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A Review On Solar Operated Multipurpose Agriculture Robot

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Abstract - This paper represent the design, fabrication, and development of solar operated agriculture robot. The robot can dig the soil, feed the seed, leveler to close the soil, and pump to spray the fertilizer. These all system works on battery and solar power. Vehicle is to be controlled with help of remote. Approximately 50% of people in India work in agriculture sector. In this agriculture sector there is a lot of field work such as digging, harvesting, sowing, weeding, etc. And spraying is also an important operation in agriculture. Which to be perform by the farmer, to protect the crop form the pest, funguses and any other diseases. It is concept of investigating multi-purpose small machine which is more efficient than the large tractors and human forces. Due to this purpose we design and developing such a system with the following feature. Harvesting is the first step in farming after the completion of this step land is ready for the seed sowing, spray pump is used to spray the fertilizer.

Key Words*: *Solar panel, Battery, DC motor, Digger, Lead screw

1. INTRODUCTION

Indian economics base on agriculture field development in agriculture lead to raise to economic status of country. In India farmer are facing problem due to unavailability of labor. Also traditional way of farming equipment which takes lots of time and it also increases labor cost.

The idea of applying robotic technology in agriculture is very new. In agriculture the opportunities for robot enhanced productivity are immense and the robot is appearing on the farm in increasing number. We can expect the robot performing agriculture operation autonomously such as mechanical weed control, digging, weeding, seed sowing, and spraying.

The automation in agriculture could help to framers to reduce their effort and their working time the automation in agriculture filed could be more effective and efficient as compare to tradition methods of framing. So our focus will be on reduce labor cost, daily working hours, environmental all impact and safety issues and most important is to reduce framer effort.

2. FUTURE SCOPE

With fully-automated farms in the future, robots can perform all the tasks like mowing, fertilizing, monitoring of pests and diseases, harvesting, tilling, etc. This also enables the farmers to just supervise the robots without the need to operate them.

In future robot also run on PLC and SCADA with fully automated.

3. METHODOLOGY

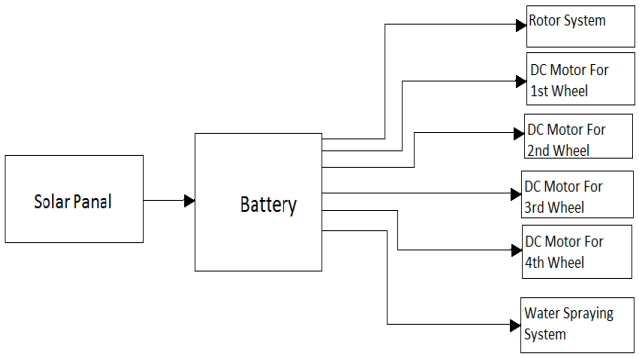

Fig 1. Block Diagram of system

The aim of our project is design and develops a multipurpose robot, which is used to reduce time and human effort. The operations are carried by a robot are harvesting, digging, seed sowing and leveling to close the soil and also sprayer to spray a fertilizer. These all operations are performed by using the battery and solar power.

- The frame of robot is made of Mild Steel (MS). The four wheels are connected to the frame, which are driven by using a DC motor.
- The front of frame harvester rotor is connected and this rotor is rotate by using DC motor.
- On the middle of frame three diggers are connected to dig the soil. The nut and bolt arrangement is used in the robot, by using nut and bolt up and down position of digger is done.

- Funnel is used to store the seeds. Three hoses are used to connect funnel and digger, into the hoses seeds are flow down with the help of low speed motor.
- At the end of frame the leveler is connected by using leveler the seeds are close in the soil.
- Sprayer is used to spray the fertilizer on the crops. Pump is used to spray the fertilizer and the pump is operated on the DC motor.
- Top of the frame solar panel is mounted. Solar panel is connected to the battery. To operate all system it requires 12V battery.

4. OBJECTIVE

The objective of this paper is to present robotic model which is easily operates agriculture operation**.**

- Now a days it is necessity of automation in agricultural field to reduce the farmers efforts & labour cost
- To perform all operation. Like weeding digging seed sowing & spraying at a single time hence increase production & saves time.
- The farmer can operate robot very easily.
- Large amount of work completes in less time.
- For battery charging solar energy is to be used. The rays of the sun can be used for solar power generation.

5. OPERATIONS

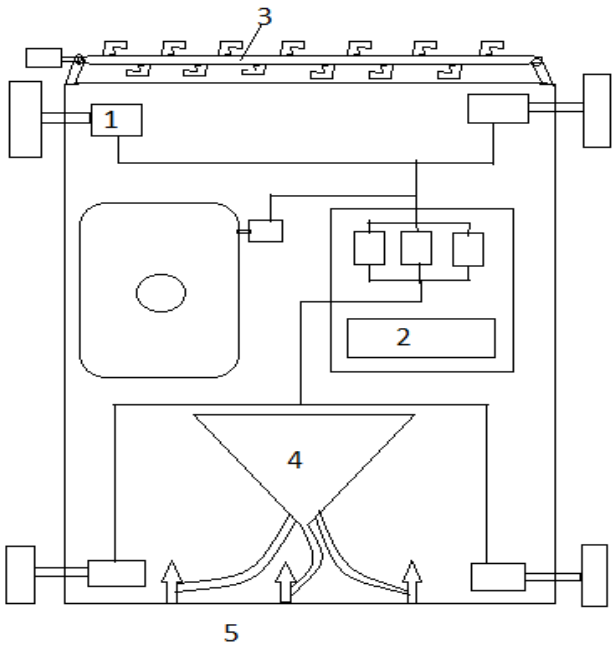

Fig 2. Schematic sketch of Agriculture Machine
1-DC motor, 2-Battrey, 3-Rotor, 4-Funnel, 5-Diggers

5.1 Weeding Operation:-

Weeds are plants that growing places where they are not wanted. The can be cause damage because the crop is not ventilated well. And there is more chance on fungal attack. A small rotor on which the curve shape blades are mounted to remove the weeds from soil. This rotor is operated by using a DC motor.

Weeding refers to the removed of weeds. Weeding only affects the soil minimally, which is beneficial to clear huge amounts of plants. Weeding is generally done manually rather than with mechanized equipment and also done regularly.

5.2 Digging Operation:-

There are three digger are used in digging operation. The diggers are mounted on the middle of the frame. Digger mechanism is used to digging and seed sowing. All the diggers are adjustable the diggers are connected to the frame by nut and bolt arrangement.

Holes are produced on the diggers. The funnel and diggers holes are connected by using the hoses.

5.3 Seed sawing Operation:-

Seed saving is the process of planting seed. Tradition method of seed sawing based on assumption of seed to seed sparing& depth of placement which is not efficient & it required lot of timed effort to. Some time it results in backache of farmer.

5.4 Leveling Operation:-

A sheet metal plate is used as soil closer & leveler. The material of sheet metal plate is mild steel. An arrangement of nut & bolt is used for sheet metal plate up & down movement. The leveler is fixed to the frame which closes the soil in the sowed soil & level the land.

6. MATERIALS AND COMPONENTS

Materials used to conduct the present research are

1.Cast iron for Frame
2.Mild steel for Diggers
3.DC motors
4.Solar panel
5.Wheels
6.Battery
7.Funnel and hoses
8.Sprayer and Nozzle

7. CONCLUSIONS

In agriculture, by using the solar operated multi-purpose robot. We can easily reduce the farmer efforts and time.

The machine required less man power and less time compared to traditional method. We hope this will satisfy the partial thrust of Indian agriculture.

So in this way we can overcome the labour problem that is the need of today's farming in India.

In future the robot also runs on PLC and SCADA with fully automation.

8. REFERENCES

1. Simon Blackmore, Bill Stout, Maohua Wang, Boris Runov (2005), Robotic agriculture – The future of agriculture mechanism, Agro Technology, the royal veterinary and agriculture University.

2. R. Eaton, R. Eaton, J. Katupitiya, S.D. Pathirana (2008), Autonomous farming: Modeling and control of agricultural machinery in a unified framework,15th international conference on mechatronic sand machine vision in practice, NewZealand.

3. Shrinivas R. Zanwar, R. D. Kokate (June- 2012), Advanced Agriculture System- International Journal of Robotics and Automation (IJRA) magazine.

4. Blackmore, S. (2007). A systems view of agricultural robotics. Precision Agriculture conference, Wageningen Academic Publishers, the Netherlands. pp. 23-31

5. Butler, S. (1887). Luck, or cunning, as the main means of rganic Modification? An attempt to throw additional light upon Darwin's theory of natural selection. (London:Trübner & Co.) Reprinted as vol 8 of The Shrewsbury Edition of the works of Samuel Butler (London: Jonathan Cape, 1924)

6. Dyson, G. (1997). Darwin among the machines, The Penguin Press

7. Leropoulos, I., Greenman, J., and Melhuish, C. (2003). Imitating metabolism: Energy autonomy in biologically inspired robots. AISB '03 Second international symposium on imitation in animals and artifacts. Aberystwyth, Wales, pp.191-194.

8. Shibusawa, S. 1996. PhytoTechnology -An introduction to the concept and topic of a new Project. http://phytech.ishikawac. ac.jp/WhatIs.html

9. Tillett, N.D., Hague, T. and Marchant J.A.(1998) A robotic system for plant scale husbandry. Journal of Agricultural Engineering Research, 69, 169-178