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SOLAR POWERED REMOTE CONTROLLED SEED SOWING MACHINE WITH SPRAYER

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ABSTRACT

The main objective of this project is to fabricate a complete functional seed sprayer machine which is fully powered by solar energy. The solar seed sprayer machine should be able to spray different types of vegetable seeds. Further analysis about the performance has been conducted through the seed amount sprayed over time and area covered by the machine. Solar energy is used as the power supply for the machine. Wireless communication is used to remotely control the machine, and the 3D printing technology is used to assist in the fabrication of required components. The solar seed sprayer machine under research is composed of four main systems. The remote driving system, solar charging system, seed storage dispenser system, and impeller spreader system. Different experiments have been conducted to assess the performance of the machine. The performance of machine is indicated through the capability of machine on spreading different types of seeds with various size and shape. The spread seed count has been also tested as well with the area covered by the machine.

Keywords: Agriculture, Solar Powered, Seed Spreader Machine, Remote Controlled.

I. INTRODUCTION

Agriculture has been the backbone of the Indian economy and it will continue to remain so for a long time. It has to support almost 17 percent of world population from 2.3 percent of world geographical area and 4.2 percent of world's water resources. The present cropping intensity of 137 percent has registered an increase of only 26 percent since 1950-51.

The net sown area is 142 Mha. The basic objective of sowing operation is to put the seed and fertilizer in rows at desired depth and spacing, cover the seeds with soil and provide proper compaction Over the seed. The recommended row to row spacing, seed rate, seed to seed spacing and depth of seed placement vary from crop to crop and for different agricultural and climatic conditions to achieve optimum yields and an efficient sowing machine should attempt to fulfill these requirements. In addition, saving in cost of operation time, labor and energy are other advantages to be derived from use of improved machinery for such operations. A traditional method of seed sowing has many disadvantages. This paper is about the different types of methods of seed sowing and fertilizer placement in the soil And developing a multifunctional seed sowing machine which can perform simultaneous operations.

For a long time, it has been thought that atomic energy would be a solution for the growing energy problem, but in recent times solar energy has proved to be an efficient, more secure and safe way of providing energy. Concepts related to the solar energy have constantly been under heavy research and development. The basic objective is to optimize the energy produced from photovoltaic cells, by making the overall systems more efficient and cost effective. Most solar panels are statically aligned; they have a fixed position at a certain angle towards the sky. Therefore, the time and intensity of direct sunlight falling upon the solar panel is greatly reduced, resulting in low power output from the photovoltaic (PV) cells. Solar tracking system is the solution to this issue as it plays a major role in overall solar energy optimization.

II. LITERATURE SURVEY

With flourishing technology that is introduced in this 21st century, there is numerous types of robots been used in agricultural activity starting from the cultivation process to the production process. The autonomous robot had been introduced in various application such is in underwater, rescue line following robot based on metal detection .in agriculture field, the usage of robotics in agriculture operation able to help to increase the production and improve efficiency. One of the types of robot used in agriculture is for the purpose of pesticide spraying with theability to navigate in the farm , recognize the target and regulate the spraying mechanism..

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III. METHODOLOGY

- This solar Energy and this energy is converted into electrical Energy. The electrical energy is stored inside a 12V Battery of capacity 9 Amp Hour, which then gives the Necessary power to a DC motor. This power is thenTransmitted to the Arduino.
- The basic objective of sowing operation is to put the Seeds in rows at desired depth, to maintain seed to seed Spacing and to cover the seeds with soil and provide Proper compaction over the seed. The recommended row to row spacing, seed rate, seed to seed spacing and depth of seed placement can vary from crop to crop and for different agro climatic conditions to achieve optimum yields. Typical application of seed sowing of Cereal's including ground nut, all types of dal's, oil seed crop's etc.
- To put the soil back on the seeds, an adjuster is used which puts soil back on seeds.
- After adjusting the soil, water is sprayed from the pipe for cultivation. Water Tank- Tap arrangement is used for irrigation purpose.

IV. MODELING AND ANALYSIS

System Architecture Design

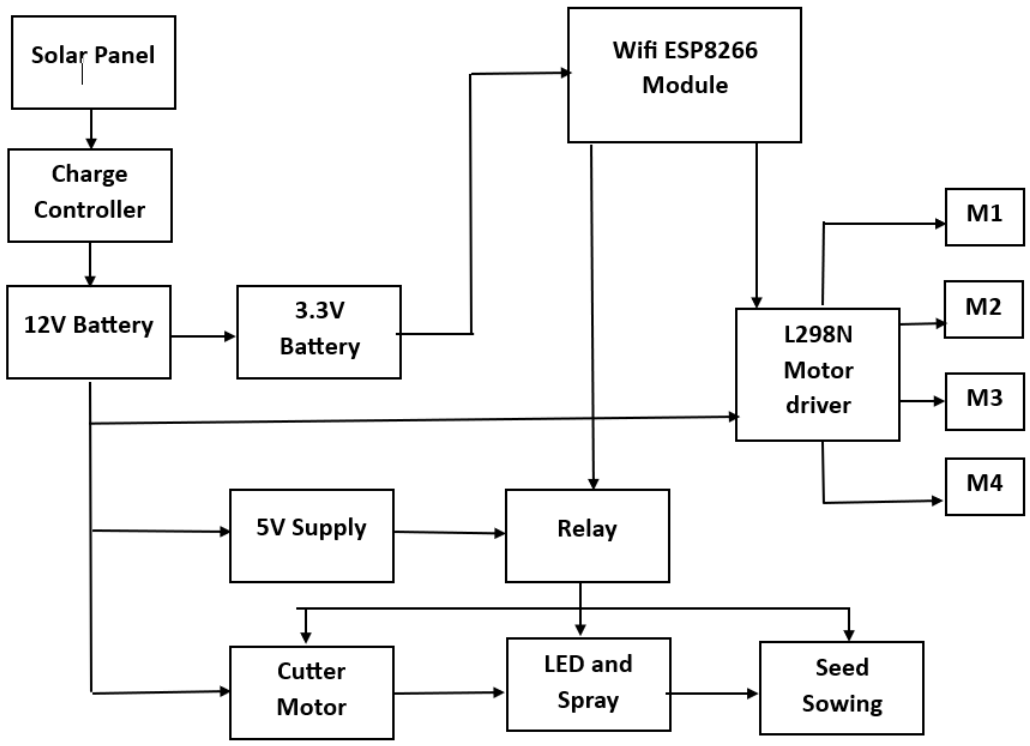

Figure 1. Construction Diagram

V. WORKING

Solar powered remote controlled seed sowing machine is device which works on solar energy with the help of remote. When farmer going to sow the seed he can do it by ourself without any man power. Solar panel is the main component of this device.

Solar energy takes and store's all the solar energy and after convert it into Electrical energy and converts it to battery thus farmer/person doesn't need to worry about the charging of battery. And in addition to this we set the program in nano Arduino.

So now the whole device going to work on remote/mobile app with the help of bluetooth. Sprayer is going to work like a fertilizing machine when it's needed so farmer can spray the fertilizer or water during seed sowing or after seed sowing.

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VI. PROBLEM STATEMENT & SOLUTION

Agriculture plays a central role in feeding the global population, but the industry faces several challenges related to efficiency, sustainability, and labor-intensive practices. Traditional farming techniques are increasingly inefficient due to high labor costs, low productivity, and environmental concerns such as excessive pesticide useand high fuel consumption.

A. Problem: Solar Powered Remote-Controlled Seed Sowing Machine with Sprayer

The current methods of seed sowing and crop spraying in agriculture present several key challenges that need to be addressed:

1. Labor Dependency and High Operational Costs: Traditional methods of sowing seeds and applying liquids (water, pesticides, fertilizers) are labor -intensive and require significant human effort and time. In many parts of the world, labor shortages and high labor costs exacerbate these challenges.
2. Environmental Impact: Conventional farming equipment typically runs on fossil fuels, contributing to air pollution, greenhouse gas emissions, and climate change. There is a pressing need for energy-efficient solutions that reduce the carbon footprint of agricultural operations.
3. Inconsistent Seed Sowing: Achieving accurate seed depth and spacing is critical to ensuring optimal crop growth. Inconsistent seed sowing due to manual errors or inefficient machinery can lead to poor crop yields and wasted resources.
4. Inefficient Spraying Systems: Manual or non-automated spraying systems often result in uneven coverage, excess chemical usage, and water wastage, all of which impact crop health, environment, and profitability.

B. Solution: Solar-Powered Remote-Controlled Seed Sowing Machine with Sprayer

The proposed solution is a solar-powered remote-controlled seed sowing machine with an integrated sprayer. This system aims to address the challenges mentioned above by combining automation, solar energy, and precision agriculture.

1. Solar Power System:

Solar Panels: A series of solar panels will be used to capture sunlight and convert it into electrical energy. These panels will power the motors, sensors, and other electrical components of themachine.

2. Remote Control and Automation:

Remote Control: The machine will be equipped with wireless communication (Wi-Fi, Bluetooth, or RF) for remote control, enabling the operator to start, stop, and navigate the machine from a distance.

VII. FUTURE SCOPE

Advancement in Solar Power Technology.

1. Integration with Smart Farming Technologies.
2. Automated Crop Management.
3. Market Demand and Accessibility.
4. Expansion of Solar Capabilities.
5. Sustainability and Environmental Impact .

VIII. CONCLUSION

The Solar-powered Remote-Controlled Seed Sowing Machine offers a significant advancement in modern agriculture, combining renewable energy and automation to improve efficiency and sustainability. By harnessing solar power, the machine reduces dependence on traditional fuel sources, lowering operational costs and minimizing environmental impact. Its remote-controlled functionality enhances ease of use, allowing farmers to sow seeds in large or difficult-to-reach areas with precision, reducing manual labor and human error. The integration of solar power further ensures that the machine can operate in off-grid locations, making it accessible in rural areas or regions with limited access to electricity.

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