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Automated seed sowing robot

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ABSTRACT

Agriculture is the backbone of India. In agriculture ploughing seed sowing is one of the major stages. Traditionally, the farmer will engage labor for ploughing, seed sowing. Thus, it requires a lot of manpower and time taking process. For ploughing, farmers are using tractors and animals, Tractors will work on fossil fuels, fossil fuels will pollute the environment. Tractors also produce the sound which in turn produces the noise pollution, on the other hand, the animals are used for ploughing the land instead of using them for ploughing the land, we can use for various tasks such as for products. Here we proposed the Automated Seed Sowing Robot which helps the farmer in ploughing the field and sowing the seeds and covering the seeds. The proposed Automated Seed Sowing Robot has 2 parts let us consider it as HEAD and TAIL. To the HEAD the blades are attached so that it will plough the land and the UR sensor is attached to detect the obstacles in the way. To the TAIL the seeds container is placed and the seeds are placed in a regular interval and at the haft is used to cover the seed.

Keywords— Agriculture, Farmer, Seed, Automated

1. INTRODUCTION

1.1 Motivation

The humans may sow the seeds, but it may not be in order and the seeds may not be placed in a correct depth, which eventually leads to is inconsistent crop and reducing the efficiency of the crop. In rural areas where there are more farming landholders, there is a scarcity of laborers, in that situation our product would seek it out. In large scale farms, it is very difficult for humans to plough the land and sow the seeds, which has created the space for the product like these. In rural areas where there are more farming landholders there is a scarcity of laborers, in that situation our product would sough it out. We see a lot of people can't afford proper food with products like this coming in productivity the efficiency of

farming increases, in turn, makes the scarcity of the food reduce. Figure 1 shows the loss suffered due to improper spacing.

Planting Outcome	Plant Spacing			Loss/Gain in Grain Weight**	Grain Yield ***
				lbs. of grain	% of yield @ perfect spacing
Perfect Spacing				0	100
% yield*	100	100	100		
Skip				-0.26	73
% yield	110		110		
Double				0.13	113
% yield	100	70 70	100		
Seed Misplaced by ¼				0	101
% yield	98	101	104		
Seed Misplaced by ½				0	100
% yield	94	98	108		
Seed Misplaced by ¾				-0.04	96
% yield	87 88		112		

Fig. 1: Corn Planting Spacing Observation

1.2 Objective

In the modern generation, the farmers are unable to do farming because of the unavailability of labor, water, money and due to a craze over the software field and various other fields, the farmers are selling the land and leaving for the cities. Now we came up with the initiative that the bot will plough the land and sow the seeds automatically, which decreases the manpower, power consumption and time process.

Our bot is automated one it will estimate the field and it will sow the seeds regularly which reduces the manpower and makes the farmers who went for the cities for their live hood will come back and start doing farming, which in turn helps in

developing the GDP of India and transfers India into healthy. Our bot will sow the seeds deep into the soil so that the seeds will never germinate, and also can't be eaten by birds and animals, these help the farmer tension in safeguarding the field. Our products efficiency is around 70-80% and it is a productive one, it helps in increasing the productivity linearly.

Load sensor gives the maximum reading the bot starts to move towards the manure pit to dump the dung.

2. LITERATURE SURVEY

According to a survey, the Indian agriculture grown in 2018 to 2019 is 7.5% GDP Indian economy grew by 7.7% in the first quarter of 2019. Total production required for 2017-2018 normally paddy, cotton, sunflower, soya bean, etc. in Andhra Pradesh target area 2018-2019 is 1717229 area. There are many seed companies, including multinational seed companies engaged in seed production and many of them have developed R&D infrastructure facilities for involving hybrids/verities to suit the requirements of the farmers crop-wise seed required plant 2018-2019 to 2020-2021. Private companies are involved in the production of low volume and high-value hybrid crop seeds such as cotton, maize, sunflower, jowar, bajra and also paddy. It has to support almost 17% of the population from 2.3% of world geographical area & 4.2% of the world's water resources.

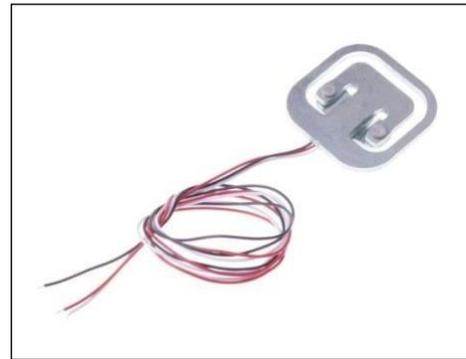


Fig. 4: Load Sensor

3.3 Servo Motor

The picking and dropping action of the bot is done using the service motor. When the dung is detected then the servo motors start and picking action starts which use a metal plate. After picking the dung present on the metal plate is dropped into the tray present on the bot.

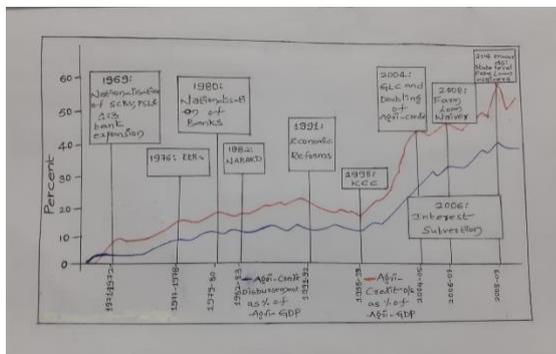


Fig. 2: Direct Agricultural Credit as a percentage of Agriculture GDP (at current prices)

3. COMPONENTS USED

3.1 Voltage Regulator

A voltage regulator is an electrical regulator designed to automatically maintain a constant voltage level. The voltage regulator we use is LM7805. The LM78XX series of three-terminal regulators is available with several fixed output voltages making them useful in a wide range of applications. It is used to provide the power supply to the controller.

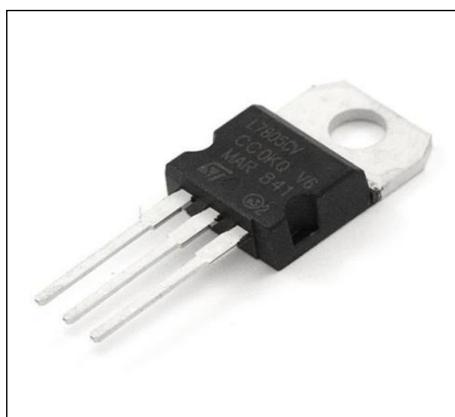


Fig 3: Voltage Regulator

3.2 Load Sensor

The load sensor gives the weight of the dung present on the tray to the controller. When the load sensor gives the maximum value then indicates that the tray is full. When the

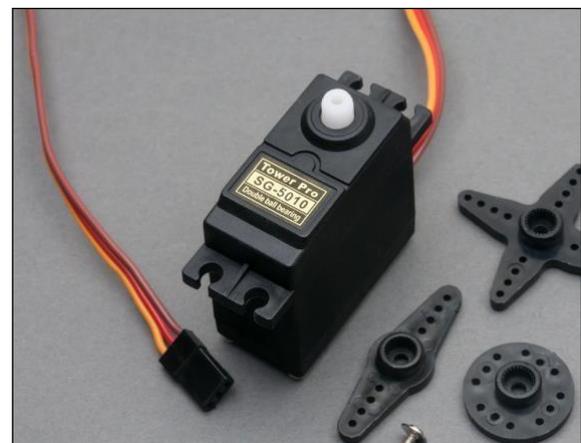


Fig. 5: Load Sensor

3.4 L293D Motor Driver

It is used to drive the motor and control it as required for our use.

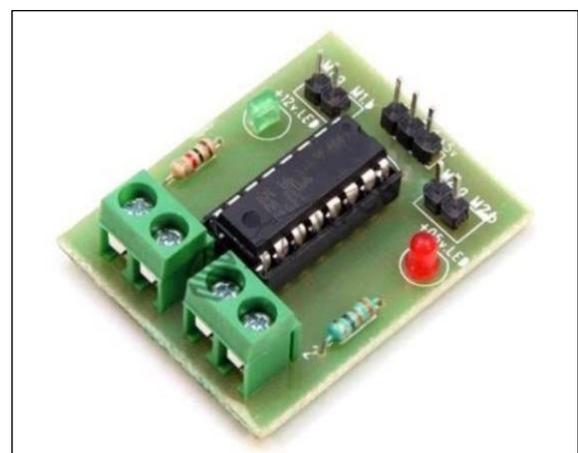


Fig. 6: Motor Driver

3.5 DC Motor

A DC motor is any of a class of electrical machines that converts direct current electrical power into mechanical power. The most common types rely on the forces produced by magnetic fields. DC motors are used for the movement of the bot.

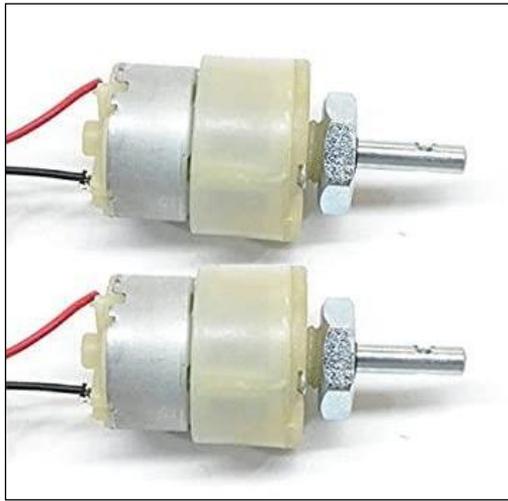


Fig. 7: DC Motors

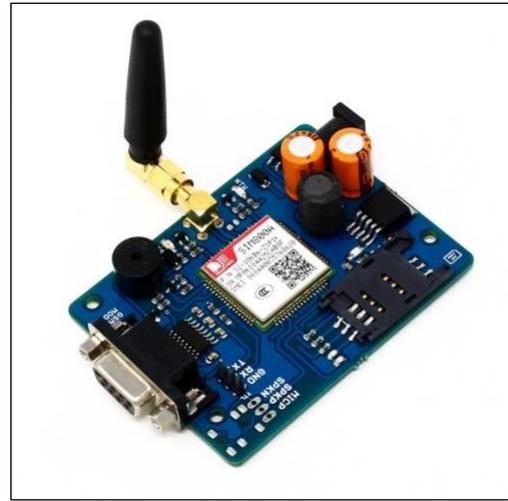


Fig. 9: GSM Module

3.6 Ultrasonic Sensor

The Ultrasonic Sensor is used in the past planning of the bot. The obstacle detection is the primary requirement of this autonomous robot. The obstacle avoidance robotics is used for detecting obstacles and avoiding the collision. The robot gets the information from the surrounding area through mounted sensors on the robot. An ultrasonic sensor is most suitable for obstacle detection and it is of low cost and has a high ranging capability.

The ultrasonic sensor is attached in front of the robot. It is placed on a servo motor. With help of servo motor action, the ultrasonic sensor can check in all the three directions (front, left and right) Whenever the robot is going on the desired path the ultrasonic sensor transmits the ultrasonic waves continuously from its sensor head. Whenever an obstacle comes ahead of it the ultrasonic waves are reflected from an object and that information is passed to the microcontroller.

The microcontroller controls the motors left, right, back, front, based on ultrasonic signals and makes the bot to travel in the direction in which the distance from an obstacle is more. If the obstacle detected is cattle faces which could be known with the help of image processing and gas sensor outputs, the bot will start its mechanical action for picking them.



Fig. 8: Ultrasonic Sensor

3.7 GSM Module

GSM module can be used for the communications between a bot and the base mobile phone the communication done through GSM technology where the GSM SIM card is inserted in the module and the other end, we have predefine mobile number to send the important alerts like obstacle ahead, seeds container is empty, etc.

4. DESIGN AND IMPLEMENTATION

This system has a 4-wheel robot system. In seed sowing machine, battery-powered wheels are used and dc motor is inbuilt in these wheels. The proposed robot uses four motors for running it in desired directions. We use a storage tank for filling seeds to the lower compartment by using the funnel. By using shaft gear like bucket teeth, it picks up's the limited quantity of seeds and regularly pours them in proper quantity. The front of the robot is provided with a drilling mechanism and the back portion of the robot can be fitted with a tail like a bent rod to cover the seeds with soil. To divert the path of the robot, we have interfaced with an ultrasonic sensor. When the seeds in the storage tank are emptied, the machine will intimate using an alarm sound to the farmer/owner. This system provides all the facility which can work efficiently.

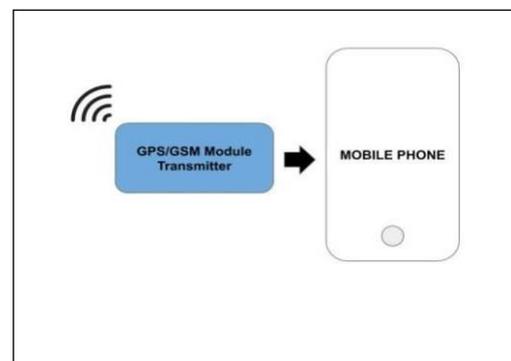
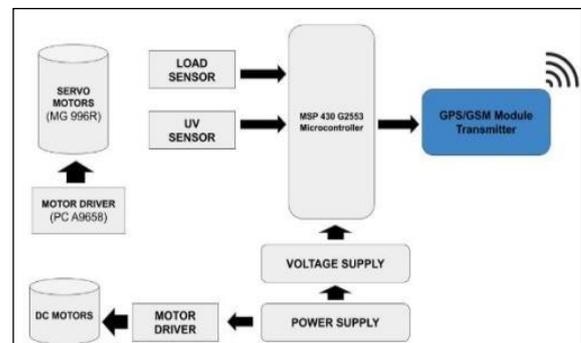


Fig. 10: System Design

Below you can find our prototype model images and the images show how our final bot look and also gives you an idea how the internal structure of the bot looked like the bottle used in the picture did act like a container for all the seeds and the load sensor is later attached to load sensor to understand when the container is empty.

5. APPLICATIONS

Our product can be used in the following fields:

- Agricultural field
- Horticulture
- Gardening
- All areas where sowing of seeds is required.

6. CONCLUSION



Fig. 11: Photographs of Model

7. TESTING AND DATA FLOW

We have tested and coded the Bot for SOYBEAN seed farming before we look into data flow, we will look into what are the required facilities for SOYBEAN cultivation.

Table 1: Table which shows the required facilities for a SOYBEAN crop

TYPE OF CROP	DISTANCE BETWEEN TWO SEEDS	DEPTH REQUIRED FOR SEED	SOIL CONDITIONS FOR CROP	PH LEVEL
SOYBEAN	40-45cm	3-5cm	Well drained and fertile loam soil	6-7.5

Below you can find the flow diagram for the SOYBEAN seed plantation.

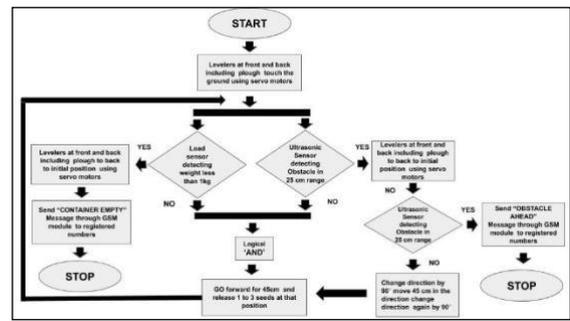


Fig. 12: Flow-chart describing the flow of the Bot for SOYBEAN plantation

This prototype helps the farmer to provide a proper advantage to the farmer and also makes the yield more efficient and reduces the man effort by making the world be in a more comfortable position in terms of food and also some more key terms are given below

- Less work more yield.
- Eco friendly.
- A perfect machine for a future generation
- Ease of using no need for complex operation

8. FUTURE SCOPE

- Less cost,
- Fewer members,
- More accurate,
- More Automated so farmers for sure will invest in the machine, which produces them more yield compare to present practices.

9. REFERENCES

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