

## SMART AGRIBOT

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**Abstract**—Agriculture Sector is the spine of the Indian Economy. There is an incredible requirement for the development of innovation in the agriculture sector, which can be accomplished by utilizing progressed mechanical strategies for farming processes like digging, sowing, harvesting, and irrigation, etc. This reduces labor costs and improves overall productivity without affecting the quality of the soil. This machine can carry out various farming activities simultaneously. Air and Noise Pollution are caused by the combustion of fossil fuels in IC Engines and External Combustion Engines. To avoid these problems, this machine uses Solar Energy as an eco-friendly energy resource. To convert solar energy into electrical energy solar panel is used and a DC Motor converts this electrical energy into mechanical energy to rotate a cutter for digging operation. Seed Hopper and Water Tank are used for seed sowing and irrigation operations respectively. This machine decreases the cost of sowing the seeds as it allows the seed to seed spacing and row to row spacing.

**Keywords:** Cutter, DC Motor, Mechanization, Seed Hopper, Solar Energy, Water Tank.

### I. INTRODUCTION

Agriculture is the backbone of the economy in India as 50% of the population is involved in farming activities directly or indirectly. Pointed at expanding the efficiency and decreasing the labor included, this robot is planned to execute the essential capacities required to be carried out in ranches.

The robot starts its function by plowing the field, then sow the seeds in the plowed area, and ends the process by covering the seeds sown with soil. It uses basic components like DC motors, Relay, H- bridge, and Arduino as the main controller. To carry out the plowing function robot is provided with wheels which are fixed in the anterior end, to sow seeds it has a container with seeds and its bottom contains a perforation to drop the seed in the plowed area and finally, the posterior end of the robot has a sloping metal sheet touching the ground to cover the sown seeds by moving forward with soil.

### II. LITERATURE REVIEW

1. SOLAR POWERED SEED SOWING MACHINE(Prof. Pranil V. Sawalakhe, IJRSET, 2015)

Work: During sowing the seeds and fertilizer are put in rows at favored depth by providing proper spacing, covering the seeds with soil and proper compaction is provided.

Components used: Chassis ,PCB ,Drill ,Battery ,Electric Motor ,Solar panel

Remarks: Concludes that bullock drawn planters are essential for sowing because the experienced workers for sowing are nearly decreasing. Plant population and Planting distance are major factors in increasing the production of crops.

2. AUTOMATIC SEED FEEDER(A.O.Hannure, IJETT,2016)

Work: The customized belt is used which mounted on cloth material. During movement of belt large amount of seeds falling in the soil are minimized by stripper plate.

Components used: frame, hopper, belt drive, sewing motor, conveyor etc

Remarks: automatic seed feeder can be used only for small seeds then using of conveyor belt with a motor is useful.

3. PNEUMATICALLY OPERATED AUTOMATIC SEED SOWING MACHINE (Prof. Gunale R.B,IJRSET,2017)

Work: pneumatic equipment for sowing small seeds in cups, and use, of driving the vacuum generator can be done electrically. equipment can be automated.

Components used: Frame, Pulley, Seed Tray, Nozzles, Pneumatic Pipes, Vacuum pump, Stepper motor

Remarks: Easy to handle, purely mechanical

4. MULTIPURPOSE THREE IN ONE AGRICULTURE AUTOMATION SYSTEM (Bhogade P.S, IJARIT, 2018)

Work: Agriculture Automation System which will do 3 tasks in one go that is we can cut grass, spray liquid insecticide and sowing machine at the same time using a single system

Components used: DC Power supply, AC Power supply, Grasscutter, Powder sprayer, Liquid insecticide sprayer, Switchboard

Remarks: system will be efficient and will definitely save time and labor work for agriculture work

5. AUTOMATIC SEED SOWING ROBOT(Prof. Jagdish Hallur, IJAERD,2019)

Work: When the seeds are empty it detects the level of storage seed and indicates with the help of LED. When any obstacle comes in-front of machine it diverts its path with the help of IR sensor

Components used: Seed hopper, Battery, Arduino, Arduino ide software, motor,motor driver

Remarks: The main aim of our project is to reduce the human effort, time requirement, and to increase the accuracy of the seed sowing project design.

6. MECHANIZATION OF MANUALLY OPERATED SEED SOWING MACHINE (Kiran K Jadhao, IJARTET,2019)

Work: Sowing operation is to place seed at proper position respective of other placed seeds in every row at a particular depth

Components used: Hopper, Adjustable Furrow Opener

Remarks: machine is cheap, easily affordable, easy to maintain and less laborious to use

III. METHODOLOGY

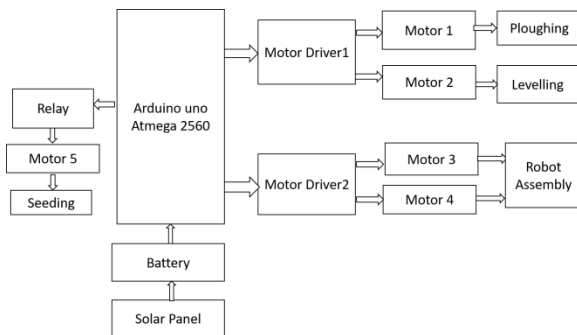


Fig 1 Block Diagram

The multipurpose robot is designed and developed to reduce time and human effort. The operations are carried by a robot are gathering, burrowing, seed sowing, and leveling to shut the soil. These all operations are performed by utilizing the battery and solar power.

- The outline of the robot is made of Mellow steel (MS). The four wheels are associated with the frame, which is driven by using a DC motor.
- The front of the frame harvester rotor is associated and this rotor is turned by using DC motor.
- On the center of the outline three diggers are associated to burrow the soil. The nut and jolt course of action is utilized within the robot, by utilizing nut and jolt up and down position of the digger is done.
- Funnel is utilized to store the seeds. Three hoses are utilized to put through pipe and digger into the hoses seeds are flow down with the assistance of moo speed motor.
- At the conclusion of the outline the leveler is associated by utilizing leveler the seeds are near within the soil.
- Top of the frame solar panel is placed. The Solar panel is connected to the battery of capacity 12V.

IV. OBJECTIVES

The objective of this paper is to display the robotic model which can be easily used for various agricultural operations.

- Nowadays it is a need for mechanization in the agricultural field to reduce the farmer's endeavors and work cost.
- To perform all operations like burrowing, seed sowing, and covering seed at a single time consequently increment generation and spares time.
- The agriculturist can work robot exceptionally easily.
- A Large sum of work completes in less time.
- For battery charging sun based vitality is to be utilized. The beams of the sun can be utilized for sun powered control generation.

V. OPERATIONS

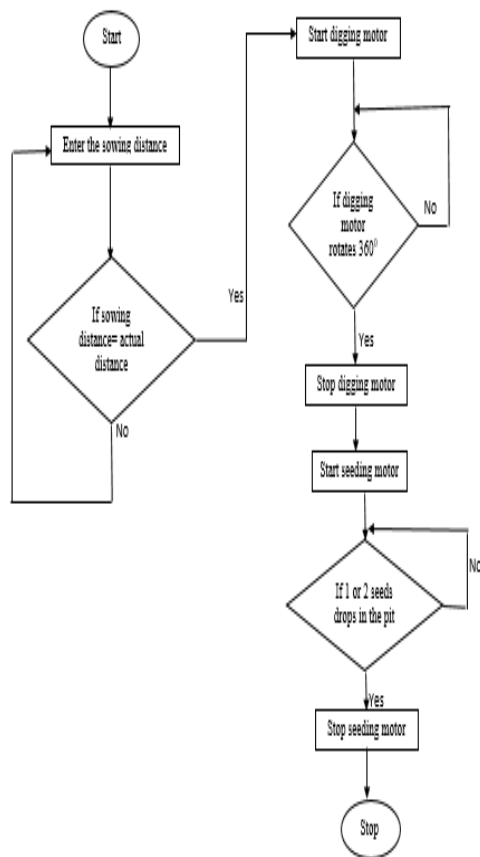
**Burrowing operation:-**There are three diggers are utilized in burrowing operation. The diggers are mounted on the center of the outline. Digger instrument is utilized to burrowing and seed sowing. All the diggers are flexible the diggers are associated with the outline by the nut and jolt arrangement. Holes are produced on the diggers.

The funnel and diggers holes are linked by using the hoses.

**Seed Sowing Operation:**-Seed sowing is the method of planting seed. Convention strategy of seed sowing based on presumption of seed to seed sparing and depth of placement which isn't productive and it required parcel of planned exertion to. A few times it comes about in spinal pain of farmer.

**Leveling Operation:**-A sheet metal plate is utilized as soil closer and leveler. The fabric of the sheet metal plate is gentle steel. A course of action of nut and jolt is utilized for sheet metal plate up and down development. The leveler is settled to the outline which closes the soil within the sowed soil and level the land.

**VI. FLOW CHART**



**VII. MATERIALS AND COMPONENTS**

Materials utilized to conduct the display investigate are

- 1. Cast press for Frame:** Cast press could be a gathering of iron-amalgams with a carbon

substance more noteworthy than 2%. Its value determines from its moderately moo dissolving temperature. The amalgam constituents influence its color when broken.

- 2. Gentle steel for Diggers:** Gentlesteel may be a ferrous metal made from press and carbon. It could be a low priced fabric with properties that are appropriate for most common building applications. Moo carbon mellow steel has great attractive properties due to its tall press substance, it is hence characterized as being 'ferromagnetic'.
- 3. DC motor:** A DC engine is any of a lesson of rotating electrical engines that change over coordinate current electrical vitality into mechanical vitality.
- 4. Solar panel:** The term solar panel is used for a photovoltaic (PV) module. A PV module is a combination of photovoltaic cells mounted in a framework for installation. Photovoltaic cells utilize daylight as a source of energy and produce direct current electricity.
- 5. Wheels:** A wheel may be a circular piece of difficult and solid fabric at whose center has been bored a circular gap through which is put a hub.
- 6. Battery:** A battery is a device consisting of one or more electrochemical cells with outside connections for controlling electrical devices.
- 7. Pipe and hoses:**A pipe could be a tube that is wide at the best and limit at the foot, utilized for guiding liquid or powder into a little opening. A hose may be adaptable empty tube planned to carry liquids from one area to another

**VIII. ADVANTAGES**

- Many farming processes like digging, sowing, harvesting and irrigation, etc. are done.
- It maintains the proper row spacing.
- The seed is sowed at proper depth.
- The Seed rate can be controlled.
- Cost-efficient.
- Less Man Power will be used.

**IX. FUTURE SCOPE**

Seed to seed spacing differs for different plants. While sowing different seeds, spacing has to be changed every time. This can be avoided by using the Digital Image Processing technique. The seed spacing and seed images for different seeds are stored in a database which is compared with the desired seed to be sown and seed spacing is done automatically by the Agribot.

**X. PHOTOGRAPHS OF THE MACHINE**

The below figures show the experimental setup of the Agribot

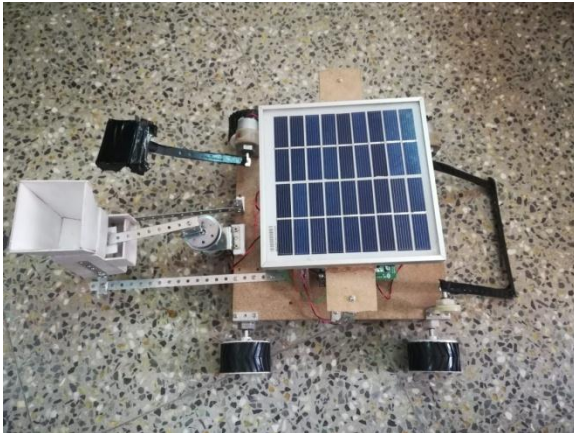


Fig 1

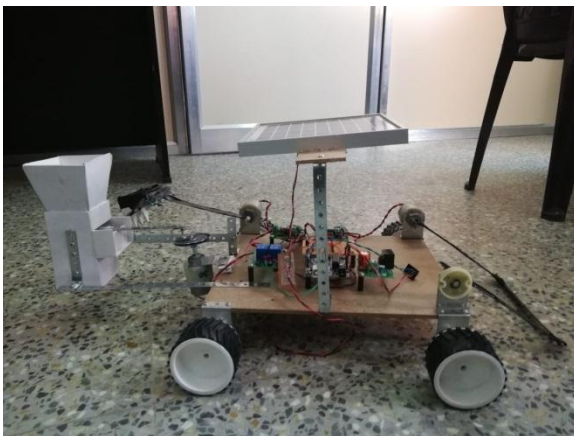


Fig 2

**XI. RESULT**

The application of row spacing to be maintained for various seeds is as below

Sr. No	Seed Name	Distance between two seeds
1	Corn	60cm
2	Soybean	18cm
3	Groundnut	15cm
4	Jowar	12cm

**XII. CONCLUSION**

In farming, by utilizing the sun based worked multi-purpose robot. We will effectively decrease the agriculturist endeavors and time. The machine required less manpower and less time compared to the conventional strategy. We trust this will fulfill the fractional pushed of Indian agribusiness. So in this way able to overcome the work issue that’s the requirement of today’s cultivating in India. With the advancement of robot cultivated framework, nourishment generation can be expanded impressively and financially.

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