ABSTRACT

The development of information technology today is very closely related to human life every day. One human activity that is helped by technology is gardening at home using aquaponic techniques. Aquaponics is a plant cultivation technique that is integrated with the culture of aquatic animals, such as fish, shrimp and molluscs. Aquaponic cultivation techniques are similar to those used in conventional hydroponic cultivation, only there are differences in the source of nutrition for the plants. Aquaponics uses feces and ammonia from the metabolism of aquatic animals as a source of nutrition which is also influenced by the pH content of the water. Ideally the pH content in aquaponics is around 6.0 – 7.0. In addition, with the Internet of Things (IoT) technology that is currently developing, the use of microcontrollers which have various programming concepts can be implemented together with several modules such as sensors and communication (wireless) in aquaponic systems. The water pH sensor module can be connected to the Arduino Uno microcontroller which will send data on the pH condition of the water in the aquaponics system via wireless to the ESP8266 module as the transceiver, then the data received can be monitored and controlled using the website. In the programming system, the concept of Object-Oriented Programming can be applied to the two controllers so that it can improve the structure, modularity and flexibility of the programming system, and enable more efficient monitoring and more precise control of water conditions in the aquaponic system. The sensor circuit can obtain data from pH sensor testing with 3 conditions, namely acidic water with an error percentage between -17% to -27%, neutral or pure water with an error percentage of 14% to 16% and alkaline water conditions with an error percentage of -1% up to -5%. And testing the QoS on the ESP8266 module for 5 minutes obtained very good results because it showed that the test results were working properly. With detailed Throughput values of 9594.126 bps, Delay of 34.65 ms and Packet Loss of 0%.

Keywords: aquaponics, ESP8266, pH sensor, and Object Oriented Programming