

AUTOMATIC SEED SOWING MACHINE USING SOLAR PANEL

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ABSTRACT

Today's world is marching towards the rapid growth of all sectors including the agriculture field. Agricultural sector is changing the social as well as economic environment of the population due to globalization. Agriculture has been the backbone of the Indian economy and it will remain as it is for a long time. Agriculture is demographically the broadest economic sector and plays very important role in the overall socio-economic fabric of India. In India most of the people are living in rural area and they are still dependent on the agriculture field but they are using old technique (conventional method). The conventional method is less efficient and time consuming. To meet the future food demand, the farmers have to implement the new technique which will not affect the soil texture but will increase the crop production. To overcome the drawbacks of conventional method we developing the seed sowing machine, this can perform different operations. The comparison between traditional sowing method and the proposed machine which can perform multiple operations. The main purpose of our machine is to automate the process of digging and seed sowing at proper distance and depth.

KEYWORDS: Agriculture, IR Sensor, Seed Sowing, Seed Spacing, Solar Panel.

INTRODUCTION

In the current generation most of the countries do not have sufficient skilled man power in the agriculture sector and it affects the growth of developing countries. So it's a time to automate the agriculture sector to overcome this problem by using upgraded technology for cultivation activity. The basic operation of sowing machine is to sow the seed in row at the required depth and maintain the distance between two seeds. Solar panel is 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. We enter the distance between two seeds through keypad. LCD is used to display the battery level. By using this innovative project of seed sowing machine we can save more time required for sowing process and it also reduces labourer cost. This machine controls the seed depth and proper utilization of seeds to reduce the wastage of seeds.

LITERATURE SURVEY

MANUAL BROADCASTING SYSTEM

A field is initially prepared with a plough to a series of linear cuts known as furrows. The field is then seeded by throwing the seeds over the field. The result is a field planted roughly in rows but having a large number of plants [2]. Many projects are undertaken to overcome the drawbacks of broadcasting system. Some of those projects are given below. Drawbacks of manual broadcasting system are no control over the depth of seed placement. No uniformity in the distribution of seed placement. Loss of seeds. Time required for sowing is more.

CONVENTIONAL SEED SOWING MACHINE

Another method of sowing the seeds is with the help of a simple device consisting of bamboo tube. This bamboo tube with a funnel on it is attached to a plough. When the plough moves over the field, the tube attached to it leaves the seeds and kept in the funnel at proper depth as well as spacing. The plough keeps making furrows in the soil in which the seeds are dropped by the seed drill [2]. Drawbacks of this system are no proper germination of seeds. Wastage of seeds. No control over the depth of seed placement.

SOLAR POWERED SEED SOWING MACHINE:

In this system the basic objective of sowing operation is to put the seed and fertilizer in rows at desired depth and spacing, cover the seeds with soil and provide proper compaction over the seed [1]. This system uses solar panel which is made up of photovoltaic (PV) cells, which turns sunlight into electricity. The main disadvantage of this project was this system is not automatic.

ARCHITECTURE

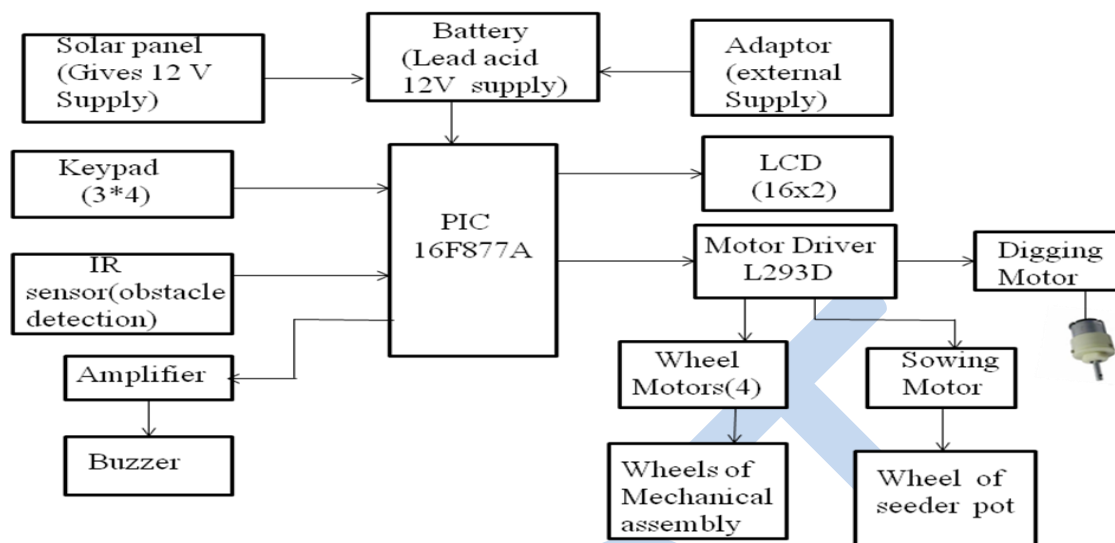


Fig 1. Architecture of proposed system

HARDWARE DESCRIPTION

PIC16F877A MICROCONTROLLER

PIC16F874A/877A devices are available in 40-pin and 44-pin packages. It controls all the devices in the systems which are connected externally.

TECHNICAL SPECIFICATIONS

Operating Frequency is DC – 20 MHz

Program Memory 8 K.

Data EEPROM Memory 256 Bytes.

Data Memory 368 Bytes.

I/O Ports A, B, C, D, and E.

Timers available in pic16F877A are 3.

10-Bit Analog-to-Digital Module 8 Input Channels.

SOLAR PANEL

Solar panel is used to capture solar energy from sunlight and then it is converted into electrical energy. This energy is used to charge 12V battery. We are using solar panel which is made up of photovoltaic (PV) cells.

TECHNICAL SPECIFICATIONS

Rated Power(Pmax) : 10W

Nominal Voltage : 12V

Limited Warranty : 12 Years

Maximum Power : 10W

Voltage at Pmax : 16.8V

Current at Pmax : 0.59A

Maximum system voltage : 50V

KEYPAD

We are using 3*4 keypad to entering the seed to seed spacing. It consists of 12 buttons arranged in a form of an array containing four rows and three columns.

LCD (LIQUID CRYSTAL DISPLAY)

LCD is required to display all the data. Whatever you will enter through the keypad, it will be displayed on LCD. LCD will also display the battery level.

TECHNICAL SPECIFICATIONS

Type: Character

Display format: 16 x 2 characters.

Built - in controller : ST 7066 (or equivalent)

Duty cycle: 1/16
5 x 8 dots include cursor.
It requires +5V power supply.

DC MOTOR DRIVER (L293D):

The L293D is required for driving the motor. It is a motor driver IC. IC L293D is an H-bridge IC.

IR SENSOR:

We are using IR sensor for obstacle detection. Also we are use it to detect the seed pot is empty or not.

FLOW CHART

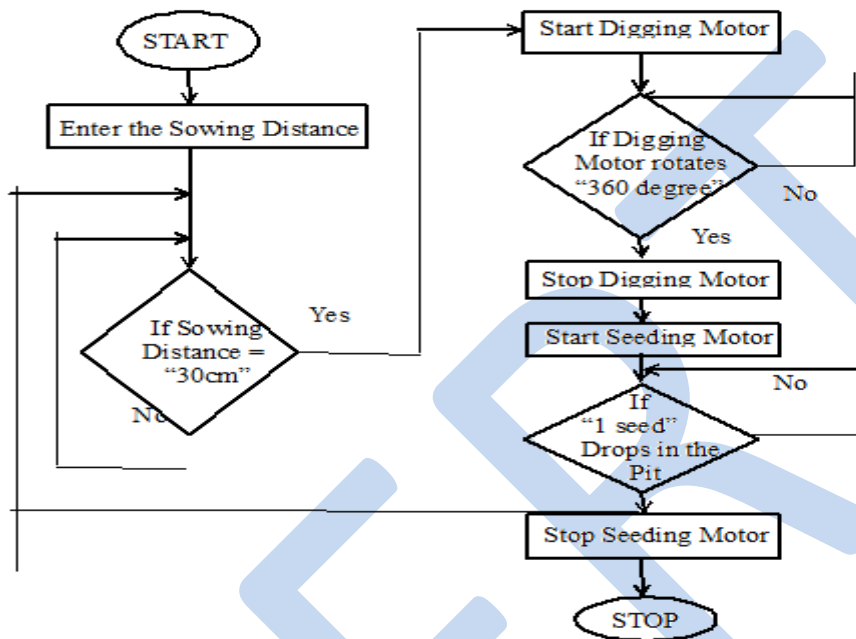


Fig 2. Flow Chart

METHODOLOGY

In our project we are going to perform automatic digging and seed sowing. 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.

We enter seed to seed spacing distance through keypad. After providing this distance wheel's motors start to rotate in clockwise direction then machine will start. These motors will stop after covering the provided distance then digging motor will start. Machine will dig the soil through mechanical assembly and stop the digging motor. At the same instant seed dropper motor starts to rotate. Seed is dropped in pit and cover the seed with soil. This process is continuously repeated till one row is completed.

RESULTS

Table 1. Result of IR Sensor

Sr.No	Parameter	Output voltage
1	When obstacle is present	5.13V
2	When obstacle is absent	0.03V

Table 2. Seed Distance Measurement

Sr.No	Entered Distance between two seeds	Actual Distance between two seeds
1	10cm	10cm
2	30cm	30cm
3	50cm	50cm

CONCLUSION

We can save more time required for sowing process. It is useful for farmers. Solar powered seed sowing machine can-

- Maintain seed to seed spacing.
- Proper utilization of seeds can be done.
- Reduces the labour requirement so as labour cost, labour time and also save lots of energy.

FUTURE SCOPE

- Introduction of Cutter in place of drill can be used as grass cutter equipment.
- Using remote control, Seed Sowing Machine can be made automatic.
- Addition of multi-hopper can be attached side by side for sowing of large farm.
- Water dripping unit could be included in seed sowing machine.

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