

ABSTRACT

Growing crops using hydroponic techniques is the future agricultural solution. Hydroponics uses water circulation to replace the soil as a provider of nutrients and oxygen. Water must be evenly distributed in all parts so that each plant gets the same amount of nutrients and oxygen. But the shape of the hydroponic device can cause uneven distribution of water discharge in all parts. This results in uneven growth of plants in different pipes, seen from plant height, leaf width, and the number of leaves. In saving water debit manually, accurate results are not obtained and the method is less practical.

To anticipate this, a modification is needed in controlling the valve opening to regulate the amount of water discharge entering each pipe, and a data monitoring system that reads the results of the water discharge sensor through *IoT* technology. This modification places a servo to rotate the valve based on water discharge conditions. By shrinking the valve opening angle will reduce the water discharge, and vice versa. The reading data is then sent to the *IoT* Platform, namely Antares so that it can be displayed in the form of a user interface.

The results showed that adjusting the valve opening angle using servo compared to the manual method would result in a difference of about 1.17 - 7.09%. In controlling the water flow automatically so that the water flow is in the range of 1 - 1.5 L / m, the system take 64 seconds. Data transmission from the controller to Antares was successfully carried out with a delay is 5 second. the difference in plant conditions after being given a Smart Hydroponic system was high. plants and the width of the leaves between plants in the pipe with each other more evenly. With the maximum difference between plant height between pipes of 0.2 cm. For leaf width, the maximum difference is 0.1 cm. But for the number of leaves, there is no change, the maximum difference for the number of leaves is 1 sheet.

Keywords: *Hydroponics, Valve Control Systems, Water Flow Sensors, Internet of Things*