

ABSTRACT

The increase of households in Indonesia will be in line with the increasing demand for energy use in Indonesia that surely has a negative impact for the availability of energy in the future. Efforts to reduce energy use are needed to overcome these problems.

Gamification comes as a method to motivate individuals to do a specific activity. The principle of gamification is to put game elements such as reward, point, level to a specific activity. There have been many researches on monitoring energy use using the Internet of Things. Internet of things enables the electronic device to measures the energy in real-time so the user can look at their daily energy usage. In this research, an IoT-based electrical energy monitoring was build that are integrated with mobile-based application that implements gamification inside.

For the accuracy of the sensor, three devices has been tested for the accuracy, each device obtained an average value of 77.32%, 64.35%, and 82.34%. The Quality of Service for throughput and delay parameters also has been tested. The throughput average value results obtained from three different users between 09:00-10:00 are 29.13 kbps, 25.44 kbps, 32.24 kbps, and throughput average value results obtained between 12:00-13:00 are 28.95 kbps, 27.88 kbps, and 28.75 kbps. The delay average value results obtained from 3 different users between 09:00-10:00 are 185.97 ms, 207.43 ms, and 179.79 ms, and the delay average value results between 12:00-13:00 are 196.1 ms, 195.89 ms, and 183.44 ms. In the end of the research, this research compares the use of air conditioners with condition that user didn't use the gamification in one week and with condition user use the gamification in one week. From the result of the test, only one of three users can reduce energy consumption by 9.05 kwh while use the gamification application.

Despite just one user on the test that can reduce the energy consumption, there is a possibility that this IoT-based monitoring energy device that already implements the gamification inside for participate as a home energy management system.

Key words : *Gamification, Internet of Things, Home Energy Management System,*
Electrical energy