

ABSTRACT

Hydroponics has been widely done in Indonesia, due to the soil less requirement for the method. This method is suitable for most city areas in Indonesia with limited living spaces. By doing hydroponics people can utilize spaces such as roofs, balconies, or terraces, and others. Higher nutrition is also an advantage of hydroponic plants when compared to conventionally grown plants.

This undergraduate thesis is aimed at designing an Internet of Things (IoT) based tool for hydroponic farming. To enable hydroponic farmers or people interested in learning hydroponics to remotely monitor their plants using applications on smartphones. This IoT-based application is also equipped with a gamification technique to increase the motivation of hydroponic farmers and enthusiasts. Gamification elements in the application include points, levels, achievements, badges, virtual currency, and leaderboard.

The accuracy test toward temperature sensor administered to each device resulted in the average accuracy scores of 94.39%, 94.4%, 95.12%. In terms of pH and TDS sensors the average accuracy values are 89.59% and 76.79%. Meanwhile, quality of service (QoS) testing with *throughput* parameters done to all three devices showed the average values of 10.64 kbps, 35.97 kbps, and 34.64 kbps. Further, QoS testing with *delay* parameters administered to all three devices resulted in average values of 410.44 ms, 65.35 ms and, 71.55 ms. Gamification testing is done through the participation of all three users who practiced doing hydroponics using the monitoring applications for 3 weeks. Gamification testing is done with a simple user experience through interviews with all three users during their use of hydroponic plant monitoring applications.

Key Words : Planting, Hydroponic, Internet of Things, Gamification, Quality of Service.