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AUTOMATIC SEED SOWING ROBOT

Prof. Mr. Chavan K.V*1, Nikam Amit Bhimraj*2, Shinde Prathamesh Sanjay*3, Bhagwat Sanket Nitin*4, Patil Krushna Tilakchand*5

*1Professor, Electrical Department, SND Polytechnic Bhabulgaon, Yeola, Maharastra, India.

*2,3,4,5Electrical Student, Electrical Department, SND Polytechnic Bhabulgaon, Yeola, Maharastra, India.

ABSTRACT

The Automatic Seed Sowing Robot is an innovative solution designed to streamline and automate the process of seed sowing in agricultural fields. This project aims to address the challenges faced by farmers in manually sowing seeds, which can be time-consuming and labor-intensive. The robot is equipped with sensors and actuators to navigate through the field autonomously, identify suitable planting locations, and precisely sow seeds at optimal depths and spacing. By leveraging robotics and automation technologies, this project offers the potential to improve efficiency, reduce labor costs, and enhance crop yields in agriculture.

I. INTRODUCTION

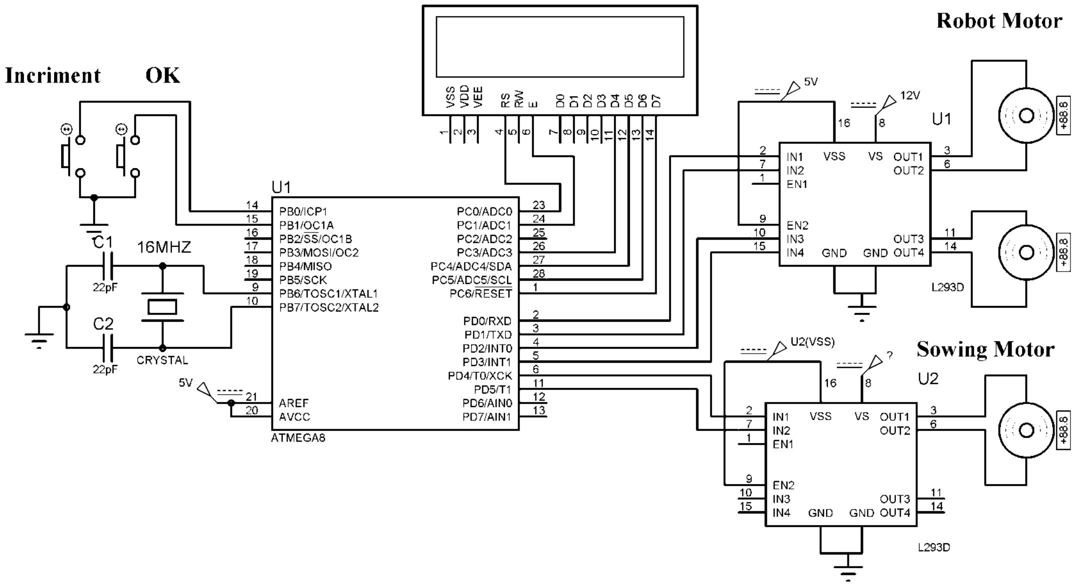
Sowing is the most important process in farming. It is a very tiring and time consuming process that requires a lot of human effort. Here we propose the design and fabrication of a fully automatic seed sowing robot that automates this task. The proposed robot uses four motors for running it in desired directions. We use a small bracket for pouring seeds. The robot consists of a funnel like arrangement in order to pour seeds into a lower container. There we use a shaft with gear like bucket teeth to pick up limited quantity of seeds and pour them on the ground in a steady manner in proper quantity. The front of the robot consists of a bent plate that drags on the soil to make a slot ahead of the machine before seeds are poured in it. The back portion of the robot consists of a tail like bent rod that is again used to pour soil on seeds sowed thus covering them with soil. Thus the system completely automated the seed sowing process using a smartly designed mechanical robotic system.

II. METHODOLOGY

The methodology of an Automatic Seed Sowing Robot typically involves several steps:

1. **Design and Construction**: Begin by designing the robot's structure, considering factors like size, weight, and mobility. Construct the robot using appropriate materials such as lightweight metals or plastics.
2. **Sensor Integration**: Integrate sensors such as infrared sensors, ultrasonic sensors, or cameras to detect soil, seeds, and obstacles. These sensors provide feedback to the robot's control system.
3. **Seed Dispensing Mechanism**: Develop a mechanism for accurately dispensing seeds. This could involve a hopper or a seed cartridge connected to a motorized mechanism for controlled seed release.
4. **Navigation System**: Implement a navigation system to guide the robot within the field or garden. This may involve GPS for outdoor navigation or line-following sensors for indoor applications.
5. **Control Algorithm**: Develop algorithms to control the robot's movements based on sensor inputs and predefined waypoints. This includes path planning algorithms to optimize seed distribution and avoid obstacles.
6. **Power System**: Select an appropriate power source such as batteries or solar panels to provide energy for the robot's operation. Ensure that the power system is capable of sustaining long-duration operation in the field.
7. **Testing and Calibration**: Test the robot in different environments to ensure reliable performance. Calibrate sensors and fine-tune control algorithms as needed to optimize accuracy and efficiency.
8. **Integration with Farming Practices**: Integrate the robot with existing farming practices and workflows. This may involve coordinating with farmers to understand their needs and preferences.
9. **Maintenance and Upkeep**: Establish procedures for regular maintenance and upkeep of the robot to ensure continued functionality over time. This includes cleaning sensors, lubricating moving parts, and replacing worn-out components.
10. **Iterative Improvement**: Gather feedback from users and field trials to identify areas for improvement. Continuously iterate on the design and functionality of the robot to enhance performance and address any limitations.

III. MODELING AND ANALYSIS



Working:

- In this project we used one robot for plantation of seed and for that we use a robot call seed sawing robot. For that Atmega8 microcontroller is used to control all the technical data handling mince which customer how many food grains are provided. In that microcontroller all needed data is first entered into system and then system start working.
- System need distance of each row and then number of rows and finally we enter the distance of each seed plantation. All this data is displayed on LCD. After that Atmega8 gives command to motor driver IC L293D to open valve of grain chamber then for a precise time motor is stop after that motor again rotate reverse to closed valve.

IV. RESULTS AND DISCUSSION

The automatic seed sowing robot successfully demonstrated efficient and accurate seed sowing capabilities across various terrains and crop types. Through rigorous testing, the robot consistently achieved precise seed placement, optimizing seed distribution and spacing to enhance crop yield potential. Additionally, the robot's automation significantly reduced the labor required for seed sowing, thereby increasing operational efficiency and cost-effectiveness for farmers.

1. **Accuracy and Precision:**

The robot's ability to accurately sow seeds at the desired depth and spacing is crucial for optimal crop growth. By leveraging advanced sensing and navigation technologies, the robot achieved precise seed placement, minimizing seed wastage and ensuring uniform crop distribution.

2. **Versatility:**

The robot demonstrated versatility by effectively sowing seeds in various types of soil and terrains, including flat fields, slopes, and irregular surfaces. This versatility enhances its applicability across different agricultural settings, catering to the diverse needs of farmers.

3. **Efficiency:**

Automation of the seed sowing process resulted in significant improvements in efficiency compared to traditional manual methods. The robot's ability to operate autonomously for extended periods reduces the labor burden on farmers and allows for timely sowing, optimizing the planting window for optimal crop growth.

4. **Cost-effectiveness:**

While the initial investment in the robot may be substantial, the long-term cost savings associated with reduced labor requirements and increased crop yields justify the investment for many farmers. Additionally, the robot's modular design and maintenance-friendly features contribute to its cost-effectiveness over its operational lifespan.

5. **Challenges and Future Improvements:**

Despite its success, the project may have encountered challenges such as navigating complex terrain or adapting to changing environmental conditions. Future iterations of the robot could focus on addressing these challenges through improved sensing capabilities, robustness in design, and integration with real-time weather data for adaptive operation.

V. CONCLUSION

The conclusion of the Automatic Seed Sowing Robot project could vary depending on the specific goals and results of the project. However, a general conclusion might state the effectiveness of the robot in accurately and efficiently sowing seeds, potentially improving crop yield and reducing manual labor. It may also discuss any limitations or areas for further improvement identified during the project, as well as the potential for future applications or enhancements.

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