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AGROSMART
A Real-Time Cultivation Predication Robot System using IoT

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ABSTRACT

Agriculture is the primary source of income for approximately 70% of Indians. As a result, India's agricultural system should be upgraded in order to lessen farmers' efforts. In the agricultural field, various activities such as sowing, weeding, weed cutting, ploughing, and so on are carried out. Seeding, ploughing, and weed eradication are all very fundamental and important operations. However, the current sowing, ploughing, and plant cutting procedures are troublesome. Seed sowing machinery is quite tough and inconvenient to operate. As a result, the need to build equipment that would lessen the farmers' efforts. During sowing, this method employs a monitoring system that seeks to fall seeds at a certain location with the set spacing between both seeds and lines. Weed control is aided by the robotic arm. As a result, in this automatic machine, the flaws of the present system will be successfully eliminated.

Keywords : Agriculture, Drilling, Ultrasonic Sensor-Based, Automation, Arduino, Seed Planting Robot

I. INTRODUCTION

India's agricultural achievements during the last four decades have been spectacular. The agricultural industry has done a good job of keeping up with increased food demand. Increases in output have been nearly exclusively attributed to higher productivity in the last two decades, with greater total area under crop yields playing a smaller role. Agriculture has made a significant contribution to overall progress. Increased production has helped feed the poor, increased agricultural revenue, and offered direct and indirect job possibilities. A succession of actions is credited with India's agricultural prosperity. The proliferation of new agricultural crops, intensification of input usage, and investments leading to irrigated area development were the main sources of agricultural progress during this time. Growth has slowed in places where the 'Green Revolution' technology had a significant influence. To push production frontiers, use inputs more effectively, and switch to more stable and higher value farming patterns, new technologies are required." Simultaneously, there is a pressing need to maximize the potential of rain-fed and other

underdeveloped areas. Indian agriculture has a wide range of demands, possibilities, and prospects due to the diverse agro-ecological settings and producers. Future growth must be faster, more evenly dispersed, and more precisely focused. These issues have far-reaching ramifications for how farmers' concerns are envisioned, investigated, and communicated to them. "On the one hand, agricultural research will be increasingly required to address community-specific problems; on the other hand, devices will have to locate themselves in a highly competitive environment in order to produce and adopt cutting-edge technologies to address the solutions facing the vast majority of resource-poor farmers." These issues have far-reaching ramifications for how farmers' concerns are envisioned, investigated, and communicated to them. "On the one hand, agricultural research will be increasingly required to address community-specific problems; on the other hand, devices will have to locate themselves in a highly competitive environment in order to produce and adopt cutting-edge technologies to address the solutions facing the vast majority of resource-poor farmers." Robotic systems have a significant role in all aspects of society, business, and industry. The project's goal is to create a microcontroller-based system that aids in on-farm activities such as sowing and fertilizing at pre-determined distances and heights with all necessary equipment. Ager, which means field, and Culturia, which means cultivation, are two Latin terms that describe agriculture. Due to traditional agricultural practices, Indian farmers have more issues with agricultural product productivity than other farmers. It is caused by unbalanced fertilizer application without knowledge of a crop's real nutritional requirements.

II. LITERATURE SURVEY

A. Multiseed Sowing Machine

Through the use of image processing techniques and flash magic, researchers proved the efficiency of seeding, plowing, and plant-cutting equipment. They also examined how seed length, seed gap, miss planting ratio, and the effectiveness of seed sowing apparatus impacted the germination of seeds and crop yield. Find undesirable cropping using image processing. [1].

B. Technique of seed soil and the idea of multipurpose seed sowing machine

Using a CAD program like PROE, planned and evaluated the seed sowing mechanism. They discovered that a multipurpose seed dispensing machine can control row gap, seed and fertilizer rates, as well as seed and fertilizer depth. The Robot Operation and Seed Sowing Method are used in the course of our project, not as a stand-alone paper. Please don't change any of the present names. [2].

C. Testing of excellence of spreading by pneumatic sowing technologies

Two sowing machines were shown for interval sowing: the OLT pneumatic pressure seeding machine and the Aeromat-Becker hydraulic pressure sowing machine, which varied in the way of operating for sugar beet cultivation. They discovered that the ideal space across crops in the seeding row is attained at speeds of 4.5 - 8 km/h upon this hydraulic suction seeding device OLT as well as 4.5 - 10 km/h mostly on pressure-produced sowing equipment Aeromat - Becker. [3].

D. Study relating to formulating long term mechanization strategy for each agro-climatic zone in India

The impact of agriculture mechanization on the Indian economy was investigated. He came to the conclusion that old and basic approaches cannot increase production and output. As a result, selective mechanization will be required in the future. [4].

E. Plan and application of sowing and fertilizing farming robot

The Raspberry Pi may be used to control the agricultural robot over the internet. By providing an IP

user name and password, live streaming may be viewed on a computer; it monitors soil water content, temperature, and fertilizing planting in agricultural areas. [5].

III. PROPOSED SYSTEM

Seeding, plowing, and waste plant cutting are the three primary elements of the suggested system, which are interconnected by utilizing communication technologies. Temperature controller, moisture sensors, seed injector, seed storing, a robotic system with engines, and a microcontroller are all included in the control and robotic stations.

The microprocessor is the device's intelligence, and it may allocate the order in which all of the networks get suggestions, as well as the practical elements managed by their embedded programs. We could use Android and use GSM to send all of the information to the robot machine.

To interact with the robot, a Software program will also be provided. Wi-Fi is used for this communication. In the robot unit, a Wi-Fi device will be attached. A user login option will be available on Android. Seeding, plowing, and weed eradication are the three alternatives. The entire agricultural field will be split into columns and the number of steps will be determined.

IV. METHODOLOGY

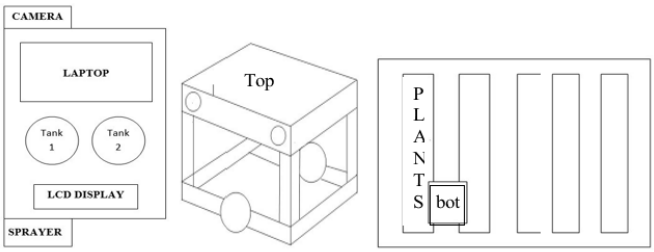
Spraying and seed sowing are two processes where an attempt is made to develop and manufacture equipment that will be able to execute both operations more efficiently while also resulting in reduced costs. The project is now primarily focused on developing a viable operating system. The locally built unit was employed to keep the design simple and cost-effective. Our project improves worker safety, decreases human effort, boosts efficiency, decreases workload, reduces worker weariness, and lowers maintenance costs. This machine is relatively inexpensive. Because this planter is so simple to use, even inexperienced farmers may operate it. We streamlined the design and made it more cost-effective and accessible to all rural farmers. From a controlling and maintenance point of view standpoint, we made different improvements and streamlined them. We linked the driving shaft to the metering mechanism in this design, eliminating the need for pulleys and belts. The shaft of the motor is driven by a DC motor that is connected to the battery bank. As soon as the motor begins, it moves the robot and activates the metering mechanism. The seed barrel is located at the robot's rear wheels near on top of the device. It has a sensor that detects the amount of seed in the tank and sounds an alert whenever the seed level is low. The front sensor's purpose is to guide the robot. When an impediment arises at the front of the robot, it alerts the system and causes the robot's path to be rerouted. Every revolution of the wheel, according to the adjustment, allows a specific seed to fall into the hopper, preventing seed waste and ensuring a flawless sowing procedure. When the robot arrives at the other end and completes the mission, it sounds an alert so that we would give the necessary assistance.

V. RESULT

Fig. 1 Execution Phase

When an impediment emerges in front of the robot, the machine receives a notice and the robot's trajectory is altered. According to the modification, each turn of the wheel permits a particular seed to drop into the hopper, eliminating seed waste and providing a perfect sowing operation.

When the robot reaches the opposite end of the mission and completes it, it sounds an alarm so that we may respond.



Top View **Expected Design** **Field + Trace for bot**

VI. CONCLUSION

The automatic planting of seeds is the major emphasis of this technology. The seeds are planted in the correct order, resulting in optimal seed germination. The use of a robot to sow seeds automatically reduces the amount of labor required. Seed waste is also being minimized to a great extent in this area. This technique was created to allow for the automated planting of seeds. Seeds are disseminated in the mud in a suitable order with the assistance of a robot, resulting in less seed waste. Just one Seed Sowing V robot has been used to carry out the onion crop planting process autonomously. This robot will assist farmers in completing the farming process in a more effective manner. Any additional crop, such as fruit, paddy, or sugarcane, can be added to the project. Instead of a wheel, the robot might be made using a chain roller. As a result, it may be used in the real-time agricultural industry. Robots will be able to undertake all duties such as planting, fertilizing, monitoring pests and illnesses, harvesting, tilling, and other jobs on fully autonomous farms in the future. This also allows farmers to just examine the robots rather than operate them. Robots will be able to run on PLCs and SCADAs in the future, making them completely automated.

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