



Prototype Multipurpose Agri Robot

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ABSTRACT

In India nearly 70% of population depends on agriculture, so there is need to do certain research and development in this sector so that existing resources can be used to their maximum extent. Current generation do not have skilled man power particularly to work in agricultural sector. It becomes the need of today to automate the agricultural sector. So we tried to develop a multipurpose agricultural robot. The essential feature of this robot is that it is multitasking and it takes its energy from solar panel. This paper aims at explaining the interfacing of solar panel, sensors and relay circuits.

Keywords: Mechanization, Robot, Fertilizer, Solar panel.

I. INTRODUCTION

Automation in agricultural sector is not a very new thought. Many of problems faced by the Indian farmers are lack of availability of skilled persons, lack of resources, wastage of money in terms of wastage of pesticides and fertilizers etc. So there is a need to optimize resources. And hence to overcome these problems there is need of automation in agriculture. Automation in agriculture could help in reducing farmer efforts and man power. Many researchers have developed plant cutter, grass cutter, pesticides sprayer, etc. But all these functions are not yet being performed using a single robot. We have tried to fabricate a single robot which can perform multiple task.

II. METHODOLOGY

The basic aim of the project is to fabricate the multipurpose robot which is used for plant cutting, grass cutting, pesticide spraying, insect killing, birds scaring. The robot is powered by a 12V battery which is charged through 10W solar panel.

- The base frame is of stainless steel of dimension 22 x 18 inch. With 3 wheels are connected which are driven by the DC motor.
- Solar panel is mounted on the top of the frame and it is connected to the 12V battery through charge controller.

- Two blades for plant cutting are mounted on the front corners of the frame.
- One blade for the grass cutting is placed to the bottom side.
- Sprayer is mounted on vertical rod for pesticide spraying with help of nozzle.
- Blue colour LED and IR sensor is placed on one corner. Whenever insects will come near the light sensor will gives a signal to the pump and the pump will spray particular amount of insecticide over the insects.

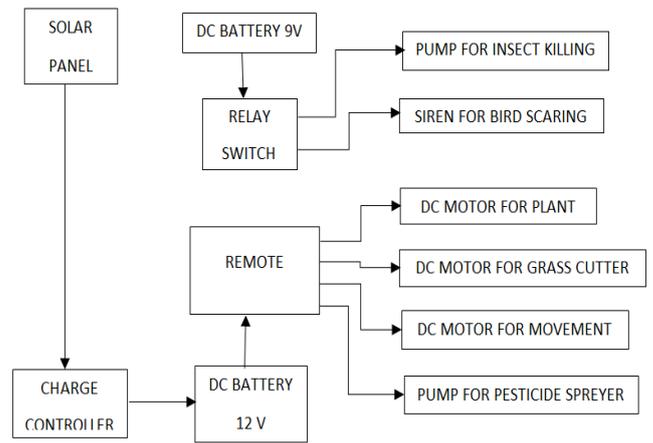


Figure 1. Block diagram of proposed system

Table 1 . Components List

SR NO.	COMPONENT	QUANTITY	SPECIFICATION
1	Solar panel	1	12V 0.63A 10W
2	Charge controller	1	12V 1A
3	Battery	2	12V 8Ah
4	DC gear motor	2	12V 198 mA
		3	12V 77mA
5	Pump	1	12V 2.6A 31.2W 3.6LPM
		1	12V 1.5A 18W 2LPM
6	Siren	1	12V 4.1A 50W 150dB
7	Sensor	1	9V 100mA 3-4 feet sensing range
8	Relay	2	9V

III. OPERATIONS

PESTICIDES SPRAYER:

The use of the pesticides should be as efficient as possible to minimize their release into environment. Pesticide sprayer consist of a tank, pump and a nozzle which is mounted on a vertical rod on front side of the frame. Pesticide is forced though nozzle by pump of 12V, 2.6 Amp having discharge rate of 3.6 lit/min. The size of droplets can be altered by using different nozzle sizes or by altering the pressure under which it is forced or combination of both.



Figure 2. sprayer

INSECT KILLING:

The use of insecticides is believed to be one of the Major factors behind the increase in agricultural productivity. For good insect control you must learn how to use insecticides (chemicals) effectively. There is one IR sensor and blue coloured LED light separated by a small distance. Whenever insects will come near the light, sensor will give signal to pump and the pump will spray particular amount of insecticide over the insects.



Figure 3. Insect killing pump

BIRD SCARING:

One of the oldest design of bird scarer is the scarecrow in the shape of human figure. This method is not working so efficiently. In our model one proximity sensor will be mounted on the frame, whenever a bird will come into its range, sensor will give signal to buzzer. The buzzer generates a loud blast that scares birds at a long distance.



Figure 4. Siren, IR Sensor

PLANT CUTTER:

Plant cutter will be mounted on front side of the two corners. These plant cutter will be operated by two DC gear motors and will cut the plants .It uses fine blades mounted on both sides of robot. These blade operates by DC gear motors of approximately 1000 rpm, which are supplied by 12V dc battery.



Figure 5. Plant cutter

GRASS CUTTER:

Grass cutter will be mounted on the bottom side of the frame. This plant cutter will be operated by the

DC gear motor and it will cut the grass. These blade operates by a DC gear motor of approximately 1000 rpm, which is supplied by 12V dc battery.



Figure 6. Grass cutter

IV. SCOPE

The main aim of our project to develop a solar operated agricultural robot for plant cutting, grass cutting, pesticide spraying, insect killing and bird scaring. This project is powered by a solar panel which absorbs UV rays from sun and converts it into electrical energy. Solar energy is the renewable source of energy and it is non pollutant. As we know the fossil fuel may deplete in near future on the other hand solar energy will be remain available all the time and that too totally free of cost. This robot would be very useful in near future as far as increasing rate of pollution is concern. At the same time following modifications can be done to make this robot more convenient.

- ✓ Robot can be made fully automated with the use of sensors and micro controller which are able to detect obstacles, crops and weeds.
- ✓ It can also be made to operate under remote control.
- ✓ With some modifications robot can perform few more operations like seed sowing,

weeding, digging, fruit picking, can also be performed

- ✓ The size of the robot can be suitably reduced to the optimum size which can be used for weeding in between the crops like ground nuts, sun flower and other vegetable cultivation.

ADVANTAGES

- Helps to reduce the human labour and saves time.
- Pollution free.
- Portable in size.
- Maintenance is less.
- Single machine can perform multiple task.
- Pesticide and insecticides are used in optimized manner.
- Skilled manpower is not required.

DISADVANTAGES

- Initial cost is high.
- Alternate source of energy is required when solar energy is not available i.e. in rainy season.

V. CONCLUSION

We want to conclude from the review of the papers that there is need of automation in the agricultural sector to enhance the productivity and reduce the human labour. Automation also reduces the saves the time. In future this robot can be enhanced with some more capabilities and to take appropriate action even in the absence of farmers.

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