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PLC Based Automatic Sprinkler Irrigation System

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ABSTRACT

Watering crops, lawns, and gardens with an autonomous sprinkler irrigation system based on programmable logic controllers (PLCs) is very effective and dependable. The PLC-based system is simple to set up and manage, and it can be modified to match the unique requirements of various crops and soil types. By minimising excessive irrigation and minimising runoff, it also aids in water conservation.In general, a PLC-based self-governing sprinkler watering system is a financially sensible and environmentally responsible way to keep landscapes healthy and bright.

Keywords-- PLC, Sprinkler, Irrigation System

I. INTRODUCTION

In all agricultural seasons, an automatic irrigation system has been designed to facilitate the automated provide of adequate water from a reservoir to field or domestic crops.

One of the goals of this research is to determine how human control can be removed from irrigation while also optimizing water use in the process.

To evaluate whether irrigation is necessary and how much water is needed in the soil, a method of continuous soil moisture monitoring is used. This study examined various sprinkler irrigation system types, as well as their design, manufacture, and installation. The adoption of a rotational irrigation system to irrigate a small plot helped with the planning since it provides a proper scientific foundation for accurate water scheduling, system evaluation, and reducing water waste and runoff. It was designed to be used with various crops. The design and installation's relevance is in providing the University's irrigation research sector with practical irrigation field demonstration facilities.

Generally speaking, with recent advancements in technology as well as circumstances such a lack of labour, a scarcity of water, and a greater demand for effective farming from a limited amount of land. In the realm of agriculture, the demand for repetitive work has increased. In the Automated Irrigation Process, PLC shows how its software and hardware are implemented. A Human Machine Interface (HMI) or visualization is created to provide centralized control and monitoring of the entire process. It uses a moisture sensor, float level sensor, and solenoid valve to control water level and flow. It makes use of an electronic controller that is set up to take input signals related to changing soil moisture conditions from a moisture sensor, which serves as an interface between the field and the controller. The water pump is operated by a relay after the controller receives the signal and provides an output that drives it. Additionally connected to the controller is an LCD that shows the current soil moisture content and water pump operation status. The findings demonstrate that clay soils require the most water for irrigation whereas sandy soils demand less water than loamy soils.

II. METHODOLOGY

1. Describe the Issue: Determine the precise irrigation requirements of the plants or crops that will be watered, taking into account elements like soil type, weather, and water availability.

2. Create a System Design: Choose the right parts to build an automatic sprinkler irrigation system based on a PLC that satisfies the indicated watering needs.

3. Setup the System: Assemble the parts in accordance with the system design, making sure that all connections are safe and correctly set up.

4. Programme the PLC: Create a PLC programme that the irrigation system will be controlled by, modifying watering schedules and amounts as necessary to maintain ideal soil moisture levels.

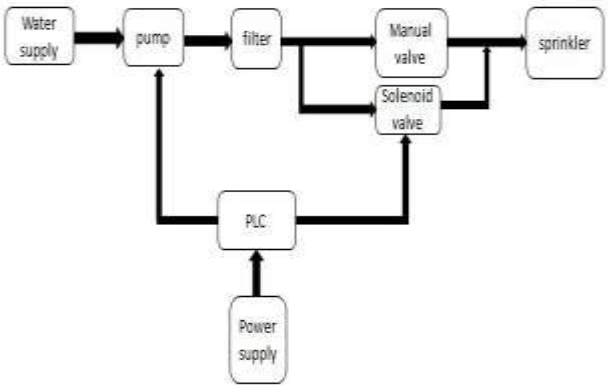
5. Test the System: Run a number of tests to make sure it

is operating correctly and providing the watering requirements of the crops or plants.

6. Continuously assess the system's performance and make adjustments as necessary to maximize irrigation efficacy and efficiency.

7. Keep Track of the System: Ensure that the system's design, installation, programming, testing, and any maintenance or troubleshooting instructions are all thoroughly documented.

By using this technology, you can build a PLC-based automatic sprinkler irrigation system that is dependable and efficient and satisfies the unique irrigation requirements of your crops or plants.



III. PRIOR APPROACH

Our project is a PLC-based irrigation system with automatic sprinklers. Using a sprinkler, water is provided to the plants in this system. The motor was started using a GSM MOBILE AUTO. When we initially arrived at the location. However, the sprinkler valves needed to be manually turned on. This causes some areas to have more water discharge while other areas experience less water release. Additionally, the system would be closed if no one was available on the pitch. It was also challenging to provide water because of the size of the land.

IV. OUR APPROACH

In this project, we are currently using a PLC (programmable logic controller). The goal of this task is to provide the crop with the necessary amount and timing of watering. The GSM mobile auto allows us to remotely turn on or off this PLC-based automatic sprinkler irrigation system from any location. All of the valves will open at the specified time and then close according to PLC programming. Solenoid valves are the name for these valves. Parallel to the manual valve is where the solenoid valve is situated. 8 acres overall make up the area. Two sprinklers are put for every valve, which results in an average installation of 8 valves. The motor is also controlled by a PLC.

V. CONCLUSION

This chapter's major goal is to suggest automated irrigation solutions for watering plants without human intervention. It is determined that the automated irrigation system put in place is practical and economical for maximizing water resources for agricultural produce. The suggested system offers customers the monitoring function in addition to the automatic irrigation system, allowing them to check the soil moisture based on the reading on the LCD display. The proposed system has been developed and tested with an automatic operation in mind. For upcoming projects, the automated irrigation system can be configured to gauge the moisture level (water content) in accordance with the various plants' various moisture needs. We come to the conclusion that the system minimizes water waste by reducing water use.

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