AUTOMATIC IOT SYSTEM TO CONTROL NUTRITION, LIGHTING, AND TELEGRAM NOTIFICATION IN INDOOR HYDROPONIC PLANTING

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ABSTRACT

Hydroponics is a method of growing plants without using soil, which is increasingly popular due to its efficiency in water use and a new method for growing indoors. However, conventional hydroponic systems require intensive monitoring and management, which can be challenging for users. Therefore, this study developed an "Automatic IoT System for Managing Nutrients, Lighting, and Telegram Notifications in Indoor Hydroponic Planting" designed to optimize the monitoring and management of indoor hydroponic plants automatically. This system utilizes Internet of Things (IoT) technology to integrate various sensors and actuators that can monitor environmental conditions such as temperature, nutrient levels, water levels, and light in hydroponics. Data obtained from these sensors is processed by ESP32 where it is used to analyze the data and provide recommendations or automatic actions and send information in real-time to the platform. This system is also equipped with a user interface that allows remote monitoring and management via the Telegram application. The results of the trial showed that this system is able to maintain the environmental conditions of hydroponic plant management, as well as reduce the need for manual intervention. The results of the sensor accuracy show that the results of the sensor accuracy show that the sensor results with an average error value of 1.9% on ultrasonic, 1.5% on DHT11, 6.3% on lightmeter, 0% on infrared and the success of TDS measurements and the results of the system test show an average error of 6.14% on the light control system, 12.98% on the nutrient control system, a 100% success rate on the harvest time notification test, a 100% success rate on the water level notification test and also very good on the telegram communication test. Thus this system offers an innovative solution to increase the productivity and sustainability of hydroponic farming.

Keywords*: IOT, Hydroponics, Automatic*