ABSTRACT

Internet has been growing rapidly and proved by the number of internet which leads to expansion of the use of objects. In this context, standards can be developed such as the use of wireless sensor device operates in 2.4 GHz band like Xbee which makes data transfer from sensors easier and faster. This rapid development also encourages sensors to do sensing and these data sensing are able to be accessed remotely by using internet, or also known as IoT.

Application of this technology can be implemented into a smart aquarium system that works by using wireless sensor network. Two sensor nodes are spread in a sensor network and these nodes will be transmitting sensor data such as pH value of aquarium water hereinafter each smart aquarium is also able to adjust good pH value for fish environment automatically, water temperature sensor to provide recommendation for the frequency of feeding and an ultrasonic sensor to measure the amount of fish feed available.

This system uses Xbee S2 devices assembled with star topology and its implementation connects 2 aquariums (or sensor nodes) to a coordinator node. By using Raspberry Pi, there are processes for uploading data from sensor nodes to the internet server and controlling fish feeding through a website that also managed by Raspberry Pi. The results of some tests performed, Xbee S2 is able to work 51.3 meters for the maximum range and when performing test in 2 different places (and different criteria), throughput is larger when 2 sensor nodes active simultaneously than just 1 sensor node and then delay is inversely proportional with throughput. Meanwhile in server, throughput in monitoring process is lower than controlling process in accordance with timespan of its observation. Reability for this system is 94.39% and availability is 94.69%.

Keyword: smart aquarium, fish feeding, wireless sensor network, xbee