

Internet of Things-Based Smart Irrigation System

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Abstract : The automation of farming activities can have a transformational impact on the agricultural sector, especially from the emerging new technologies such as the Internet of Things (IoT). The system uses water level sensors and soil moisture sensors that measure the content of water in the soil as the values generated from the sensors enable the system to use an appropriate quantity of water, which avoids over or under irrigation. Due to the increase in the world's population, there is a need to increase food production. With this demand in place, it is difficult to increase crop yield using the traditional manual approaches that lead to the wastage of water, thus affecting crop production. Food insecurity has become a scourge greatly affecting the developing countries and agriculture is an essential part of human life and tends to be the mainstay of the economy in most developing nations. Thus, without the provision of adequate food supplies, the population of those living in poverty is likely to multiply. The project's main objective is to design and develop an IoT (Internet of Things) microcontroller-based Smart Irrigation System. In addition, the specific research objectives are to find out the challenges with traditional irrigation approaches and to determine the benefits of IoT-based smart irrigation systems. Furthermore, the system includes Arduino, a website and a database that works simultaneously in collecting and storing the data. The system is designed to pave the way in attaining the Sustainable Development Goal (SDG 1), which aims to end extreme poverty in all forms by 2030. The research design aimed at this project is a descriptive research design. Data was gathered through online questionnaires that used both quantitative and qualitative in order to triangulate the data. Out of the 32 questionnaires sent, there were 32 responses leading to a 100% response rate. In terms of sampling, the target group of this project is urban farmers, which account for about 25% of the population of Nairobi. From the findings of the research carried out, it is evident that there is a need to move away from manual irrigation approaches due to the high wastage of water to the use of smart irrigation systems that propose a better way of conserving water while maintaining the quality and moisture of the soil. The research also found out that urban farmers are willing to adopt this system to better their farming practices. However, this system can be improved in the future by incorporating it with other features and deploying it to a larger geographical area.

Keywords : crop production, food security, smart irrigation system, sustainable development goal

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