



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJIRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 11, Issue 9, September 2022

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 8.118



9940 572 462



6381 907 438



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Solar Based Pesticide Spraying Machine

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ABSTRACT: Our project purposes a multipurpose solar powered, flexible, remote controlled, semi-automated spraying robot with 4 degrees of freedom in spatial movement, with an additional plant moving equipment. The robot is designed to spray pesticides/insecticide directly into individual lesions minimizing wastage or excess chemical spraying, hence making the system cost effective and also environment friendly. It is designed to cut down undesired plants selectively by remotely controlling the start and stop of the moving system.

I. INTRODUCTION

Insects are largely responsible for the crop destruction. Insecticides or pesticides, a man made or natural preparation are used to kill insects or otherwise control their reproduction. These herbicides, pesticides, and fertilizers are applied to agricultural crops with the help of a special device known as a "Sprayer," sprayer provides optimum performance with minimum efforts. The invention of a sprayer, pesticides, fertilizers, bring revolution in the agriculture or horticulture sector especially by the invention of sprayers, enable farmers to obtain maximum agricultural output. They are used for garden spraying, weed and pest control, liquid fertilizing and plant leaf polishing. Agriculture sector is facing problems with capacity issues, shrinking revenues, and labour shortages and increasing consumer demands. Renewable Energy is generally defined as energy that comes from long lasting resources. The sun is the most abundant and unlimited source of energy. As solar energy is one of the most important non-conventional sources of energy. Solar energy get from the sun is harvested on the solar panel the panel is made up of photovoltaic cells, which converts energy from photon to electric. And these cells are made up of silicon semiconductor. Solar panel is used to store electric energy or charge the battery from the solar energy. And the battery charged is used to operate DC pump for spraying the pesticides.

II. RELATED WORK

Step by step procedure for the working principle.

1. Tank is filled with mixture of pesticide and water
 2. Solar radiation incident on the solar panel it will absorb this radiation and produces the current with the help of semiconductor.
 3. Control system control the voltage and this voltage supply to battery and battery store output of the control system
 4. Motor is operated by battery and is provided to start the motor
 5. Pump lift the pesticide supplied towards the nozzle through the pipe
 6. Nozzle sprayed or distribute pesticide on the crop at a uniform pressure
 7. Mixture of water and pesticide is distributed on crop with the help of hand notch. It's working on electrical energy which is generated by a solar panel. It is converted in to mechanical energy and pump is operated for spraying pesticide.
- Bluetooth Command use for operating Machine:
- Command 1 is used for moving machine forward.
 - Command 2 is used for moving machine reverse.
 - Command 3 is used for to turn the machine left.
 - Command 4 is used for to turn the machine right.
 - Command 5 is used for to turn on stirrer.
 - Command 6 is used for turn off stirrer.
 - Command 7 is used for to turn on sprayer motor.
 - Command 8 is used for to turn off sprayer motor.

Command *_10 is used for to add pesticide in stirrer tank.

Command 0 is used for to turn off system.

III. METHODOLOGY

A) Block Diagram:

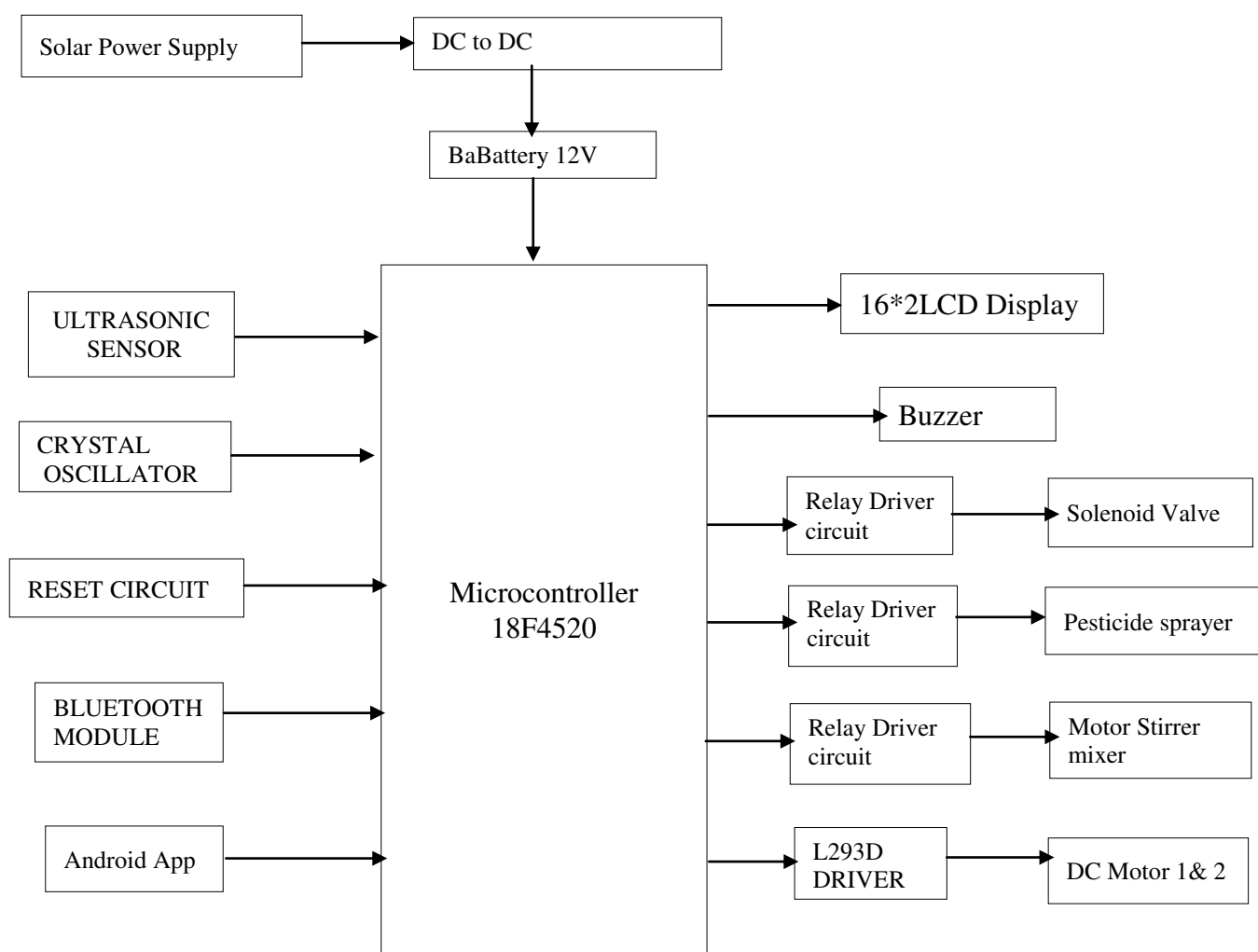


Figure 1. Block Diagram of System

B) Block Diagram Description:

The block diagram of the project is seen in Fig. This is a project which can be viewed as a viable alternate to conventional method. The automatic sprayer is a four wheeled vehicle which sprays pesticide in any given crops 10 with almost nil human assistance. The vehicle is powered using an onboard solar powered battery which brings down the running cost. The control of the vehicle is achieved using an inbuilt microcontroller unit which is programmed to respond to the Bluetooth device. User also can give command of pesticide quantity for different 3 pesticides. Here 3 pesticide tanks are there according to user command solenoid valve open to dispense given quantity of given pesticide. Stirrer motor turns “ON” to mix pesticide in water tank. After that sprayer motor “ON” to spray pesticide on crops. Vehicle can be move on Bluetooth command. Microcontroller is the brain of the desired system. It consists of two sections one is transmitter section and another is receiver section. In transmitter section it consists of Bluetooth device

whereas Bluetooth, Solar panel, ultrasonic sensor, level sensor, LDR and Storage battery which works as input. In receiver section it consists of Microcontroller, LCD, L293D Motors driver IC, Relays, Buzzer, Stirrer Motor, Sprinkler motor, Solenoid Valve, DC motor. The sun rays are collected by the solar panel, where it converts solar energy into electrical energy and it is stored in the storage battery. We use here automatic solar panel rotation system according to intensity of light to catch maximum solar energy. By using bluetooth, we send instructions/commands to the microcontroller unit. The operation takes place in the microcontroller unit to display commands on LCD display therefore we can operate the complete operation such as sprinkler motor, mixer, solenoid valve and L293D motors for movement of the prototype.

C) Flowchart:

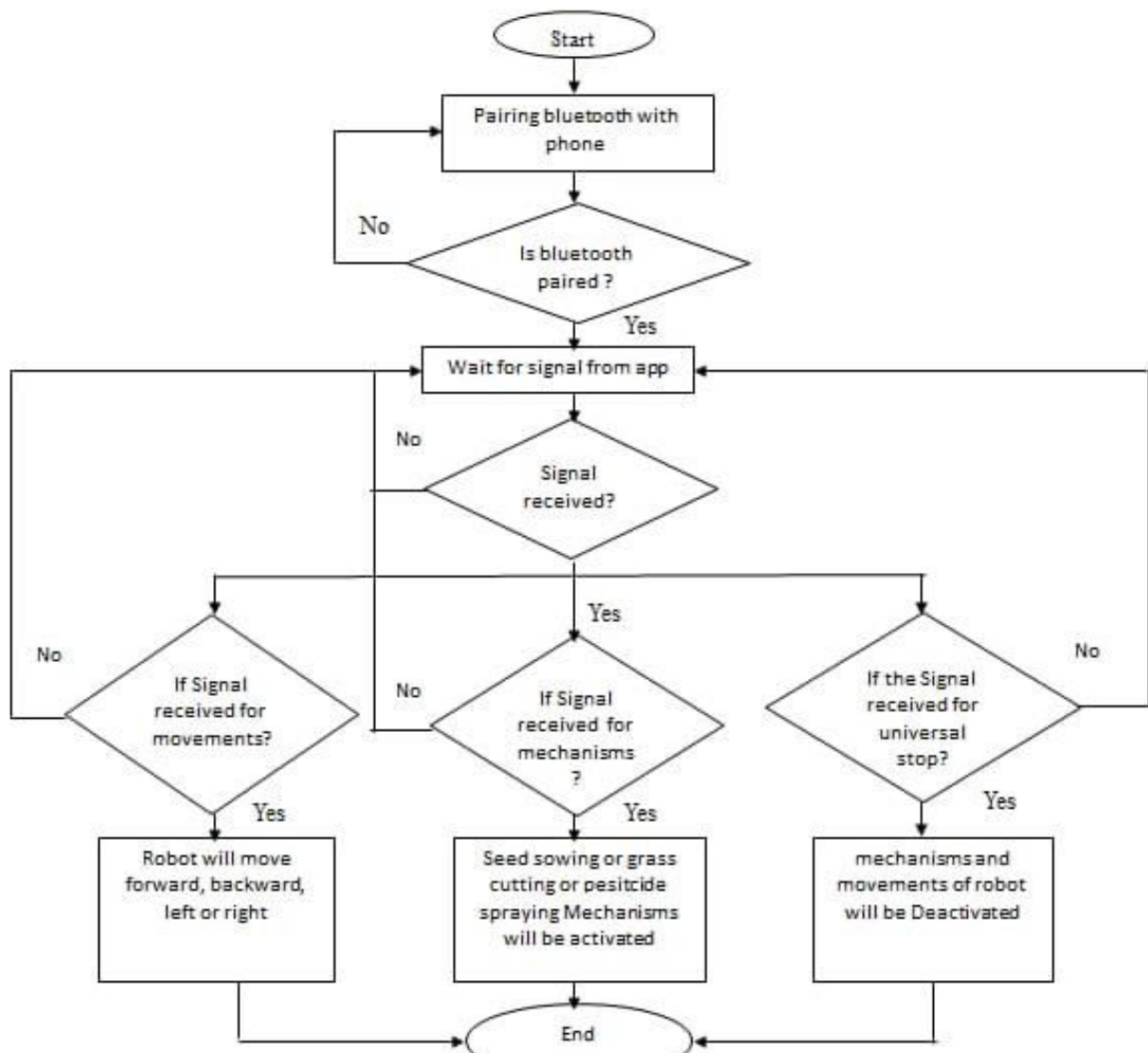


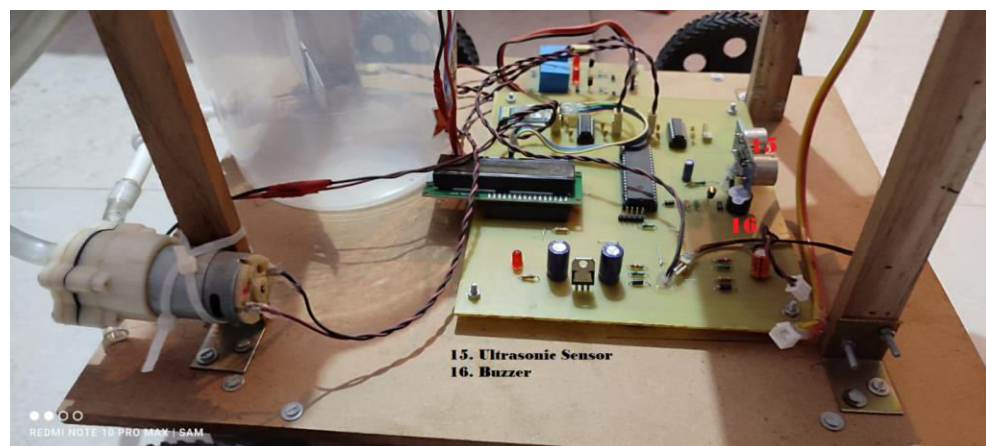
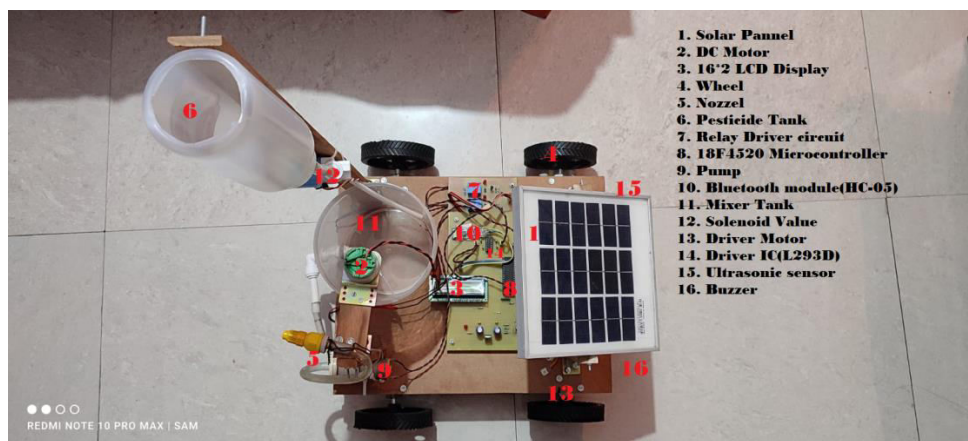
Figure 2: Flowchart of System

D) Algorithm:

The detailed step wise working of the system is mentioned below.

- 1.start the system.
- 2.pairing Bluetooth with phone.
- 3.Is bluetooth paired? If no then go to step number two.
- 4.Wait for the signal from app.
- 5.Signal received? If no then go to step number four.
- 6.If signal receive for movement? If yes then robot will move forward and backward, left or right.
- 7.If signal receive for mechanism? if yes then pesticide spraying mechanism will be activated.
- 8.If signal receive for the universal stop? If yes then mechanism and movement of robot will be deactivated.
- 9.end of the process

IV. EXPERIMENTAL RESULTS





V. CONCLUSION

The prototype 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. This project demonstrates the implementation of robotics and mechatronics in the field of agriculture. The performance is satisfactory under laboratory condition. The project result in development of a Solar Based Pesticide Spraying Machine. The project is eco-friendly and will comparatively require less time for spraying of pesticides. With respect to conventional spraying machine. The circuit diagram is designed and tested for the Solar Based Pesticide Sprayer.

REFERENCES

1. Nitin Das, Namit Maske, Vinayak Khawas, Dr. S. K. Chaudhary, Er. R. D. Dhete, Agricultural Fertilizers and Pesticides Sprayers- A Review, IJIRST – International Journal for Innovative Research in Science & Technology| Volume 1 | Issue 11 | April 2015.
2. Shailesh Malonde et al —Design and Development of Multipurpose Pesticides Spraying Machine| IJAEGT Volume 04.
3. Pandurang Lad et al —Solar Operated Pesticide Sprayer| IJARSE Volume 04.
- 1] Linz, A. Ruckelshausen and E. Wunder, "Autonomous Service Robots for Orchards and Vineyards: 3d Simulation Environment of Multi Sensor Based Navigation and Applications".
- [2] Degarmo, E. Paul; Black, J T.; Kohser, Ronald A. (2003), Materials and Processes in Manufacturing (9th ed.), Wiley, ISBN 0-471-65653-4
- [3] Groover, Mikell P. (2007), "Theory of Metal Machining", Fundamentals of Modern Manufacturing (3rd ed.), John Wiley & Sons, Inc., pp. 491–504, ISBN 0-471-74485-9
- [4] Oberg, Erik; Jones, Franklin D.; McCauley, Christopher J.; Heald, Ricardo M. (2004), Machinery's Handbook (27th ed.), Industrial Press, ISBN 978-0-8311-2700-8.



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Impact Factor: 8.118



ISSN INTERNATIONAL
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