -106 dB. Diperoleh juga delay dengan rata-rata sebesar 0.248 detik.

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A generator set which is also known as a genset is a device that can produce electricity by consuming various kinds of fuel. Genset is commonly used in places where there is no access to electricity, be that because of a power outage or because of an isolated location that has no access to electricity. The ability to monitor and operate genset from afar might be a useful tool to simplify the maintenance and usage of genset over a distance. In this thesis, the writer has designed and implemented a prototype of a device that can monitor and operate genset from afar using Internet of Things (IoT) with LoRaWAN and Antares as its method of communication. The device was tested and connected with a genset and has the capability to turn a genset on and off again through a phone application connected to the internet. The device also has the capability of observing several parameters which are temperature, fuel level, genset’s battery voltage, and the genset’s output voltage itself. From the measured data it is obtained that the AC voltage sensor has an inaccuracy of 7,9%, the DC voltage sensor has an inaccuracy of 9,02%, the temperature sensor has an inaccuracy of 11,11%, and the ultrasonic sensor has an inaccuracy of 13,79%. The result from measurement shows that SNR has a minimum of -18,5 dB and maximum value of 5 dB and that RSSI has a minimum value of -120 dBm and maximum value of -106 dB, both of those parameters barely fulfill the threshold range required by LoRa. The delay also has an average of 0.248 seconds.