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EVALUATING SYSTEM DESIGN, INTELLIGENT CONTROL STRATEGY, MONITORING AND MANAGEMENT IN OPEN-FIELD AND SMART GREENHOUSES: A TURKISH CASE STUDY

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Abstract

Smart greenhouse systems are one of the best methods that greenhouse owners can use to increase product quality and yield. In the presented project, environmental factors such as temperature, humidity, soil moisture, air quality, light intensity of the smart greenhouse were remotely controlled. Remote control of hardware components such as light control, heating, cooling, water level measurement, plant condition, fertilization amount, control of the roof of the greenhouse, irrigation status of the greenhouse were provided. Additionally, general health problems of plants were studied on the dataset with Convolutional Neural Network (CNN). This allows the user of the application to intervene early on plant diseases that cannot be noticed with the naked eye. Also, sensors, relays and some hardware equipment were used to make the application. All of this hardware was part of an IoT-based system managed from a centralized platform. Growth rates of plants in the greenhouse and in the flowerpot were monitored. And the height graphs of the plants: cucumbers, daisies, peppers are presented and compared in the study. Also, as a result of controlling and monitoring of the greenhouse at certain periods, 12-hour dryness chart and soil moisture chart of each plant was produced.

Key words: Convolutional Neural Network (CNN), IoT, Remote Control, Smart greenhouse system

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