AUTOMATIC SEED PLANTATION USING PLC

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***Abstract*:** Farming is main business in India. Seed breeding plays a vital role in agricultural industry. Now days we have a new business of commercial seed breeding. However these nurseries do not have any automated system for this work. Filling the seed trays with soil and then sowing the seeds in to it is an time consuming work. Hence we have developed an machine which helps to reduce the time to fill the trays and sow the seed. We have designed a conveyer with the assembly of hoppers and seed dispenser. Steel hoppers are used to dispense the soil. Hence once a tray is placed on conveyer it will be filled with soil and seed within minute. System is controlled using PLC and we have used Johnson motors, proximity sensors in it.

***Keywords*:** PLC, conveyer, proximity sensor, Johnson motors, hoppers, seed dispenser.

1.INTRODUCTION:

Nurseries uses conventional method for seed breeding which increases cost and time to complete the work. There some automated systems are available in market however which are costly and complex to use by unskilled person. Hence we have designed a system with simple design and easy to use. In this a conveyer is used to carry the tray. Hoppers are used to dispense the soil. One seed dispenser is used to dispense seeds. Once tray is placed on conveyer, it is turned ON. Proximity sensor detects tray and stops the conveyer and soil, seed and soil is dispensed in the tray respectively.

2.COMPARISON:

Conventional seed breeding	Automated seed breeding
Time consuming	Less time required
No automation	Automated .
Production rate is low	High production rate
Low efficiency	High Efficiency.

3. METHODOLOGY:

Seed breeding is rising side business for farmers. When conventional method is used it causes time delay and human errors. A conveyer is used to carry tray of seedlings. Using capacitive proximity sensor tray is detected on conveyer. As per position of tray soil is dispensed in the tray. Once half soil is filled tray is moved to next position where seed is dispensed using seed dispenser.

After that tray is again moved and using one more soil dispenser soil is filled in the tray. Here to open and close the hoppers Johnson motor is used. Seed dispenser is specially designed to dispense seed in to the tray.

Seed dispenser is a tray which has a special assembly to dispense the tray. It is operated using the Johnson motor and a pulley.
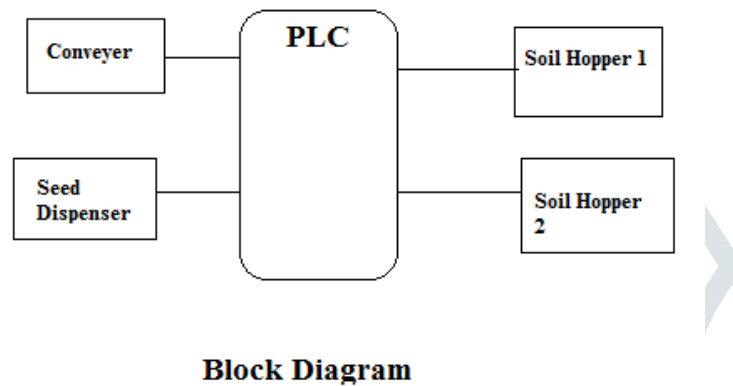
4.   BLOCK DIAGRAM:

Block Diagram

Fig 1

5.HARDWARE DESCRIPTION:

5.1.   Conveyer:

Conveyer is designed to carry load of approximately 5-6Kg. Johnson motor is used to roll the conveyer belt. Belt used is of synthetic rubber. A PVC pipe and ball baring ring is used to make rollers of conveyer.

Load carrying capacity of Johnson motor is 5kg/cm.

Fig 2

5.2.　PROXIMITY SENSOR:

Proximity sensor C1DN18-B01OPC is used here. Here we have used 3 number of sensors attached to conveyer. As sensor sense the tray conveyer is made to halt and respective action is taken as per position of sensor.
Maximum range is 10-15mm.

Surface of sensing area is 18mm.

Fig 3

5.4.　JHONSON MOTOR:

There are four motors are used in this system. It is works on the 12v supply. It is used to drive the wheelchair on space or on stairs. The signal from the AVR controller is given to motor.

To drive the motors the motor driver is used. L298 H bridge driver is used here.

The one motor has 150rpm speed.

Maximum torque capacity is 5kg/cm load.

Fig 4

5.5. Hoppper:

Hopper is designed to dispense the soil at a particular rate. Dispensing of soil is decided by repose angle of the hopper. Hopper is made up of MS steel sheet. Hoppers opening and closing is controlled by motor and a cap attached to hinges.

Fig 5

5.6. PLC ALLEN BRADELY Micro 820

 Allen Bradely micro 820 programmable logic controller is used in this system. This controller is suitable for small machines like this which gives nice flexibility and ability to remote control the system. Depending on the selection of the model I/O of the device varies. We have selected micro 820 2080-lc20-20qbb model for this machine.

Fig 6

6.   FEATURES:

1. User friendly.
2. Increased Efficiency.
3. Less Complex.
4. Reduced time.

7.   RESULT:

1. When START button is pressed conveyer starts.
2. Tray is easily detected by sensors.
3. Tray is easily filled with soil and seed.

8.   CONCLUSION:

By using this automated seed planting machine we are able to reduce the time for filling the seed tray. This improves the efficiency of seed breeding method in nursery. Also its design makes sure that this machine can be used by any unskilled person. Cost of developing machine is under the desired threshold which makes sure that it can compete with the other machines available in market.

ACKNOWLEDGEMENT:

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