

Solar Based Agro-Sprayer Robot For Fertilizer

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ABSTRACT

Spraying pesticides manually outdoors, compared to the environment has high temperature and is more closed, humidity and for operating the green -house with the help of spray work. We are developing a prototype in order to reduce labour work for spraying pesticides. In rural areas as there is power cutout, it will be a solution for precise spraying, as it is solar based. The production would be maximum with minimum input. It is controlled by Bluetooth for operation. The water is mixed with the pesticide in the prescribed amount and as per the set dosage it is sprayed evenly in the forward direction. To control the robot we are using Arduino for communication with the help of android app via bluetooth. Robot is controlled by giving command via bluetooth. .

Keywords-Electricity,Bluetooth,Arduino, Sprayer, Solar panel,Photovoltaic cell (PV)

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I. INTRODUCTION

The project aims on the design, development and fabrication of the demonstration unit of the project "SOLAR BASED PESTICIDE SPRAYER ROBOT". More than 42% of the total population in the world has chosen agriculture as their primary occupation. In latest years, the improvement of autonomous motors in agriculture has experienced improved interest. This improvement has led many researches to start developing more rational and adaptable vehicles.

In the sphere of agriculture self reliant vehicle, a concept is being developed to analyze if a couple of small self sufficient vehicles, machines could be extra green than traditional massive tractors and human force. These vehicles have to able to operating 24 hours a day all year round, in maximum weather conditions. This system can reduce the chemicals and energy usage by using solar energy instead of diesel and fertilizers.

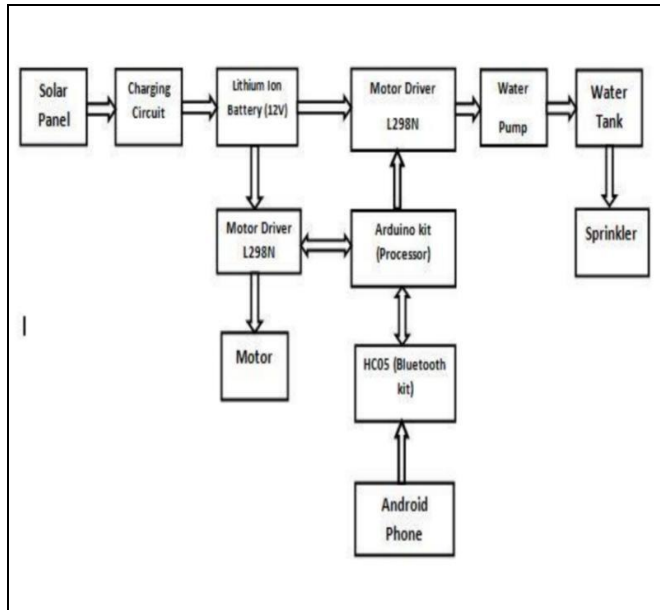
II. OBJECTIVE

To protect labour from pesticide and reduce labour intensity. This model will be able to contribute maximum output production system with the minimum input. Maintenance of petrol sprayer is high compared to solar.

III. NEED FOR THE SYSTEM.

Due to agro -bot the working becomes precise so it acts as a helping hand to the farmer. Agro-bots are one of the best option which may act as a solution to the harm of pesticides to health. With the help of this agro-bot we can minimize the air and noise pollution.

IV. BLOCK DIAGRAM



V. WORKING PRINCIPLE

The working of proposed robotic system depends largely on arduino uno micro controller board . It consist of AVR micro controller chip named as AT Mega 328p . The motors which provides primary motion for the robot are interface and controlled through DC motor driver module i.e. L298N which is of H-bridge configuration .This motor driver module helps in switching the supply terminals of motors which accordingly provides all directional motion to the robot . Micro controller chip is programmed as per the user requirement . Propose robotic model is provided with battery as primary source which is further connected to the battery management system along with solar charging unit.

VI. WORKING MODEL

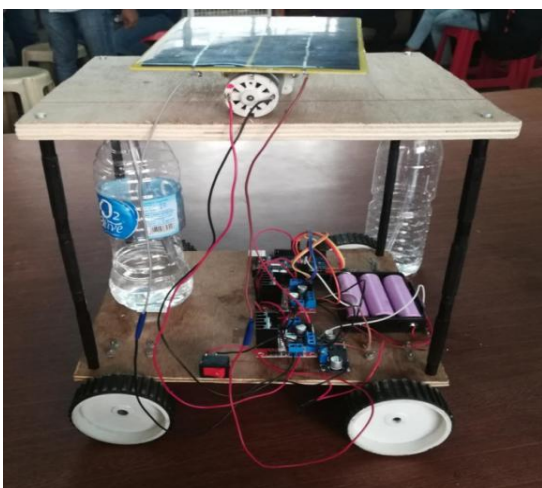


Fig.1

VII. COMPONENT

1) .Arduino UNO :

Sr.No	Parameters	Rating
1	Operating voltage	5V
2	Input Voltage	7-20 V
3	Digital I/P and O/P pins	14
4	Analog input pins	6
5	Dc current per I/O pin	20mA
6	Dc current for 3.3V pin	50mA
7	Flash memory	32KB
8	SRAM	2KB
9	EEPROM	1KB
10	Clock speed	16 MHz

2) Lithium -Ion Battery:

Sr.No	Specification	Features
1	Nominal discharge capacity	2500mAh
2	charge	1.25 A ,4.20 V,CCCV 125mA cutoff
3	discharge	0.2 C ,2.5 V ,discharge cutoff
4	Nominal Voltage	3.6V

3) Motor Driver Module:

This lets in you to control the velocity and path of DC vehicles, or manipulate one bipolar stepper motor with ease. The L298N H-bridge module can be used with automobiles which have a voltage of between 5 and 35V DC. There is also an on-board 5V regulator, so if your deliver voltage is up to 12V you could additionally source 5V from the board.

4) DC Motor:

Controlling single or dual DC motors is very easy. For this we have to connect each motor to A and B connections on L298N module .so if we using two motors for robot so we have to ensure that the polarity of motor has to be same on both inputs . otherwise we may need to swape them over when we said both motor to forward and from which on motor goes backwards .Motor directions are controlled by sending HIGH or LOW signals to drive for each motor.

5) **Bluetooth Module:**

This HC05 bluetooth module has 6 pins-

PIN Description :-

ENABLE- when enable is pulled LOW , module is disable which means the module will not turn ON. When enable is left open or connected to 3.3V , the module is enabled .

Vcc- supply voltage 3.3V-5V.

GND- ground pin

TXD RXD- this two pins act for UART interface communication.

STATE- IT acts as a status indicator.

6) **Solar Panel:**

<i>current</i>	<i>Voltage</i>	<i>power</i>
200mA	12V	2.4W

VIII. ADVANTAGES

1. There is no health hazards to the operator as operator has no need to go on field for pesticide spraying since it is remote controlled.
2. Easy to operate and user friendly.
3. Very less pollution on other models.
4. It is portable.
5. Unit cost is very cheap one.
6. Maintenance cost is low.
7. Easy to assemble.

IX. FUTURE SCOPE

We are planning to combine all the electricity work done in farm in one complete solar scheme.

From the automation point of view we can make flying type robot so we can spray the pesticide from long distance and see the operation.

X. CONCLUSION

It does not compromise the performance of a petrol based pesticide sprayer. In addition, the model is designed to be eco-friendly and lower cost, and thus will prove to be more efficient when compared to petrol based pesticide sprayer.

A minor modification to the form factor, the module can be brought out as a commercial product.

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