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AI BASED IRRIGATION SYSTEM

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Abstract: The main goal of the project is to use an automated water inlet arrangement, which can also record and monitor temperature, humidity, and other parameters, along with a moisture sensor to monitor the soil's moisture content in both wet and dry situations. Wherever possible, it automatically regulates plant irrigation to minimize the need for human involvement. In the modern world, when water supplies are becoming more limited, it is imperative to implement intelligent irrigation techniques. The project explains how IOT may be used to manage irrigation in an intelligent manner. The goal of this project is to prevent issues like continual monitoring and saving time. Additionally, it aids in water conservation by automatically supplying water to fields and plants based on their water needs. This system can also be useful for agricultural parks and lawns. The system's goal is to determine the soil's moisture content based on how much water has been sprayed on it. The user's mobile phone will receive all of this information. The intelligent irrigation system was created to maximize crop water usage. Plant roots are home to a dispersed wireless network of soil-moisture temperature sensors throughout the system. A gateway unit additionally manages sensor data, acts as triggers and actuators, and sends data to the web application

1. Introduction:

The Internet of Things, or IoT, is a system that gives people and things a unique identity and the capacity to transfer data across a network without requiring human-to-human or human-to-computer interaction in two directions. The scientific advancement known as the "Internet of Things" has great promise for improving living quality through the use of intelligent sensors and connected devices that communicate via an internet network.

The same IoT devices that regulate irrigation systems are also used to analyze soil properties such as PH levels, quality, and soil nutrients. This aids farmers in determining which areas of the soil require fertilizer or other soil correction.

2. Objectives and Significance:

Objectives:

The purpose of a smart irrigation system is to measure the soil's moisture level and adjust the watering schedule accordingly.

These objectives include:

1. Improving User Convenience: Simplifying the fuel purchase procedure such that it only requires a few smartphone taps.

2. Increasing Operational Efficiency: The intelligent irrigation system was created to maximize agricultural water usage.

3. Environmental Sustainability: The system includes a dispersed wireless network of temperature and soil-moisture sensors positioned in the plant roots.

3. Literature survey:

Evolution of Smart Irrigation System:

- Examine the development of the irrigation system over time.

- List the difficulties and inefficiencies that farmers encounter.

- Talk on the necessity of technological advancements in the irrigation industry.

User-Centric Design in Irrigation System:

- Review studies on user-centered design concepts.

- Talk about the value of an easy-to-use interface and real-time soil moisture level tracking.

Future Trends and Emerging Technologies:

The current system has the potential to expand by adding a module that would allow power control to be done over the phone.

By using a mobile device to enter the password, the project may be made to function, totally eliminating the need for manual labor in the agricultural fields.

In order to eliminate the farmers' frequent need to travel to the irrigation spot.

Gaps in Existing Literature:

- Point out any weaknesses or restrictions in the state of the art studies on irrigation system applications.

- Talk about issues that require more investigation or study.

Conclusion:

- Recap the main conclusions drawn from the literature review.

- Draw attention to the Smart Irrigation System's importance in light of current studies.

- Offer an analysis of the literature's applicability to the creation and use of smart irrigation systems.

This organized review of the literature will lay a solid foundation for future study and development by assisting in the formation of a thorough grasp of the gaps in the field of integrated irrigation applications and the state of the art.

4. Problem Statement:

The problem facing modern agriculture is to maximize water use to increase crop productivity while protecting this valuable resource. Conventional irrigation techniques sometimes rely on manual monitoring or set schedules, which can result in overwatering, ineffective water distribution, and higher operating expenses. Effective irrigation management is made even more difficult by the shifting patterns of the climate.

Challenges in Traditional Irrigation System:

1. Inefficiency and Over-watering: Conventional irrigation systems frequently use manual control or set schedules, which results in inefficient water distribution. It is possible to overwater, which can waste water resources, raise operating expenses, and possibly result in soggy conditions that are harmful to plant health.

2. Under-watering: Conversely, depending too much on set times can lead to under-watering, which can cause crop stress, a decrease in production, and low-quality produce.

3. Lack of Precision: When it comes to supplying the appropriate amount of water at the appropriate time, traditional methods fall short. Uneven soil moisture levels can be caused by this imprecision, which can have an impact on crop health and plant growth.

4. Reliance on Weather Predictions: Conventional systems frequently depend on weather forecasts, which might not be reliable.

Impact and Implications:

A smart irrigation system is similar to giving conventional farmland watering techniques a brain. The conventional methods of crop watering can waste resources and stunt crop growth because

they occasionally use too much or not enough water. Utilizing technology, the smart system keeps an eye on the weather and crop requirements. By helping farmers irrigate their fields precisely when they need to, it conserves water, increases crop yields, and improves farming efficiency. By conserving resources, this helps safeguard the environment in addition to helping farmers cut expenses.

5. Proposed System:

The "Smart Irrigation System," as it is called, is a creative and helpful solution for farmers because it lessens manpower requirements and other communication problems. Since this occurs in irrigation fields, miscommunications are totally avoided. Farmers are the only ones who know that this is used. Additionally, fewer laborers will be needed to work on the irrigation fields as a result of this initiative. This project mostly uses an Arduino, a relay, a DC pump, a 7805 regulator, and moisture sensors. The Arduino is connected to the Keypad, LCD, and Relay. It has been employed to confirm and safeguard the farmers' water level.

6. User-Centric Design and Safety Measures:

An intuitive user interface is essential for farmers to grasp and operate the Smart Irrigation System. Even people with little technical knowledge can operate the irrigation system efficiently with the help of intuitive controls and clear displays.

7.WorkChart:

Research Through Innovation

8. Conclusion:

In summary, putting in place a "Smart Irrigation System" is a revolutionary step toward productive and sustainable agriculture. This creative idea uses technology to improve crop yields, conserve water, and encourage environmental stewardship—all of which are limitations of conventional irrigation techniques.

The system's user-centric design guarantees accessibility and user-friendliness, enabling a wide variety of farmers to adopt and profit from this technology.Technology and conventional farming

methods can be seamlessly integrated thanks to the user-friendly interface, remote monitoring capabilities, and timely alerts.

The Smart Irrigation System has many advantageous effects. Real-time data analysis helps conserve water by avoiding overwatering and cutting down on waste. This helps farmers save money, but it also encourages wise use of water resources, which supports the sustainability of the environment.

Farmers are better equipped to adapt to changing climate conditions and increase their resilience in the face of climate change because to the system's data-driven decision-making capabilities. Higher crop yields contribute to the financial stability of farming communities and enhance food security.

In summary, the Smart Irrigation System is a comprehensive strategy that takes into account the requirements of both users and the environment, while also revolutionizing the way we manage water in agriculture. This initiative is a shining example of innovation as we head towards a future of precision farming. It provides a scalable and easily accessible solution for a more productive and sustainable agricultural environment.

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