

Solar Based Seed Sprayer

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Abstract— An agricultural robot or Agro sprayer is a robot deployed for agricultural purposes. The main area of application of robots in agriculture is seeding robots are designed to replace human labor. The agricultural industry is behind other complementary industries in using robots because the sort of jobs involved in agriculture are no and digging. This project strives to develop a robot capable of performing operations like automatic seeding and digging. It also provides manual control when required and keeps tabs on the humidity with the help of humidity sensors. Then main component here is the microcontroller that supervises the entire process. The device used for navigation is an ultrasonic sensor which continuously sends data to the microcontroller.

Index Terms—Agriculture, Seeding, Digging, Ultrasonic Sensor, and Microcontroller.

I. INTRODUCTION

Farmers today spend a lot of money on machines that help them decrease labor work and increase yield of crops. There are various machines that are available for ploughing, harvesting, spraying pesticides etc., however these machines have to be manually operated to perform the required operations and moreover separate machines are used for every functions. The yield and profit returns from employing this equipment are very less as compared to the investment. Another issue is the growing demands of the world's population. The World Health Organization estimates that Earth's population will touch 9 billion in 35 years which will lead to a staggering demand in increase of growth of food crops. Automation is the ideal solution to overcome all the above mentioned shortcomings by creating machines that perform more than one operation and

automating those operations to increase yield on a large scale.

As one of the trends of development on automation and intelligence of agricultural machinery in the 21st century, all kinds of agricultural robots have been researched and developed to implement a number of agricultural production in many countries, such as picking, harvesting, weeding, pruning, planting, grafting, agricultural classification, etc. And they gradually appear advantages in agricultural production to increase productivity.

Autonomous agricultural robots are an alternative to the tractors found on fields today. Cultivation tasks like seeding, spraying, fertilizing and harvesting may be performed by fleets of autonomous agricultural robots in the future. Independent of the actual design a serious agricultural robot will be a complex and expensive vehicle – the challenge is therefore to prove that it is competitive to traditional technology and may even bring a decisive lead.

One critical factor here is the optimal utilization of the robot over the day and over the year. To reach a full utilization the agricultural robot needs to be a vehicle with some basic capabilities and the possibility to support multiple applications. Among the basic capabilities we surely require a navigation system for safe and autonomous navigation. India's record of progress over the past four decades in agriculture has been quite impressive. In the current generation, man power shortage is a major problem specifically in agricultural sector and it affects the growth of developing countries. In India at most 70% of people are dependent on agriculture. The progressive invention in agriculture system is becoming an

important task because of rising demand on quality of agriculture products and declining labor availability in rural farming areas.

II. LITERATURE REVIEW

2.1. DESIGN AND IMPLEMENTATION OF SEEDING AND FERTILIZING AGRICULTURE ROBOT

Shivaprasad B S¹, Ravishankara M N², B N Shoba³
In modern globalization, many technologists are trying to update a new development based on automation which works very rigidly, high effectively and within short time period. The progressive invention in agriculture system is becoming an important task especially because of rising demand on quality of agriculture products and declining labor availability in rural farming areas. The designed system is seeding and fertilizing agriculture robot using microcontroller. The aim of the designed system is to seeding, fertilizing and soil ph, temperature, moisture, humidity checking. The robot is controlled by remote. The designed system involves navigation of robot to the destination successfully and does the above functions. The direction of the robot is controlled via remote. The robot and the remote system are connected through internet system. 6 DC motors are used for navigation of the robot. The speed of the DC motors is controlled using controller. The solenoid is used to control seeding and fertilizing.

2.2. Agricultural Robot for Automatic Ploughing and Seeding

Amrita Sneha. A, Abirami.E, Ankita.A, Mrs. R. Praveena, Mrs. R. Srimena
This paper strives to develop a robot capable of performing operations like automatic ploughing, seed dispensing, fruit picking and pesticide spraying. It also provides manual control when required and keeps tabs on the humidity with the help of humidity sensors. The main component here is the AVR AT mega microcontroller that supervises the entire process. Initially the robot tills the entire field and proceeds to ploughing, simultaneously dispensing seeds side by side. The device used for navigation is an ultrasonic sensor which continuously sends data to the microcontroller. On the field the robot operates on automated mode, but outside the field is strictly

operated in manual mode. For manual control the robot uses the Bluetooth pairing app as control device and helps in the navigation of the robot outside the field.

2.3. Seed Sowing Using Robotics Technology

Swati D. Sambare, S. S. Belsare

In India, near about 70% people are dependent upon agriculture. So the agricultural system in India should be advanced to reduce the efforts of farmers. Various number of operations are performed in the agriculture field like seed sowing, weeding, cutting, pesticide spraying etc. Very basic and significant operation is seed sowing. But the present methods of seed sowing are problematic. The equipment's used for seed sowing are very difficult and inconvenient to handle. So there is a need to develop equipment which will reduce the efforts of farmers. This system introduces a control mechanism which aims to drop seeds at particular position with specified distance between two seeds and lines while sowing. The drawbacks of the existing sowing machine will be removed successfully in this automatic machine.

2.4. Mechatronics Based Remote Controlled Agricultural Robot

Vijaykumar N Chalwa¹, Shilpa S Gundagi²

In this project work an engineering solution to the current human health hazards involved in spraying potentially toxic chemicals in the confined space of a hot and steamy glasshouse or agricultural field is achieved by the design and construction of an autonomous mobile robot for use in pest control and disease prevention applications in commercial greenhouses. For this a mechanical robot is designed. The effectiveness of this platform is shown by the platforms ability to successfully navigate itself down rows of a greenhouse, while the pesticide spraying system efficiently covers the plants evenly with spray in the set dosages.

2.5. Robotic Agriculture Machine

Gholap Dipak Dattatraya¹, More Vaibhav Mhatardev², Lokhande Manojkumar Shrihari³, Prof. Joshi S.G

This paper presents a system with high speed of operation for an advanced agriculture process which includes cultivation based on robotic platform. The robotic system is an electromechanical (conveys a

sense that it has agency of its own) and artificial agent which is steered by DC motor which has four wheels. The farm is cultivated by the machine, depending on the crop considering particular rows & specific columns. The infrared sensor detects the obstacles in the path and it also senses turning position of vehicle at end of land. The seed block can be detected and solved using water pressure. The machine can be controlled remotely and solar panel is used to charge DC battery. Assembly language is used in programming the microcontrollers. The microcontroller is used to control and monitor the process of system motion of vehicle with the help of DC motor. The result of implemented unit is also presented.

III. PROBLEM STATEMENT

- Design and develop an agricultural sprayer robot which can be able to seeding and digging carried out in agricultural field. The control of this agro-sprayer should be wireless and can be able to show above operations.
- Fabricate the model of same operated by wireless control which able to show above mentioned operations like seeding and digging.
- Also design and analyze a real time system for this robot to give a solution and propose a model which can be used in real time field.

IV. METHODOLOGY

The assembly of the robotic system is built using high torque DC motor, (transmitter receiver) for wireless communication, Battery, microcontroller which is shown in block diagram below. When DC motor is started, the vehicle moves along the particular columns for digging and sowing the seeds and its movement is controlled by remote guiding device. The remote control transmitter and receiver is shown in block diagram below.

The microcontroller is brain of this system, which can dedicate the order of suggestions received to all the networks, and sensible factors processed by their corresponding embedded programs. The wireless protocol used for signal transmitting and receiving functions. Here the one will monitor the robot and send the signal. According to the received signal the robot

will move in the direction digging and it will place the seed on field for specified distance.

V. SYSTEM DESIGN

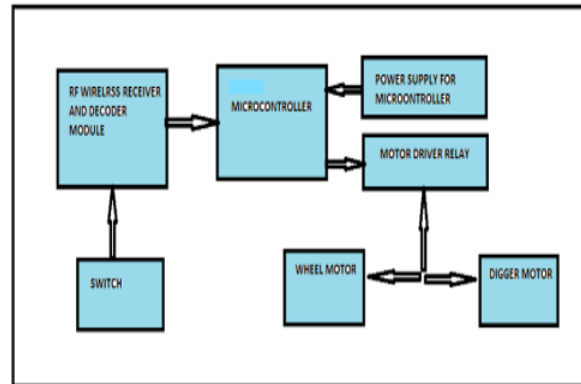


Figure 1: Block Diagram

The assembly of the robotic system is built using high torque DC motor, RF module (transmitter receiver) for wireless communication, relay driver circuit, Battery package and microcontroller module which is shown in block diagram above.

When DC motor is started, the vehicle moves along the particular columns of ploughed land for digging and sowing the seeds and its movement is controlled by remote guiding device. LCD module is used to display the condition of the battery level. The remote control transmitter and receiver is shown in block diagram.

This system has two main sections, robot end and control section, which are intercommunicated.

Using aided by the RF wireless communication technologies. The control section as well as robotic station possess the amenities viz. ploughing unit, seed dispenser, and water pump, robotic system with motors, microcontroller, and power supply.

VI. CONCLUSION

This project entitled “Solar Based Seed Sprayer” has been using discrete electronics component around advance arduino the system is operated by DC motors and corresponding output are obtained means performing agri. operations. The above parameters are sensed and automated by the ultimate application of

Arduino microcontroller. It gives very precise and accurate results.

In this project we made an effort to overcome some problems in agriculture. The rapid growth in the industries is influencing the labors who are situating in the villages to migrate to the cities. This creating the labor problem for the agriculture. The wages for the labor is also more. As the prices of commodities such as food grains, fuels, cloths and other essentials of daily life is increasing rapidly the labors demand for the more wages from the owners. This factors influencing the farmers who are interested in agriculture activity to leave their land uncultivated. By implementing this project in the field of agriculture we can help the farmers in the initial stage of agriculture i.e. during the seeding and fertilizing. This project can be a better substitute for the human who performs the seeding and fertilizing. This project is very useful for the farmers who are intended to do agriculture activity but facing the labor problem.

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