DESIGN AND DEVELOPMENT OF IOT BASED SUB-SURFACE IRRIGATION SYSTEM

Drought is the most severe problem for agricultural production, and the intensity of this problem is increasing in most cultivated areas around the world. Hence improving water productivity is the primary purpose of sustainable agriculture. This study aimed to use cloud IoT solutions to control a modern subsurface irrigation system for improving irrigation management in arid regions. To achieve this goal, we designed, constructed, and validated the performance of a fully automated controlled subsurface irrigation system (CSIS) to monitor and control the irrigation water amount remotely. The CSIS is based on an autonomous sensors network to instantly collect the climatic parameters and volumetric soil water content in the study area. Therefore, we employed the Digital Ocean cloud platform to host sensor readings, perform algorithmic analysis, instant visualize the live data, create event-based alerts to the user, and send instructions to the IoT devices. The validation of the CSIS proved that automatically irrigating date palm trees controlled by the sensor-based irrigation scheduling (S-BIS) is more efficient than the time-based irrigation scheduling (T-BIS). The S-BIS provided the date palm with the optimum irrigation water amount at the opportune time directly in the functional root zone.