Design and Fabrication of Solar Seed Sowing Machine Using Remote Control
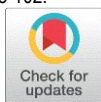
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Abstract: *The aim of this project is to develop a lightweight, economical and reliable seed sowing machine that will increasethe efficiency of the crop produced and also to develop a better mechanical machine to help the agriculture field which reduce the amount and type of work spend on one crop. Hence in this work of project we decided to design and builda machine which will be available for farmer of small scale production at cheaper rate also which can reduce their expenditure and the profit of farmer at the same time. The main specialty of this projects that it can also sow cotton seed with ease. The agriculture field needs to find solutions on old agricultural technique and replace them with moreefficient technique. In this project we tried to design and fabricate machine to reduce target energy input in more efficient way than in the past. The advent of autonomous system architecture gives us opportunity to develop a newrange of agricultural equipment based on small smart machine that can do the right thing in the right place at the right time in the right way. It will increase productivity and decrease expenses in agriculture sector. In agriculture, the opportunities for robot can increase efficiency and the robots are on farms in various appearances and with new technologies are in increasing numbers. The proposed robot design can perform the agricultural operations such as seed sowing and it is a remote controlled robot with reciprocating action of a seeding mechanism.*
Keywords: *Agriculture, remote control, solar panel, seed (groundnut.*

I.INTRODUCTION

Indian agriculture has begun in early days by 9000 BCE as a result of early cultivation of plants, and domestication of crops and animals. Agriculture is the one of the main occupation in INDIA. They were using animals to perform these operations. Our history of agriculture contains many examples of the use of tools, such as the hoe and the plough. Due to rapid development in technology farmingbecome much less labour sensitive and many other problems are occurred in the agricultural field. By this People are tired of doing the agricultural activities in the sunlight and their health is also affected very much by doing the heavy work in the fields. People were Seeding by manual method includes broadcasting the seeds by hand. The aim of our project is to perform agriculture work, By using this robotic technology the farmer can perform these all operation just by sitting in a cool placeand can do ploughing, seeding and grass cutting. The basic idea in this paper is to develop a mechanized device thathelps farmers to perform operations like seeding/seed sowing at predesignated distances and depth. So now it'snot necessary to do seeding in sunlight. By using robot technology one can easily perform these all operation by providing the input to the robot it performs the operationaccording to the data given by the user. Traditional methods of farming are broadcasting, dibbling, drilling, opening furrows by a plough and dropping seeds by hand or dropping seeds in the furrow with a bamboo/metal funnel attached to a plough. For sowing in small areas dibbling i.e., making holes by a stick or tool for droppingseeds by hand has been practiced for many years. There are also multiple row traditional seeding mechanism withmanual scale for measuring the quantity of seeds are most popular with experienced farmers. In manual seeding mechanisms, it is impossible to achieve uniform distribution of seeds.

II.LITERATURE SURVEY

1. **Shriyash Thawali et.al (2017)** deals with manufacturing and development of robot in agricultural applications. The main application of this robots in agriculture is of harvesting stage i.e. seeding. This robot is replaces human labour consumption. This paper represents a robot which is capable of performing operation automatic seed distribution and spraying of pesticide. The microcontroller supervises the entire process. The robot for Manual control uses the Remote controller to control the device and helps in the directingof the robot on the field.

2. **Sreelakshmi.P et.al (2016)** proposed for a prototype of an agricultural based robot capable of performing farming activities like sowing seeds. This automatic robot is capable of performing and scanning field operations. Therobot is fed with inputs like field dimensions, spacing between the seeds and the tasks are performed accordingly. This model of the agricultural robot is cost effective and user friendly.

3. Dr. Sunitha.K.A et.al (2017) proposed sowing mechanism actuated with motors and the complete body is divided into two parts the tail part acts as a container for seeds. The successor holds on all the electronics used forautomating and actuation. The locomotion is provided with wheels covered under conveyor belts.

4. Usha.P et.al (2015) used to development of develop agricultural land without the man power. The aim of thispaper is to decrease the man power, time and there is increase in productivity rate. All the automated robot works like seeding, harvesting etc. and the vehicle is navigated are preferred by using microcontroller.

5. Vinay Kumar Tiwari et.al (2017) focused on all the basic automatic of the seeding mechanism for moving it forward and backward and also for putting the plough ofseeding mechanism up and down for it to seed at a givendepth. The systems of sowing the seeds and directing the vehicle are preferred by this automatic robot using microcontroller, relay switches etc. The seeding technique is now used as an alternate to the old farming techniques and promote to soil and water conservation.

III.METHODOLOGYCOMPONENTS USED

Figure 1: Components

1. Battery: An electric battery is a collection of one or more electrochemical cells in which stored chemicalenergy is converted into electrical energy. The principles of operation haven't changed much since the time of Volta. Each cell consists of two half cells connected in series through an electrolytic solution. One half cell houses the Anode to which the positive ions migrate from the Electrolyte and the other houses the Cathode to which the negative ones drift. The two cells are may be connected via a semi permeable membranous structure allowing ions to flow but not the mixing of electrolytes as in the case of most primary cells or in the same solutionas in secondary cells. This difference of electron concentration causes an electrical potentialdifference to develop between the metals. This electricalpotential difference or emf can be utilized as a source ofvoltage in any electronics or electrical circuit. This is a general and basic principle of battery.

2. NODE MCU: The NodeMCU (*N*ode *M*icro *C*ontroller *U*nit) is an open-source software and hardware development environment built around an inexpensiveSystem-on-a-Chip (SoC) called the ESP8266. TheESP8266, designed and manufactured by EspressifSystems, contains the crucial elements of a computer:CPU, RAM, networking (WiFi), and even a modernoperating system and SDK. That makes it an excellentchoice for Internet of Things (IoT) projects of all kinds. However, as a chip, the ESP8266 is also hard to access and use. You must solder wires, with the appropriate analog voltage, to its pins for the simplest tasks such as powering it on or sending a keystroke to the "computer"on the chip. You also have to program it in low-levelmachine instructions that can be interpreted by the chiphardware.

3. Solar Panel: A solar panel is a device that converts sunlight into electricity by using photovoltaic(PV) cells. PV cells are made of materials that generate electrons when exposed to light. The electrons flow through a circuit and produce direct current (DC)electricity, which can be used to power various devices orstored in batteries. Solar panels are also known as solarcell panels, solar electric panels, or PV modules.

Solar panels are usually arranged in groups called arrays or systems. A photovoltaic system consists of one or more solar panels, a inverter that converts DC electricity to alternate current (AC) electricity, and sometimes other components such as controllers, meters, and trackers. A photovoltaic system can be used to provide electricity for off-grid applications, such as remote homes or cabins, orto feed electricity back into the grid and earn credits or payments from the utility company. This is called a grid-connected photovoltaic system.

A solar panel is a set of solar photovoltaic modules electrically connected and mounted on a supporting structure. A photovoltaic module is a packaged, connected assembly of solar cells. The solar panel can be used as a component of a larger photovoltaic system to generate and supply electricity in commercial and residential applications. The working principle of alltoday solar cells is essentially the same. it is based on thephotovoltaic effect. in general, the photovoltaic effect means the generation of a potential difference at the junction of two different materials

in response to visibleor other radiation.

The basic processes behind the photovoltaic effect are:
- Generation of the charge carriers due to theabsorption of photons in the materials that form ajunction
- Subsequent separation of the photo-generatedcharge carriers in the junction
- Collection of the photo-generated charge carriersat the terminals of the junction

4. Seed Drill: It is a device used in agriculture that sows seeds for crops by positioning them in the soil and burying them to a specific depth while being dragged by a tractor. This ensures that seeds will be distributed according to the power source used seed drills may be classified into .
i)Bullock drawn seed drillsii)Tractor drawn seed drills

5. LCD: LCD (Liquid Crystal Display) screen is anelectronic display module and find a wide range ofapplications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. A 16x2 LCD means it can display 16 charactersper line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD hastwo registers, namely, Command and Data.

6. Leveller: Leveller breaks the hardpan of the soiland helps the water to seep into the soil for improving drainage. It is a multipurpose hand tool used for diggingand other agricultural operations. It consist of flat iron bar to which the fingers or prongs are joined by fasteners orwelding.

7. Motor Drive: Motor drivers acts as an interface between the motors and the control circuits. Motor require high amount of current whereas the controller circuits works on low current signals. They convert step and direction input from the controller to currents and voltages compatible with the motor.

IV.WORKING PRINCIPLE

In our project we are going to perform automatic digging,seed sowing and levelling. Solar panel used to capture solar energy and then it is converted into electrical energy. This energy is used to charge 12V battery which is utilized by DC motors. The motor is switched on .This motor will stop after covering the provided distance thendigging motor will start .Machine will dig the soil through the mechanical assembly and stop the digging motor. Atthe same instant seed dropper motor starts to rotate .Seed is dropped in pit and leveller covers the seed with soil. The entire machine is controlled by using remote control .Thisprocess is continuously repeated until one row is completed.

BLOCK DIAGRAM
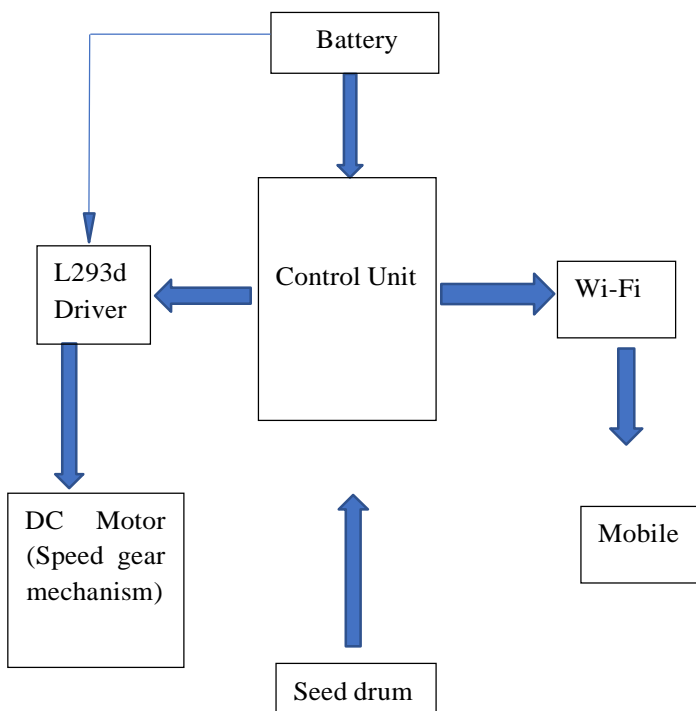
V.SEED SELECTION

By using this machine we can sow seeds like **Groundnut, Maize, Bean, Cotton seed, Sunflower seed ,Green gram, Black gram.**

VI.ADVANTAGES

- To improve efficiency in planting
- Increased yielding and reliability in crop
- Less maintenance cost
- Seed planting accuracy
- Save time of sowing
- Reduce seed loss
- Dependency on labour also decreased
- As a result, this machine is very useful foragricultural purposes

VII.TIME AND CALCULATION

Traditional Method of Seed Sowing:

Traditional agriculture is a primitive type of food production and farming that makes extensive use of indigenous knowledge, land use , traditional equipment, natural resources ,organic fertilizer ,and farmers farmer's cultural value **.** The time taken for sowing isabout 2 to 3 hours.

- It is old methods of sowing.
- The rate of production is low.
- This method of farming is environmentallyfriendly.
- Bullock carts and other wooden tool equipmentare used.
- In this method of farming natural manure is usedas fertilizers.

Modern Method of Seed Sowing:

These are the farming practices that make considerable use of man power, capital, and equipment such as winnowing machines, threshers, harvesters. The timetaken for sowing is 30 mins.

- It is the new and scientific method of farming.
- The rate of production is high in a lesser period.
- This method of farming is not environment friendly.
- Tractors and other advanced tools are used.
- In this method of farming, chemical fertilizers areused .
- This method saves time and labour cost.

Figure 2: Solar seed sower

VIII.CONCLUSION

This seed plantation machine has great potential for increasing the productivity of the planting. Till now tractor was the main traction unit for nourishment in farming. With the adaptation of this seed planting machine its purpose will be done. Hence there is need to promote this technology and made available to even small scale farmers with affordable prices.

The following are the expected results from the proposedsystem.

□ The main focus of this system is its Automatic way ofsowing the seeds. The seeds are been sowed in an appropriate routine which results into a suitable growth of seeds.

□ This automatic way of sowing seeds using a robot reduces the labour requirement. Here the wastage of seeds is also been reduced to a greater extent.

□ This system has been developed for the sowing of seeds in an automatic way. Here with the help of a robot the seeds are been dispensed in the soil in a proper sequencehereby reducing the wastage of seeds.

□ This robot will help the farmers to do the farming process efficiently. The main thing about the project is tomake an

efficient and low cost robot which can be affordby the small farmers.

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