



Solar Powered Seed Sowing Machine

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ABSTRACT

In India, the majority of the population is dependent on agriculture for their livelihood. The use of fossil fuels in the agricultural activities leads to various environmental issues such as noise pollution and water pollution. Due to the increasing cost of energy, farmers are forced to spend more time on seed sowing. This is why a project has been developed that uses solar power. The machine is controlled by a microcontroller unit. It uses a solar panel to harvest the solar power and then recharges the battery. The DC motor is also used to provide power to the machine. It is connected to the rear wheel using a transmission system. The machine's path is monitored by an infrared sensor, which is controlled by the MCU. The seeds are sown according to the revolutions of the wheel. The machine then uses its solar power to dig the soil and cover it with fertilizer. It is designed to reduce the amount of pollution that comes from the agricultural activities.

I. INTRODUCTION

Now days in agricultural sector face many problems such as there is no skilled person is available to carry out agricultural process and time consuming for the process are high. The world population is rapidly grows so the agricultural products are highly focused and industrial requirements are also increased. In India the 70% of population is depends on the agricultural related activities and agricultural is the backbone of the India. The pollution level in all over the world is raised to hazardous level and many city is in India also reaches hazardous level in air condition and this pollution are mostly caused by the vehicles and some industrial activities. So we need to study all these issues. Innovative idea of our project is to overcome this problem faced by farmers and entire world due to pollution. Our project will use solar panel to reduce the pollution level and it is fully automated so it can save time and money for farmers and reduces the man labors and skilled person requirement for agricultural needs can also be reduced. This project consume much less power than tractor consumption and this project use the solar energy which is a renewable energy and enormously available in nature. In recent times the seed sowing machine are solar powered but partially operated is only available not fully automated is available in this project we can overcome all the disadvantage in the current market by it is fully automated and solar powered and cost efficient for the farmers.

II. LITERATURE SURVEY

Mahesh R. Pundkar. et.al High precision pneumatic planters have been developed for many varieties of crops, for a wide range of seed sizes, resulting to uniform seeds distribution along the travel path, in seed spacing. The basic function of sowing operation is to sow the seed and fertilizer in rows at required depth and to maintain the distance between the seeds and provide proper compaction over the seed [1]

Swetha S. et.alIn this machine solar panel is used to capture solar energy and then it is converted into electrical energy which in turn is used to charge 12V battery, which then gives the necessary power to a shunt wound DC motor. This power is then transmitted to the DC motor to drive the wheels. And to further reduction of labor dependency, IR sensors are used to maneuver robot in the field. Here 4 post sensors are used to define the territory and robot senses the track length and pitch for movement from line to line. [6]

Kunal A. Dhande. et.al In this work we replace complicated gear system by hall effect sensor for easier and costlier seed sowing and also reduce a need of labour. The Hall Effect sensor convert rotation into distance for which seed sowing at particular distance. Also, there is adjustable system for sowing at different distance. By using this machine, the sowing can be done row by row and distance will maintain. [7]

Trupti A. Shinde. et.al In seed sowing machine system, they are used battery powered wheels and dc motor inbuilt in these wheels. When the seeds are empty it detects the level of storage seed and indicates the alarm. When any obstacle comes in the in-front of machine or divert path the seed sowing machine can detect this obstacle very easily. In each complete rotation of rotating wheel there is seeds falls from this seed drum and the seed plantation process can take place smoothly as well as without wastage of seeds. The end of system machine reached and it create alarm. [10]

III. PROPOSED SYSTEM

We propose a machine which can carry out various farming activities like digging, sowing and irrigation etc. Figure 1 shows the block diagram of our experimental setup. This is a manually operated machine which is equipped with a four-wheel drive. The seed sowing machine is developed at a very low cost. It is cheap and easily affordable by rural farmers. It is maintenance free and various adjustments can be made with ease for continuous operation. In this project many components are used they are MCU(micro controller unit), IR sensors, Solar panel, Battery, Charge Controller, DC Shunt Motor, Seed Storage tank, Soil plough, Soil cover, Seed Disc.

3.1. MCU (micro controller unit)

The Micro Controller Unit is a compact integrated circuit design to give specific operation in embedded system. Micro controller unit is key component in this project the IR sensor gives the output signal to the micro

controller unit based on the IR sensor output the Dc Motor is controlled by the Micro Controller unit. The Micro Controller used in this project is Arduino Nano V3 micro controller

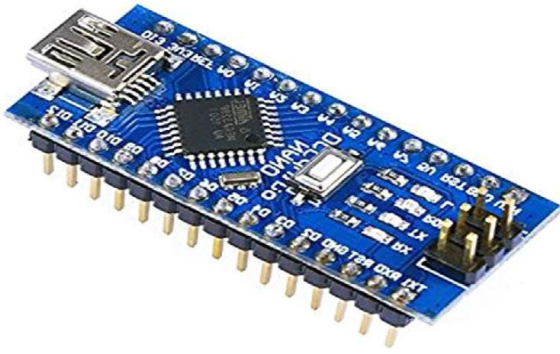


Fig. 1. Micro controller unit.

3.2. IR sensor

IR sensor is used in this project to control the motion of the machine and path of the machine and sense the obstacles in the path. Which gives its output to the MCU which controls the machine (see Fig. 2).

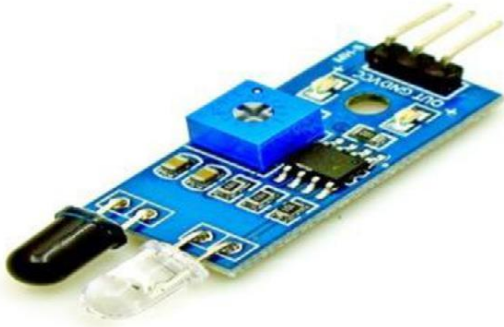


Figure 2: IR Sensor

3.3. Solar panel

The main concept solar panel is used to convert solar energy to electrical energy. The solar panel used is 12 V solar panel. The solar panel is made of material of semiconductor and it consist of pv cell.

Which supplies the energy to the Dc Shunt Motor (see Fig. 3).



Fig. 3. Solar panel.

3.4. Battery

The battery is a electrochemical cell which is used to save the electrical energy and in this project we use 12 V Lead acid battery.

3.5. Charge controller

The charge from the solar panel is stored in the charge controller where the solar power is converted into the electric power. This power during conversion **process can be stored and used.**

3.6. Seed storage tank, soil plough, soil cover

The Seed storage tank is used to store the seed and we can add the seed according to requirements. The soil plough is used to dig the soil in the field. The Soil cover is used to cover the soil after the sowing of the seeds. The Seed sowing disc which used to drop the seed to the field from the seed storage tank and it is controlled by the revolution of the wheels.

IV. WORKING METHODOLOGY

In this project first solar energy is absorbed on the solar panel by pv cell and then it is transferred to the charge controller which used to transfer the solar energy into electrical energy and save the charge [1]. The electrical energy from the charge controller than transferred to the battery of 12 V (lead acid battery). The battery is used to save the electrical energy when the solar power is insufficient we can use the electrical energy from the battery. The electrical energy is given to the Dc motor. The Micro controller in this machine will control the motor motion and it will stop and on the Dc motor. The IR sensor will sense the obstacles and path should be covered by the machine. According to the output of the IR sensor the MCU will control the Dc motor. The seed are sowing is carried based on revolution of the wheel (one seed for one revolution). Dc Motor which converts electrical energy into the mechanical energy and the mechanical energy is transmitted to the rear wheel using the transmission system. The seed plough will dig the soil in correct required manner and seed from the seed storage tank will fall to the seed disc which will drop the seed into the soil based on the revolution of the wheel we can control the seed feed to the soil. The sand cover is a used to cover the soil after sowing the seed and fertilizer can also be sprayed

4.1 Material used

In this project we use three types of materials such as Low carbon steel, Medium carbon steel and High carbon steel. Low carbon steel is used to construct the farm machinery and medium carbon steel used to construct the shafts connecting rod etc. The high carbon steel is used to construct the transmission system.

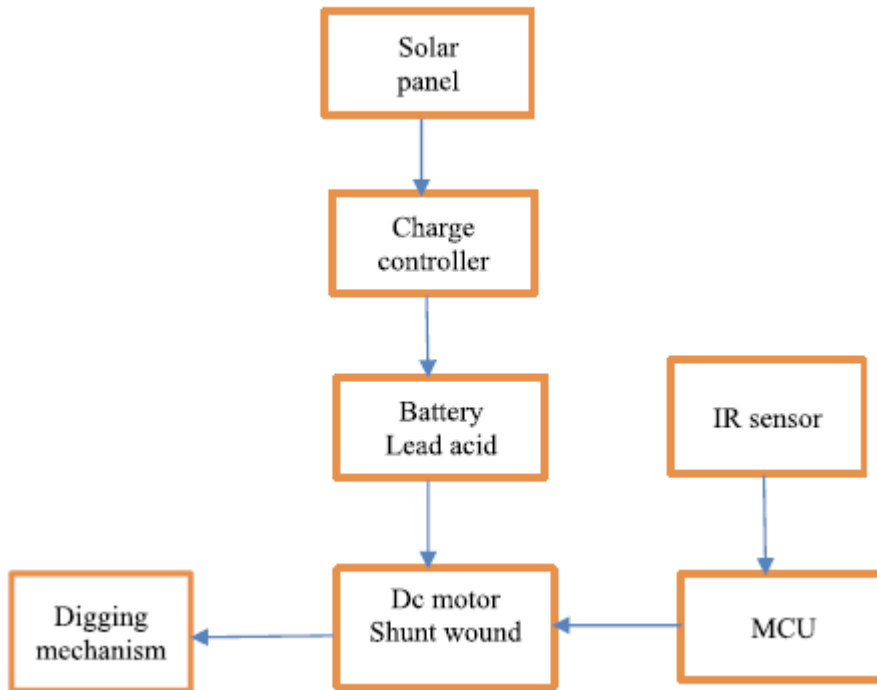


Fig. 5. Experimental setup.

4.2. Future Scope

- 1) Introduction of drill in place of cutter can be used as soil erosion equipment.
- 2) Machine can be operated automatically with the help of remote control or navigation sensors.
- 3) Multi-hopper can be attached instead of single hopper for sowing of a large farm.
- 4) Seed Spacing sensors can be used for accurate spacing.

V. CONCLUSION

In India about 70% of the population lives in rural areas and their main source of income is dependent on agriculture sector. So, it is important to have special focus on agriculture sector and to apply latest technologies and methods which are more advance and efficient. This will lead to better growth rate of the country. Our machine which operate on solar power when compared to different traditional seed sowing methods, it can be concluded that:

- 1) Sowing rate can be controlled
- 2) Seed spacing can be achieved
- 3) Less manual power is required
- 4) No pollution is caused
- 5) Economical
- 6) Variety of seeds can be sowed

VI.REFERENCES

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