

ABSTRACT

On the hydroponics system, the concentration of nutrition should be controlled to approach the optimal growth of plants. One popular method to regulate the concentration of nutrition is by using the fuzzy logic controller system. Generally, the controller is set for a static setpoint. However, most plants have changing optimal concentration of nutrition based on their growth stage. Therefore, it is necessary to design a control method to accommodate the dynamics setpoint of nutrition parameter. In this paper, a dynamic setpoint weighting fuzzy logic controller (DSW-FLC) is proposed to tackle dynamics optimal nutrition concentration of hydroponics system. Electrical conductivity (EC) was used to represent nutrition concentration and it was measured as a reference to actuate the valve of nutrition and the valve of water. Based on the result, the implementation DSW-FLC could track dynamics setpoint of hydroponics plant with average error 16,98 uS/cm and 36,35 uS/cm for static setpoint and dynamic setpoint, respectively. The nutrition parameters (EC, water tank level, and nutrition tank level) are then transmitted to the internet server by using WIFI connection with rate of 5 data/min to help remote farmers monitoring their hydroponics system.

Keywords: FDSWC, hydroponics, IoT, nutrition concentration, electrical conductivity.