

Smart plant monitoring system

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Abstract

In this paper, a smart plant monitoring system is presented. In today's world, only a limited number of devices such as PCs and mobiles are connected to the internet. However, the world is becoming increasingly dominated by the Internet of Things (IoT), which refers to the inter-networking of physical devices embedded with electronics, sensors, software, and network connectivity. The IoT enables devices to achieve greater value and services by exchanging data with the manufacturer. Agriculture is the backbone of many countries, and water scarcity is a significant issue in this field. To address this problem, the irrigation process can be automated using IoT. This paper proposes a system that captures details about the soil and temperature using different sensors, and uses IoT to monitor and maintain the appropriate moisture content in the soil, which reduces the wastage of water. The proposed system uses Arduino UNO as the microcontroller and temperature, moisture, and humidity sensors to measure the respective values in the soil. The system achieves greater accuracy, efficiency, and economic benefits while reducing human intervention. This paper examines the basic concepts of IoT and its scope for different applications, including revolutionary farming methods. The work done & presented in this paper is the result of the mini-project work that has been done by the first sem engineering students of the college and as such there is little novelty in it and the references are being taken from various sources from the internet, the paper is being written by the students to test their writing skills in the starting of their engineering career and also to test the presentation skills during their mini-project presentation. The work done & presented in this paper is the report of the assignment / alternate assessment tool as a part and parcel of the academic assignment of the first year subject on nanotechnology & IoT.

Keywords: Soil, Sensor, Moisture, Accuracy, Performance

1. Introduction

As we strive to create sustainable and efficient ways of living, smart technology has found its way into various aspects of our lives, including the realm of gardening and plant care. The advent of smart plant water monitoring systems has revolutionized the way we nurture and maintain our plants, providing us with real-time insights and precise control over their water requirements. In this two-page introduction, we will explore the concept, benefits, and key components of a smart plant water monitoring system, highlighting its potential to optimize plant health, conserve water resources, and simplify gardening practices [1].

2. Concept and Functionality

A smart plant water monitoring system is an intelligent solution designed to monitor and regulate the

watering needs of plants in a precise and efficient manner. It utilizes a combination of sensors, data analytics, and connectivity to provide accurate information about the moisture levels in the soil, enabling users to make informed decisions about watering their plants [2].

The functionality of a smart plant water monitoring system revolves around its ability to measure soil moisture levels in real-time. Sensors placed in the soil continuously monitor the moisture content, relaying the data to a central hub or a mobile application. This data is then analyzed and presented in a user-friendly format, offering insights into the plant's water needs [3].

Additionally, smart plant water monitoring systems often come with features such as automated watering schedules and notifications. Users can set specific moisture thresholds, and the system will automatically water the plants when the levels drop below the desired range. Notifications can be sent to the user's smartphone, alerting them about the watering status and any necessary actions [4].

3. Benefits

The implementation of a smart plant water monitoring system brings several benefits to plant enthusiasts, gardeners, and the environment as a whole [5].

Firstly, these systems help optimize plant health and growth. By providing accurate and real-time information about soil moisture levels, users can ensure that their plants receive the right amount of water at the right time. This precise watering reduces the risk of overwatering or underwatering, both of which can harm plant health. As a result, plants thrive, producing vibrant foliage, blooming flowers, and bountiful harvests [6].

Secondly, smart plant water monitoring systems promote water conservation. Traditional watering practices often lead to water wastage due to inefficient watering schedules or lack of awareness about plant water needs. With a smart system in place, water is used judiciously, as plants are watered only when necessary. This not only reduces water consumption but also helps in sustainable water management, particularly in regions facing water scarcity [7].

Furthermore, smart plant water monitoring systems simplify gardening practices. The automation and convenience offered by these systems eliminate the guesswork associated with plant care. Users no longer need to rely solely on visual cues or manual checks to determine when to water their plants. The system takes care of monitoring, alerting, and even watering, making gardening more accessible for beginners or those with limited time for plant care [8].

4. Key Components

A smart plant water monitoring system comprises several key components that work together to ensure efficient monitoring and watering. These components include [9] the following, which is shown in the Fig. 1.

- a) **Soil Moisture Sensors:** These sensors are placed in the soil, measuring the moisture content and transmitting the data to the central hub or mobile application [10].
- b) **Central Hub/Mobile Application:** The central hub or mobile application acts as the interface between the user and the system. It receives data from the soil moisture sensors and presents it in a user-friendly format. It also allows users to set watering schedules, view plant health metrics, and receive notifications [11].
- c) **Connectivity:** Smart plant water monitoring systems rely on wireless connectivity, such as Wi-Fi or Bluetooth, to transmit data between the sensors and the central hub/application.
- d) **Automated Watering System (Optional):** Some smart plant water monitoring systems include automated watering mechanisms, such as sprinklers or drip irrigation, which are triggered based on the moisture levels detected by the sensors, which is seen in Fig. 2.

5. Conclusion

Smart plant water monitoring systems offer a game-changing solution for plant enthusiasts and gardeners seeking to optimize plant health, conserve water, and simplify gardening practices. With

real-time insights into soil moisture levels and the ability to automate watering, these systems empower users to make informed decisions, resulting in thriving plants and reduced water waste. As smart technology continues to evolve, the smart plant water monitoring system represents a significant advancement in sustainable gardening practices, making plant care accessible and environmentally friendly.

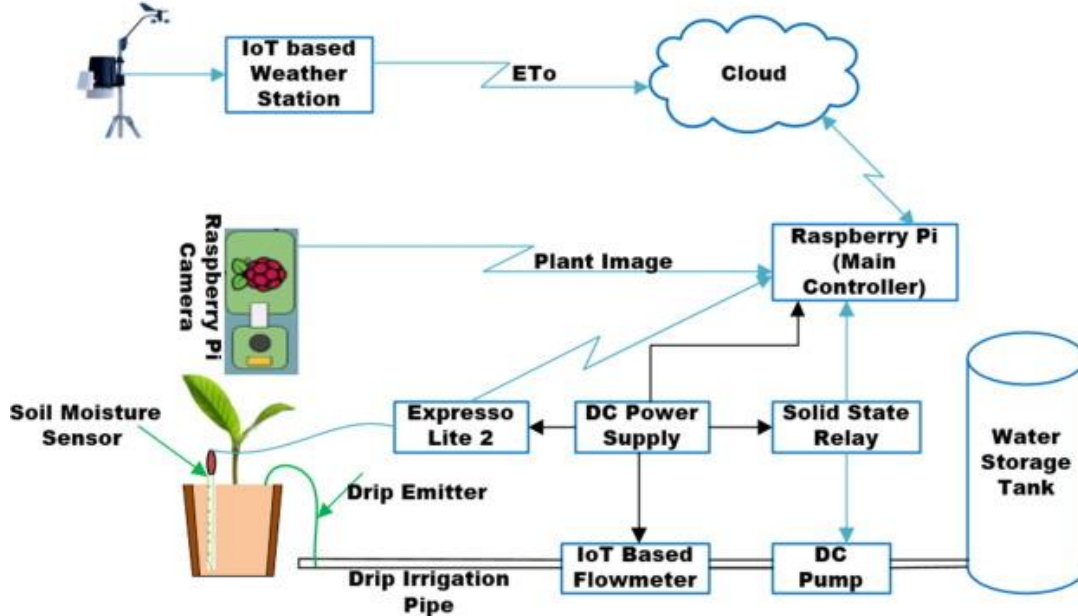


Fig. 1 : Water plant smart monitoring system



Fig. 2 : A typical smart water plant monitoring system

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