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PLANT IRRIGATION WATER SPRINKLER ROBOT

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ABSTRACT

Plant Irrigation Water Sprinkler Robot System Uses a robot with a single sprinkler that moves through the field with a water tank moves throughout the field spraying water all over it. It is like a moving water tank that automatically moves all overthe field spraying water through it. The robot can be equipped with geo fencing sensors so it will cover complete fields without needing any manual intervention.

This project is used to agriculture purpose while spraying the water through the robot by using remote control.it will make some useful applications of agriculture, not in agriculture

It will use in household also it will help to reduce the man work and increasing the work efficiency.

I. INTRODUCTION

Irrigation systems require large piping setups along with many sprinklers in order to achieve proper irrigation. This system has many problems associated with it. It requires expensive piping as well as sprinkler costs along with high powered motors in order todrive water through such long pipes. There is always a chance of leakages that may causeoversupply of water to a particular area andunder supply in another leading to plantationloss. Also this will incur heavy repairing costs. Our proposed system uses a robot with a single sprinkler that moves through the field with a water tank that moves throughout the field spraying water all over it

The limitations of water resources and global population growth have led states and governments worldwide to increase agricultural products per area and optimize soil and water resources productivity with using new irrigation methods. Generally, current irrigations systems are classified into pressure and gravitational systems. Thus, choosing each system could maximize water productivity and minimize costs of keeping farms. In recent years, advancements in technology have revolutionized various aspects of agriculture, aiming to enhance productivity, optimize resource utilization, and mitigateenvironmental impact. One such innovation that has garnered significant attention is the development of plant irrigation water sprinkler robots. These robots represent a fusion of robotics, automation, and irrigation systems.

The plant irrigation water sprinkler robot project endeavors to design and implement a robotic system capable of autonomously watering plants in agricultural fields or garden environments. This project integrates principles of robotics, sensing technologies, and water management to create a solution that optimizes irrigation practices whileconserving water resources and minimizing human intervention.

A conveyor system is a common piece of mechanical handling equipment's that moves materials from one location to another. Conveyors are especially useful in applications involving the transportation of heavy or bulky materials.

The primary objective is to develop a robotic platform equipped with sensors to detect plant moisture levels, soil conditions, and environmental parameters such as temperature and humidity. Based on real-time data collected from these sensors, the system autonomously determines the watering needs of the plants and precisely delivers water using a sprinkler mechanism.

II. WORKING PRINCIPAL

Microcontroller Control

A microcontroller (such as Arduino) serves as the brain of the robot.

- The moisture sensor is connected to one of the analog input pins of the microcontroller.
- The microcontroller continuously reads the analog output from the moisture sensor, which represents the soil moisture level.

Decision Making

- The microcontroller is programmed with a control algorithm that determines when to activate the water

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sprinkler based on the soil moisture readings.

- The program defines a moisture threshold below which the soil is considered dry and requires watering.

Water Pump Activation

- When the microcontroller detects that the soil moisture is below the preset threshold (indicating dry soil), it sends a signal to activate the water pump.
- The water pump draws water from a water source (like a reservoir or water supply line) and pumps it through the system.

Sprinkler Operation

- The water flows through the tubing to the sprinkler heads positioned around theplants.
- The sprinkler heads disperse water evenly over the soil surface, providing irrigationto the plants.

Monitoring and Adjustment:

- The microcontroller continues to monitor the soil moisture levels at regular intervals.
- If the soil moisture rises above the preset threshold (indicating sufficient moisture), the microcontroller stops the water pump and closes the solenoid valve.

Automation

- The robot autonomously waters plants based on real-time soil moisture data, eliminating the need for manual intervention.
- The devices are place across Sugar canelift so that only sugar cane through lower grids, are lifted by teeth which is connected to chain. This chain is attached by gear driven by engine. When engine runs the chain starts to circulate making teeth to lift up. The sugarcanes are lifted by teeth and are stored in trolley.

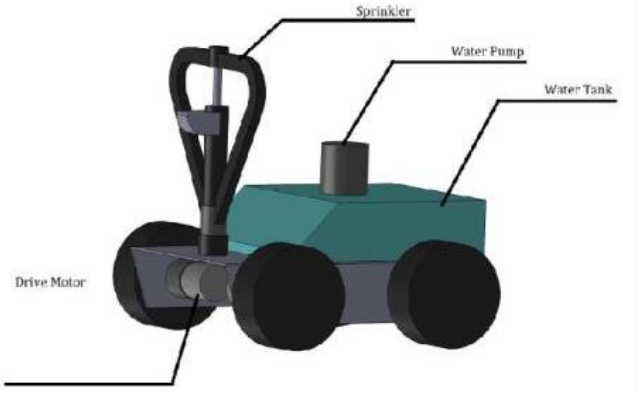

Fig 1: Model of the Project

III. COMPONENTS OF THE PROJECT

Microcontroller

Water Pump

Motor Driver

Power Supply

Chassis and Wheels

Wireless Communication Module

Microcontroller

- Specifications: Choose a micro- controller capable of interfacing withsensors and controlling actuators. For example, Arduino Uno or Raspberry Pi 4.
- Key Features: Sufficient GPIO pins, compatibility with sensors and motor drivers,and programming ease.

Water Pump

- Specifications: Select a DC water pumpsuitable for your irrigation needs.
- Key Features: Flow rate (liters per hour),maximum head pressure, and voltage rating.

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Motor Driver

- Specifications: Use an appropriate motor driver to control the water pump and any other motors (if applicable).
- Key Features: Current rating, voltagecompatibility, and PWM control.

Power Supply

- Specifications: Select a suitable power supply based on the voltage requirements ofyour components.
- Key Features: Stable output, adequatecurrent capacity, and safety features.

Chassis and Wheels

- Specifications: Design or purchase a chassissuitable for your robot.
- Key Features: Lightweight, sturdy, with sufficient space for components and ease of

Wireless Communication Module

- Specifications: Consider adding Wi-Fior Bluetooth for remote control or data logging.
- Key Features: Range, compatibility withmicrocontroller, and power consumption.

IV. WORKING MODEL

Fig 2: Working Model

V. COST ESTIMATION

Table 1: Cost Estimation

Sl. No.	Material	Quantity	Cost Per Unit, Rs/-	Total Costin Rs/-
1	Chassis wheel	4	150	600
2	Chassis	1	3000	3000
3	Motors	4	300	1000
4	12v Battery	1	1600	1600
5	Pump	1	500	500
6	Tank	1	300	300
7	Pipe	1	350	350
8	Arduino	1	2250	2250
9	Iron rod	1	750	750
10	Welding rod	3	400	1200
11	Model Construction cost	4		7150
	Total cost	-	-	18700/-

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VI. CONCLUSION

In this project we have conclude thatirrigation and its related methods, two categoriesof irrigation has been explained briefly. The first category includes some traditional methods and the second one includes modern methods. One of the modern methods which are covered in this work is SICSMS method. By utilizing SICSMS methodsome problems encountered such as moving the sprinkles with human labor, labor should move the sprinklers after irrigation period. An AGV has been developed and simulated, which is able to move during a rail way. Aiming to travel on this rail can detect the available irrigation in its path and remove them to their new place. The comparison between the conventional SICSMS method and AGV equipped SICSMS method highlighted that the maximum under cultivation surface is reachable by AGV equipped SICSMS method. one channel relay used to on off the sprinkler which is placed at tank on the top of the rover. By filling pesticides or water in tank. Then sprinkler should turn on. It sprays it around. Then the rover motion controlled by transmitter. It sprays wherever the signal is processed manually.

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