**International Journal of Innovative Research in Engineering**
*Volume 4, Issue 3(May-June 2023), PP: 243-245.*
*www.theijire.com* ***ISSN No: 2582-8746***

# Design and Fabrication of Spraying Agrobot

**S.Sakthivel[1], G.Dharani[2], V.Divakar[3], A.Gopalakrishnan[4], T.Jeganeeshwaran[5]**
[1]*Assistant Professor, Civil Engineering, the Kavery Engineering College, Mecheri, Tamilnadu, India.*
[2,3,4,5] *Final year, Department of Agriculture Engineering, The Kavery College of Engineering, Mecheri, Tamilnadu, India.*

**How to cite this paper:**
S.Sakthivel[1], G.Dharani[2], V.Divakar[3], A.Gopalakrishnan[4], T.Jeganeeshwaran[5],"Design and Fabrication of Spraying Agrobot ",IJIRE-V4I03-243-245.

https://www.doi.org/10.59256/ijire.2023040382



***Abstract:*** *Agriculture is our wisest pursuit because it will in the end contribute most to real wealth, good morals and happiness. AGROBOT is a short form for Agricultural robot. Nowadays 40% of the world has chosen agriculture as the major profession, throughout the last decade the event of the automated vehicles and robots are dynamic. This Agrobot project is designed to decrease the labor work of farmers additionally to increasing the speed and accuracy of the work which leads to the saving of time. Here the designing systems like plough the land, sowing the seed or spraying the fertilizer and harvesting of crops are preferred by this autonomous robot using microcontroller. The Internet of Things (IoT) is playing a major role in reducing manual labor. It is helpful to combined robots with agriculture which is capable of moving around the field for spraying fertilizer like a farmer. Them, NodeMCU controls the robot for spraying fertilizer and an ultrasonic sensor is used for obstacle detection coming in the front of the divider of land.*

***Key Word:*** *NodeMCU, Water Pump, Spray Nozzles, Agrobot.*

## I.INTRODUCTION

This project which can help the people in different problematic condition between Agricultural farming and pesticide spraying Agricultural is one of our most important industry for providing food, feed and fuel necessary for our survival. Certainly, robots are playing an important role in the field of agriculture for farming process autonomously. Normally, farming process include planting, irrigation, fertilization, monitoring and harvesting of a crop of any kind. Day by day, the Electronics and Electrical industry develops the different systems as per requirement of people. So as an Engineer, we always think about the need of people and try to complete that requirement. So as per requirement of society we design this system, which is a combination of different subsystems and using this subsystem we can produce this important and intelligent device. However, due to a variety of problems, full automation of agriculture is not possible. Despite the fact that it is being introduced at the research level,it is not being provided to farmer as a commodity so that they can profit from the resources. Its extraordinary feature is to make your farm smart and intelligent through use of IoT (NodeMCU) to save time, save human resource and to get good results in reduce efforts. This system will be a helping hand for the spraying fertilizer in large area.

## II. NECESSITY OF THIS AGROBOT

Robots can be used to combat plant diseases that cause a lot ofdamage to crops. Fungi are the most common causes of crop loss in the entire world. To kill a fungal disease you need a fungicide, a kind of pesticide. Fungal diseases interfere with the growth and development of a crop. They attack the leaves which are needed for photosynthesis and decrease the productivity of the crop and cause blemishes on the crops which make them worth less on the market. After the crops are harvested fungi can grow and spoil the fruits, vegetables, or seeds. Robots can treat plants that have been infected or destroy them if necessary. They could treat just the plants that need it, instead of covering the entire crop with fungicide.

## III.WORKING OF PEST CONTROLLING

- Pest controlling is required in any agriculture field, otherwise it can damage the crops of the fields.
- Pest controlling is either done manually or recently robot by means of liquid pesticides spraying on the crops. It helpful to protect the crops and leaves from insects and fungies.
- In most of area it is done manually, but with improvement in technologies about agriculture instruments like robots is used for many works like harvesting of the crops, spraying water to crops, cutting of crops and also providing pesticides to the crops.
- Many inventers worked on the robots for spraying pesticides and they also gets success, such robots which are helpful to farmers for spraying pesticides called Agrobots.

## IV.METHODOLOGY

**Component Used**

**1. Arduino/NodeMCU:** The Arduino project created an open-source hardware design and software SDK for their versatile IoT controller. Similar to NodeMCU, the Arduino hardware is a microcontroller board with a USB connector, LED lights, and standard data pins. It also defines standard interfaces to interact with sensors or other boards.

**2. DC Motor 12V:** A DC motor is any motor within a class of electrical machines whereby direct current electrical power is converted into mechanical power. Most often, this type of motor relies on forces that magnetic fields produce. Regardless of the type, DC motors have some kind of internal mechanism, which is electronic or electromechanical. In both cases, the direction of current flow in part of the motor is changed periodically.

**3. 12V Water Pump:** A pump is a device that moves fluids (liquids or gases), or sometimes slurries, by mechanical action. Pumps can be classified into three major groups according to the method they use to move the fluid: directlift, displacement, and gravity pumps. Pumps operate by some mechanism (typically reciprocating or rotary), andconsume energy to perform mechanical work by moving the fluid. Pumps operate via many energy sources, including manual operation, electricity, engines, or wind power, come in many sizes, from microscopic foruse in medical applications to large industrial pumps.

**4. ESP32 CAM:** The ESP32-CAM is a small size, low power consumption camera module based on ESP32. It comes with an OV2640 camera and provides onboard TF card slot. The ESP32-CAM can be widely used in intelligent IoT applications such as wireless video monitoring, WiFi image upload, QR identification, and soon.

**5. LCD Display:** LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. The command register stores the command instructions given to the LCD. A command is an instruction given toLCD to do a predefined task like

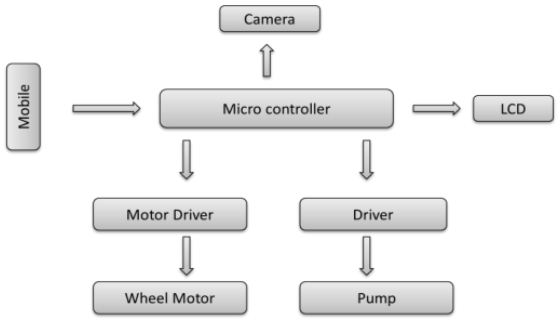
- Initializing it
- Clearing its screen,
- Setting the cursor position,
- Controlling display & etc.

**6. Relay Module:** A relay is an electrically operated switch that can be turned on or off, letting the current go through or not, and can be controlled with low voltages, like the 5V provided by the Arduino pins. Controlling a relay module with the Arduino is as simple as controlling any other output as we'll see later on.

**7. Spray Nozzles:** A spray nozzle is a device that turns the pressure energy of a liquid flow into kinetic energy. The nozzle efficiency can be defined as the ratio between the energy available at the nozzle inlet and the energy wich isactually used to increase the liquid speed and create the spray, the difference being the energy lost during the process because of friction.

- Breaking of the liquid into separate droplets.
- Directing the liquid drops onto a surface or anobject, to achieve the desired result.

## V.WORKING OF THE AGRIBOT




- To spray the liquids of pesticide on the crops to protect them against insects while travelling in the field with help of sprayer.
- Block diagram of pest controlling Agrobot is shown. The Robot contains components Keyboard, microcontroller, battery, air compressor; sprayer, nozzle, air tank etc. will work as shown in block diagram. The required pressure inthe air tank is maintained by air compressor.
- Key board of remote works as transmitter. The transmittertransmits the signal which is given to it. This signal is captured by robot which works as receiver by microcontroller.
- As robot senses signal with help of H- bridge circuit D.C motor will actuate and motors get revolution. The working capacity of the battery used in this model is about 2 hour.
- Wheels which are connected through D.C motors. So as the motors get revolution the wheels are also rotate. Wheels are rotated as given order reverse, forward, left, right. In this model the diameter of wheel is 4".
- When voltage is given to circuit as right wheel, motor of right side actuates and wheel takes right turn. When voltage is given to circuit as left wheel, motor if left side actuates and the wheel takes left turn. Same procedure is done in the forward of reverse motion of the robot.
- As the carrier of robot travels in the field, the robot sprays the liquid pesticides on the crops with help of sprayer at

particular distance.

## VI.RESULT

- **Sprayer:** Sprayer is the main mechanism in this project without sprayer it is useless because it is main element to pest the pesticide. In this model spraying is controlled by manually. So we work very much to how to control it.
- **Pump:** 12V DC Pump with rated pressure of 0.6 MPA,100 PSI(5.5Bar). The maximum flow of the pump is 5 L / min.

## VII.CONCLUSION

The robot can basically complete the work of automatic controlled and meet spraying requirements in the greenhouse. The robot also met the economic and time constraints that it was subject to. The robot was able to drive up and back along the tracks in the greenhouse. As a result, the two control modules for the robot have been successfully tested and demonstrated. While controlling a robot with Wi-Fi limits the range of communication distance, it is a smart and simple way to direct a robot. One of the simplest ways to control the motion of a robot is to use the internet. Since it necessitates the user's access to the specified guide. People would find it easy to use. In comparison to another unit, this is less expensive.

## References


1. *"Automated Farming Using Microcontroller and Sensors"(IJSRMS) ISSN: 23493371 (Abdullah Tanveer, AbhishekChoudhary, Divya Pal, Rajani Gupta, Farooq Husain)*
2. *Mr. V. Gowrishankar, April 2018 ISSN: 2455-5703*
3. *"Design and Implementation of Seeding Agricultural Robot" (JIRAS) (P.Usha, V. Maheswari, Dr. V. Nandagopal)*
4. *"IOT Based Smart Agriculture" IJARCCE June 2016 (Nikesh Gondchawar1, Prof. Dr. R. S. Kawitkar2)*
5. *"Agricultural Robot for Automatic Ploughing and Seeding" 2015 IEEE International Conference on Technological Innovations in ICT (TIAR 2015) (Amrita Sneha.A, Abirami.E, Ankita.A, Mrs. R. Praveen, Mrs. R. Srimeena ).*
6. *Kiiski, H., Dittmar, H., Drach, M., Vosskamp, R., Trenkel, M. E., Gutser, R., and Steffens, G. Fertilizers, 2. types. Ullmann's Encyclopedia of Industrial Chemistry, 2009*
7. *Accessed: Apr. 15, 2019. [Online]. Forests and agriculture: land-use challenges and opportunities – FAO, www.fao.org/3/ai5588e.pdf*
8. *Bhattacharyay D. (2020). Unmanned Aerial Vehicle Applications in Smart Agriculture. Protected Cultivation and Smart Agriculture. doi:10.30954/ndp-pcsa.2020.37*
9. *Kiramat. (2018). Smart Agriculture System. doi:10.31224/osf.io/972af*
10. *Nhamo, N., &Chikoye, D. (2017). Smart Agriculture. Smart Technologies for Sustainable Smallholder Agriculture, 1-20. doi:10.1016/b978-0-12-810521- 4.00001-3*
11. *'Wi-Fi Robot For Video Monitoring & Surveillance System' by Pavan.C, Dr. B. Siva kumar, International Journal of Scientific & Engineering Research Volume 3,Issue 8, August-2012 ISSN 2229-5518*
12. *Heavy-weight problem solved by the new SMART H5 robot. (2000). Industrial Robot: An International Journal, 27(5). doi:10.1108/ir.2000.04927ead.002*