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A Review on Gardening Robot for Irrigation System

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ABSTRACT
This paper describes the armature and perpetration of a distributed independent gardening system (gardening robots) with applications in civics/inner perfection husbandry. The garden is a mesh network of robots and plants. The gardening robots are mobile manipulators with an eye-in-hand camera. They are able of locating plants in the garden, saddening them (watering them), and locating and grasping fruit. The plants are enhanced with detectors and calculation to cover their well-being (soil moisture) and with the help of the network to communicate servicing requests to the robots. This paper explores the integration of robotics in gardening weeding ranging from automated Smart irrigation systems. It discusses the impact of artificial intelligence and sensor technologies on optimizing plant care. The review also addresses current limitations and suggests potential avenues for future research in the field of gardening robotics. This project aims to develop a robot that can perform an operation such as automatic irrigation and weeding. For manual control, the robot uses a Bluetooth pairing application as a control device and helps to navigate the robot outside the field.

Keyword: Husbandry, Robotics, Irrigation, Automation,

INTRODUCTION

Husbandry is the backbone of India's economy. Agrarian development is, thus, a precondition of our public substance. Agriculture in India dates back to the Indus Valley Civilization period and indeed before that in some corridor of Southern India. Moment, India ranks second world wide in estate affair. Agriculture is the wisdom and art of Cultivating shops and beast. The major problems in Agriculture are removing weeds, and scattering dangerous fungicides. Scattering of dangerous fungicides leads to several health problems for the growers & the people who are consuming it. There's a great demand for labor but only a many people are interested in the field of husbandry. Moment, the husbandry has been largely mechanized [1]. The use of technology has reduced the threat factors in husbandry, particularly those unleashed by nature [1]. Not only has quick processing been made possible, but technology has also reduced growers' reliance on, and vulnerability to, nature. With the use of technology, it has also come possible to minimize the pitfalls involved in husbandry to which the early growers were awfully exposed [1]. Unlike the olden day growers, the new age Indian planter isn't the stereotypical 'Kisan'. They're tech- expertise and are open to espousing new technologies that can help them ameliorate their income [2]. For case, a Facebook group for organic growers in India with member strength of 22,000 has come an engaging platform for growers to seek help

or advice from other growers [2]. Growers now use WhatsApp groups considerably to change knowledge and unite with peers. From ordering seeds online to seeking inputs on social media, there's rapid-fire relinquishment of information technology by Indian growers. Start- ups and technology enterprises are trying to break into India's agrarian geography using newer business models [3]. These enterprises are tapping governments, banks, tilling co-operatives, development agencies, and indeed commercial social responsibility programs to produce a feasible business and help growers [3]. Large companies that depend on agrarian yield want information on sowing and pre-harvest conditioning up to crop [3]. Robotics plays a significant part in agrarian product and operation. In husbandry, time- saving independent technology is demanded to make ranch operation effective. Experimenters are now fastening on colorful functional parameters of husbandry to design independent agrarian vehicles, as conventional agrarian ministry depends on crop and topology. Robots like these are enough important perfect reserves for mortal power as they emplace unmanned seeing and machine systems. The overall thing of this design is to give a conflation of exploration findings on the economics of field crop robotics.

LITERATURE SUMMARY

From this paper [4] a sensible irrigation system has been oriented to give irrigation-supported soil stuffiness. Soil stuffiness testing aims to understand whether or not the soil is in dry condition or it's in wet condition. For this, An ATMega328 microcontroller is used. It deals with an associate automatic factory irrigation system that mechanically senses the humidity content of the soil and judges whether or not irrigation is demanded or not and the way a lot of water is needed for soil. This system uses the ATMega328 microcontroller. It's programmed to sense the humidity content of the soil over a quantum of time. When the humidity content is a lower quantum than the limit that's predefined, it'll start to supply the needed volume of water until it reaches the limit. Therefore formerly the soil is dry the pump can mechanically water-soak the fields and once the soil is wet the pump can mechanically switch off, thereby eradicating the demand of the pool and conserving time. Only within the dry condition, does the pump operate, since the necessity of water is added to that soil for the proper growth of the crops in wet soil. Hence this design can conserve water throughout irrigation. It also offers homemade running when necessary and controls the humidity tabs with the aid of humidity detectors. The main part then is that the AVR At the mega microcontroller supervises the whole system. at first, the robotization tills the whole field and takes to tending, at the same time allocating seeds aspect by aspect. The Mobile used for navigation is an unsupportable device that unendingly sends the knowledge to the microcontroller. In the sector the automatic operates in machine-controlled mode, still, outside the sector is rigorously operated in homemade mode. For homemade operation, the medium uses the Bluetooth pairing app as an operation device and helps with the navigation of the robotization outside the sector. So we tend to use a robotic transmittable to overcome those limitations. Then we need to use a camera to capture photos of any object (hole or depth) in front of the robot. The position of the digital camera is controllable because the camera is placed at the front of the robot.

NEED OF THIS PROJECT

Outdoor water saving can be achieved using smart irrigation technology. Smart irrigation controllers & sensors have been developed to reduce outdoor water used by irrigating based on plant water needed compare to traditional automatic system, which irrigate on a user- determine fixed schedule. This technology exists as a complete controller or as a sensor that can be added to an existing irrigation to create a smart controller. Smart irrigation technology uses weather data or soil moisture data to determine to irrigation

needed of the landscape. Smart irrigation technology includes; these products maximize irrigation efficiency by reducing water waste, while maintaining plat health & quality.

COMPONENT

Here is the list of components which is used in this project;

- Battery
- Core wire
- Single shaft motor
- Wheels
- Arduino Uno (ATMega328P)
- Ultrasonic sensor (HC-Sr04)
- Soil Moisture Sensor
- DC motor
- Blade
- Servo motor
- Bluetooth module (HC-05)
- Motor driver (L293D)
- ESP32 camera module
- Relay Module

BLOCK DIAGRAM

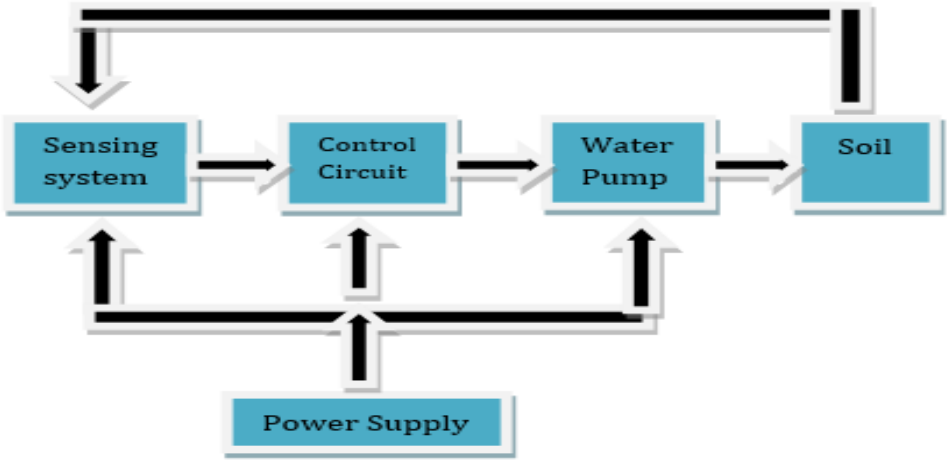

Fig -1: *Block diagram of system*

ADVANTAGES

- Reduce labor cost
- Require small water source
- Reduce soil erosion & leaching
- No man power required
- Reduce water consumption

DISADVANTAGES

- Cost for purchasing
- Installing & maintaining the equipment
- Reliability of irrigation system
- Loss of property & habitation are potential consequences.

FUTURE SCOPE

This smart irrigation system extends saddening time for shops (watering time for plant), and provides ideal growth condition. It save time and timekeeper detention as per the environmental condition can be added for automatic watering. This smart irrigation system can be adjusted and modified according to the changing environment. Irrigation helps to grow crops, maintain geographies, and revegate distributed soils in dry areas and during times to below average rainfall. In addition to these uses, irrigation is also employed to cover crops from frost, suppress weed growth in grain fields, and help soil connection.

CONCLUSIONS

In conclusion, gardening robots are not just tools for the future; they are here now, and they are transforming the way we approach gardening. These innovative machines are helping us save time, conserve resources, and make gardening a more enjoyable and accessible activity. As technology continues to advance, we can expect even more exciting developments in this field. So, whether you're a gardening enthusiast or someone looking for a way to simplify outdoor maintenance, gardening robots have something to offer.

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