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Smart Irrigation: A Step toward Sustainability

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Why we need to upgrade?

Proper irrigation methods play an important role in agriculture. India's agriculture relies primarily on the monsoon, which is not a reliable source of water. Therefore, there is a need for an intelligent irrigation system for the land that can supply sufficient water to the farms and fields depending on the water content of the soil. Many areas of farmland are effectively over or scarce due to the spatial variability of water infiltration and runoff from rain and irrigation. Submerged areas are exposed to water stress and lose production, while submerged areas suffer from plant diseases and nutrient leaching. Appropriate soil moisture levels are essential for optimal plant growth. Water is a fundamental element of livelihood and should be avoided improperly. Irrigation is the main consumer of water and consumes a lot of groundwater. Water supply for irrigation purposes needs to be regulated.

IoT in smart agriculture

The Internet of Things (IoT) is an intelligent, future-oriented technology that provides unconventional and actionable solutions in many areas. In the agricultural sector, IoT technology has made great strides in agricultural management. With this technology, all farm equipment and equipment can be linked to each other to make the right decisions about irrigation and fertilizer supply.The Internet of Things (IoT) uses mobile devices monitor device functionality. The Internet of Things (IoT) connect communication objects installed in various locations probably far away. The Internet of Things (IoT) is a type of network technology that collects information from various sensors and does everything join the internet and exchange information.

Smart irrigation using IoT

A system with a soil moisture sensor that detects moisture and humidity in the soil and sends a signal to the microcontroller, which analyses the data and determines whether the pump should operate. The proposed framework makes use of an Arduino UNO microcontroller board with an ATMEGA328P 8-bit microcontroller. The data collected by

the sensor, as well as the status of the pumps, will be sent to the user to assist in keeping track from a remote location. This ensures that the soil receives neither too little nor too much water, preserving moisture and preventing water waste.

Figure 1.1 System Flow Chart

Fig1.1 shows the overall system framework with sensor,pump, and microcontroller and WiFi module in general. At the point when the soil moistness regards have outperformed quite far then emanating siphon will start watering the earth according to the program and will, therefore, stop when the earth gets enough sogginess.

Soil moisture sensor

The soil moisture sensor measures the water content of the soil. Moisture in the soil is an important factor in the watercycle of the atmosphere. Sensor module has high output resistance level when soil moisture is low. There are both digital and analog output. Digital outputs are easy to use, but not as accurate as those based on analog outputs. If it is damp, the motor will automatically switch on and off**.**
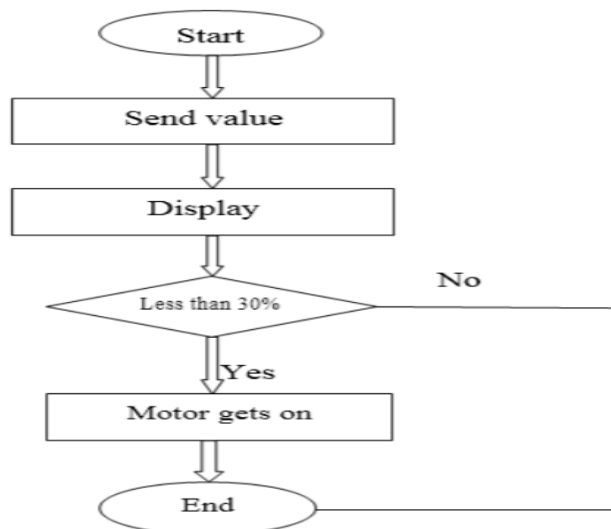

Figure 1.2: -Flow chart of Soil moisture sensor

Objective

The main objective of this project is to provide an automatic irrigation system thereby saving time, money & power of the farmer. The traditional farm-land irrigation techniques require manual intervention. With the automated technology of irrigation, the human intervention can be minimized.

Features of smart irrigation system: -

- Water level monitoring
- Efficiency of irrigation pump
- Water scheduling
- Leak detection
- Climate driven irrigation
- Remote control of irrigation system

Conclusion

Agriculture networking technology is not only a requirement of modern agricultural development, but it is also a significant symbol of agricultural development's future level; it will be the future direction of agricultural development. After constructing the hardware for an agricultural water irrigation system and analysing and testing it, investigating the network hierarchy's features, functionality, and implications, the software architecture of precision agriculture water irrigation systems is quite interesting. Using the internet of things to produce agricultural products that are both efficient and safe has a significant impact on ensuring water resource efficiency as well as ensuring the agricultural production's efficiency and stability in the coming years, more advancement in the field of IoT is expected. These systems could become more efficient, faster, and less expensive. In the future, this system can be made into an intelligent system that predicts user actions, rainfall patterns, harvest times, and animal intruders in the field, and then communicates the information using advanced technology such as IoMT, allowing agricultural systems to become self-contained and yield high quality and quantity yields.

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