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REVIEW ON ADVANCEMENT IN AUTOMATIC SEED SOWING MACHINE AND ITS APPLICATIONS

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Abstract - *Agriculture plays a major role in the economy of a country. It is the backbone of Indian economic system. The success of crop production depends on timely seeding of these crops with reduced dull work of farm labor. This project consists of the better design of the machine which can be used specifically for sowing of soybean, maize, pigeon pea, Bengal gram, groundnut etc. The problems in the existing seed sower is rectified and advancement which has done is explained in this paper. The electromechanical techniques are used to design the seed sowing machine. It is operated by mobile phone Wifi. DC motor, battery, microcontroller and some other mechanical components are used to design this machine. The machine detects the seed flow and also detects the obstacles in front of the machine. This machine works efficiently to help the people.*

Key Words: sensor, mobile phone Wifi, microcontroller, seed sowing device, methods

1. INTRODUCTION

In the current generation most of the countries do not have sufficient skilled man power specially in agricultural sector and it affects the growth of developing countries. The main requirement of Automation is to reduce man power. There are many new technologies introduced in this field. In this paper, how the seed sowing machine can be automated is explained. By automating the sowing process we can reduce production cost, improve productivity and to conserve resources. The machine is controlled by using phone Wifi. Seed sowing machine is a device which helps in the sowing of seeds at a particular area hence helps the farmers in saving time and money. Both seed sowing and ploughing process can be done in this machine.

2. COMPONENTS USED

2.1 Body of the machine

The body of the machine is made up of square shape angles. This angle plate is of stainless steel. It consists of four wheels and two motors are used to control the wheel. The ground clearance of 200mm is provided to avoid stuck of machine in the soil.

2.2 Wheels

The wheels are connected with the motor to control motion of the machine. The tooth harrow wheel with little projection is used in the back wheel and this prevents the wheel from stuck in the soil. The normal wheel is used as the front wheels. The wheels which are designed help to give grip during the seed planting so that the user can easily drive the assembly of the machine as per required direction.

2.3 Seed tank

The seed tank is fixed at the centre and the flow of seed is controlled by using electric cylinder. Different kinds of seed can be sowed easily. The movement of cylinder is adjusted depending on the size of the seed.

2.4 Electronic components

The function of the electronic components used in this machine are:

2.4.1 Arduino UNO

The arduino board is used to control the motion of the machine and adjustment of the seed flow.

2.4.2 L298 Motor driver

The motor driver is used to control the forward and backward movement of the motor.

2.4.3 Wifi module

The wifi module is connected to the arduino and the wifi is connected to mobile to operate the machine.

2.4.4 Dc motor

Two dc motors are used for the movement of the machine. The dc motors are connected to the motor driver. The motor driver send the required power to the dc motor. The specification of the dc motor used is 3600 rpm(10v,120w).

2.4.5 Electric cylinder

The electric cylinder is fixed to the open and shut valve of seed tank. It is used to control the flow of seed from the tank. The seed flow from the tank varies depending on the size of seed can be sowed.

2.4.6 Battery

Two 12V batteries are used to give power to the dc motor and the electric cylinder. Here lead acid rechargeable battery is used.

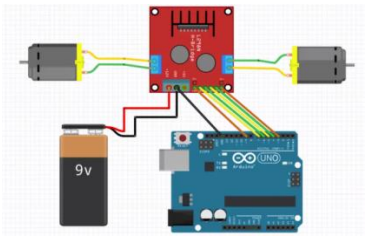
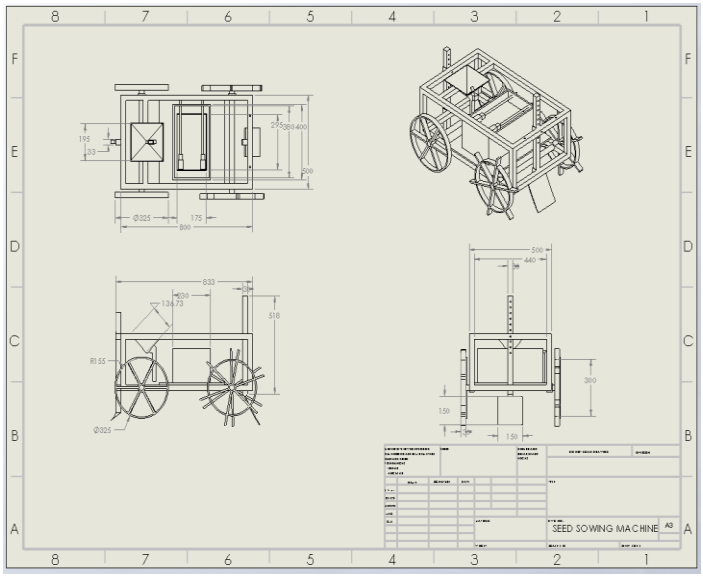


Fig -1: Circuit Diagram

3. DESIGN OF THE MACHINE

3.1 2D drawing



3.2 3D View

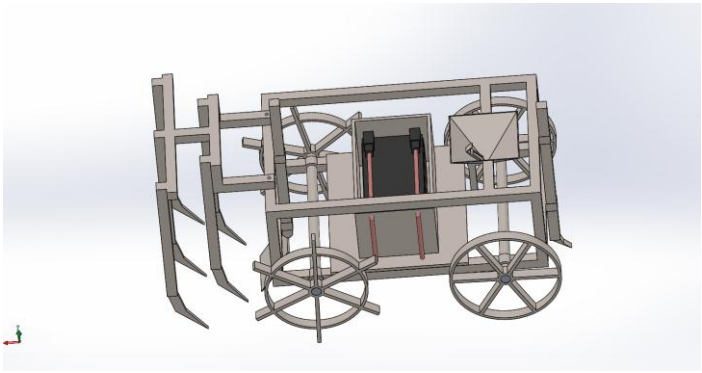


Fig -2: Seed sowing machine with plougher

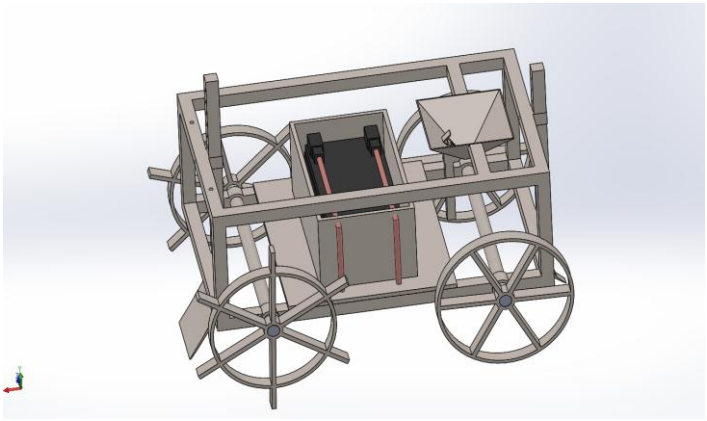


Fig -3: Seed sowing machine for the purpose of seed sowing

4. WORKING

The two dc motors are connected to the back wheel. The wires of the dc motor are connected to the motor drive separately. The motor driver is connected to the arduino and to the battery. The bluetooth module and the electric cylinder are connected to the arduino through wires. The program required to run the seed sowing machine is coded and uploaded to the arduino board. Depending upon the command given from the mobile the seed sowing machine acts according to it. The electric cylinder is used to control the seed flow by opening and closing the valve. Depending upon the size of the seed four stages are set for the electric cylinder.

A single plough is fixed in front of the seed tank. The height of the plough can be adjusted manually. The plough is used to create a hole in the land for sowing a seed. A sand closer is fixed next to the seed tank, the height of the sand closer can also be adjusted manually. The sand closer is used to close the hole created by the plough. The height of the single plough and the sand closer is adjusted using a pin lock type system.

This seed sowing machine can also be used as a ploughing machine by attaching a plough at the back side of the machine. The attachement is temporary we can remove and attach it anytime we want.

When the bluetooth module is connected to the mobile phone, a specific app(many apps are available in playstore with free access) is used to control the machine, in that app the number of keys are available depending upon the coding given. The key is specified for a operation in the form of program. If one key is pressed, a message is send to the arduino board through bluetooth. Then the arduino response based on what operation is assigned to the key.

For example: If we want to adjust the flow of seed, it is adjusted by electric cylinder, there are four stages given to the electric cylinder. If we press key 1 in the mobile, the arduino sends a signal to the electric cylinder and the shut valve slightly opens, the stage one is for small size of seeds, depending on the size of seeds the four stages in electric cylinder are used.

If we want to move the machine forward, the up arrow is pressed and the arduino sends signal to the motor driver, the motor driver permits the current to flow to the dc motor, if we want to move the machine backward the down arrow is pressed in that case the motor driver reverse the polarity of current to the dc motor now the machine moves backward.

5. CODE FOR THE MOVEMENT OF THE MACHINE

```
char t;
 void setup() {
pinMode(13,OUTPUT); //left motors forward
pinMode(12,OUTPUT); //left motors reverse
pinMode(11,OUTPUT); //right motors forward
pinMode(10,OUTPUT); //right motors reverse
pinMode(9,OUTPUT); //Led
Serial.begin(9600);
 }
 void loop() {
if(Serial.available()){
 t = Serial.read();
 Serial.println(t);
}
 if(t == 'F'){ //move forward(all motors rotate in forward direction)
 digitalWrite(13,HIGH);
 digitalWrite(11,HIGH);
}
 else if(t == 'B'){ //move reverse (all motors rotate in reverse direction)
 digitalWrite(12,HIGH);
 digitalWrite(10,HIGH);
}
 else if(t == 'L'){ //turn right (left side motors rotate in forward direction, right side motors doesn't rotate)
 digitalWrite(11,HIGH);
}
 else if(t == 'R'){ //turn left (right side motors rotate in forward direction, left side motors doesn't rotate)
 digitalWrite(13,HIGH);
}
 else if(t == 'S'){ //STOP (all motors stop)
 digitalWrite(13,LOW);
 digitalWrite(12,LOW);
 digitalWrite(11,LOW);
 digitalWrite(10,LOW);
}
delay(100);
}
```

6. APPLICATION

- Reduce the labour cost.
- Reduce the sowing time.
- Both sowing and ploughing can be done using a single equipment.
- Reduce the man power.
- By using the tooth harrow wheel, the machine can be easily moved in both dry and wet land.

7. LIMITATION

- A person is required to operate and maintain the working of a machine.
- The battery must be recharged after certain period.

8. CONCLUSION

Innovative Seed sowing equipments has remarkable influence in agriculture. By using innovative seed sowing equipments time required for sowing process is reduced. It is very helpful for small scale farmers. The seeds are been sowed in a proper sequence which results in proper germination of seeds. This automatic way of sowing seeds using a robot reduces the labor requirement.

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