WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Smart Agriculture Fertilizer Spraying Robot.

Soniya G Kamble [1], Sanjivani P Koli[2], Shreya P Patil[3], Pratiksha M Yantapur [4], Dipali V Patil[5]

[1,2,3,4] Students, Department of Electrical Engineering, Sharad Institute of Technology Polytechnic, Yadrav, India.

[5] Lecture, Department of Electrical Engineering, Sharad Institute of Technology Polytechnic, Yadrav, India.

ABSTRACT—

The agriculture sector faces many challenges such as crop diseases, pest infestation, water irrigation, weeds, fertilizer dumping, and many more. These problems lead to substantial crop loss, economic loss and also cause severe environmental hazards due to the current agriculture practices.The Robotics Technologies have the potential to solve these problems competently. As agriculture is a dynamic sector, the problems in agriculture are not mid-core by robotics, and a specific solution is provided to an expressly daedal problem. Diversity of systems have been developed to help these challenges and provide a better approach worldwide. This paper contains significant contributions used to address the challenges that agriculture faces and through robotic techniques we can eliminate problems.

KEYWORDS — WIFI based camera observations.

I. INTRODUCTION

Production of agriculture is one of the mostly discussed problems as a significant part of our population. Agriculture plays a pivotal role in Indian economy. We have inequalities of poverty and unemployment in health, education and agricultural sectors. Small scale farming which is the subject of this project is important for increasing the growth in agriculture and food security. It may be noted that Indian agriculture is home to small and marginal farmers [80 percent], Agriculture census shows that in India there are about 121 million farmers, about 99 million are small farmers. Here the main purpose of this project is to reduce farmer's work and time consumption. This machine is meant for a preliminary aim of avoiding the utilization of shovels & levers in plantation of saplings thereby enhancing the plantation process by making it facile. Also, we implementing customized fertilizer dumping mechanism using Arduino uno microcontroller and DC servo motors. In this project we are providing electric power from rechargeable batteries and inverter for powering this AC motor. We are using heavy duty rechargeable battery which will store large power for utilization. For charging of this battery, we are using solar panel. By using solar we minimizing environmental effect which will causing by pollution which emitting by petroleum energy source and thermopower plants.

II. LITERATURE REVIEW

A.R. Al-Ali, M. Qasaimeh, M. Al-Mardini, S. Radder, I.A.Zualkernan "ZigBee-based irrigation system for home gardens". 2015 International Conference on Communications, Signal Processing, and Their Applications (ICCSPA'15) (2015). In this paper author used zigbee protocol for communication. This zigbee protocal system had a some limitation like, it had short range so, we are implementing IoT based communication system for communication.

H.S. Abdullahi, F. Mahieddine, R.E. Sheriff "Technology Impact on Agricultural Productivity: A Review of Precision Agriculture Using Unmanned Aerial Vehicles",2015 this paper based on humanly controlled robot which required a person to control the robot. In our system we used line follower to self-navigation in farm.

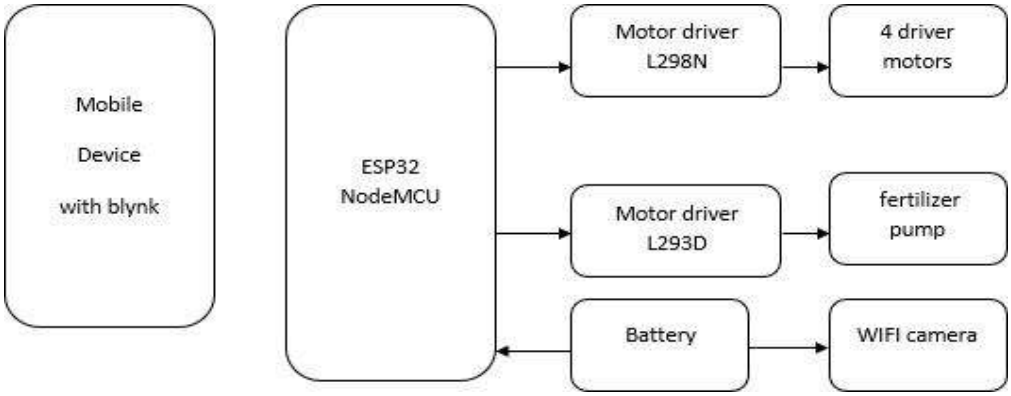
Artificial Intelligence and Machine learning has penetrated each and every category mentioned above. Bannerjee (2018) segregated advancements in AI category wise and gave a brief overview on various AI techniques. First it discusses penetration of Artificial neural networks and expert systems to solve above mentioned problems, then machine learning and fuzzy logic system. Lastly it covers automation and IOT in the agriculture. In this paper there is fertilizer dumping technique is absent so we implement in our project.

III. DESIGN METHODOLOGY

In this project we are using above circuit diagram for motoring our robot in farm. In this design we mainly using ESP8266 NodeMCU for controlling computing purpose. At the input side we connection hardware pin to virtual pin which is pin V0, V1, V3. At the output side pin D3, D4, D5 and D6 are connected to output side. At the fertilizer spraying unit we connect motor

driver L293d to ESP8622 to the pin of D7. In this project we are specially using IoT based controlling. So, we are using BLYNK server app which is give us ability to form a victual remote to operate this robot. In this all system we also monitor using long range camera which also connected to internet we are able to command world-wide. This camera having 360degree horizontal rotation and 180- degree vertical rotation.

Above block diagram we are using ESP8622 NodeMCU microcontroller for controlling all the aspects. At input section we are used virtual pins to sense input from mobile device. At output section we connected motor driver and water pump is connected to motor driver.



Block 1 – Mobile device with Blynk. By using mobile device, we are controlling the robot on the field at any ware. Also, we are using this devise as display of camera.

Block 2 – ESP8622 NodeMCU. In this device we are connecting all inputs and outputs to this controller. This is WIFI device which is connected directly to the pre-set Wi-Fi connection. By using this we are connecting our all device to cloud.

Block 3 – Motor driver L298N. this driver is used for to provide power to the driver's motors.

Block 4 – motor driver L293D. this driver is used for to provide power to the driver's fertilizer pump.

Block 5 – this block is drivers motors block which is provide us mobility in field.

Block 6 - this block is used for fertilizer pump.

Block 7- this is power sources block which is provided power to all devices.

Block 8 – this is camera block.

PROPOSED METHODOLOGY:

Step 1: Make connections as per circuit diagram.

Step 2: Make Connection On NodeMCU and then connect NodeMCU to the Wi-Fi using hotspot/Router.

Step 3: Then connect the NodeMCU pins output to the relay driver circuit.

Step 4: Programme the NodeMCU using Aurdino IDE Software.

Step 5: Download the Application which is available as a File, Install it from add liberary files.

Step 6: Connect the output of NodeMCU (D0 – D14) for different control function.

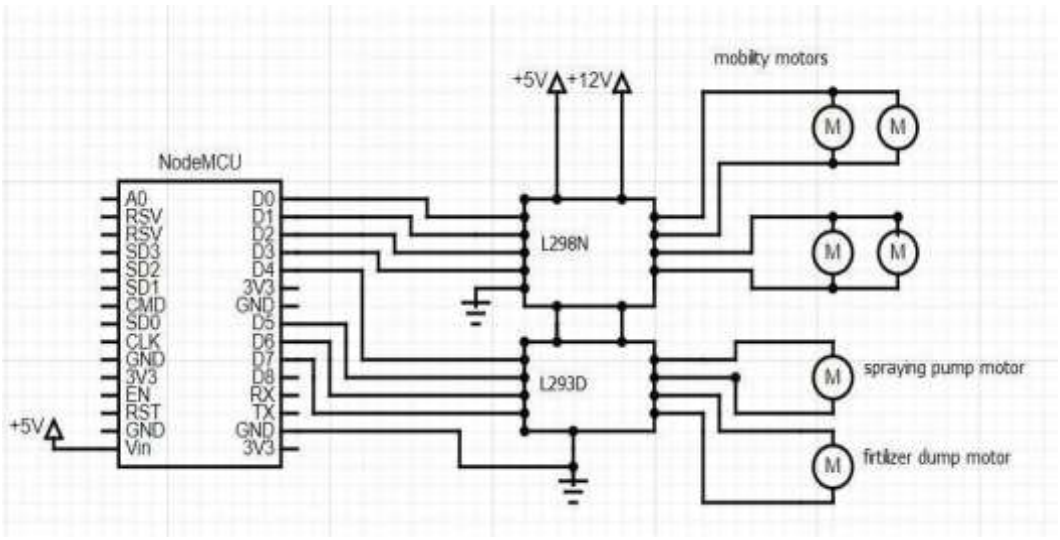
Step 7: Compile the typed programme check whether errors are occur or not.

Step 8: Upload the programme onto NodeMCU using micro-type USB Cables

Step 9: Then control the NodeMCU module with android application

Design & Implementation:

As per the circuit diagram connections are made by using wires. We have used the INPUT_PULLUP function in Arduino IDE instead of using the pull-up resistors with each switch



In this project we are using above circuit diagram for motoring our robot in farm. In this design we mainly using ESP8266 NodeMCU for controlling computing purpose. At the input side we connection hardware pin to virtual pin which is pin V0, V1. At the output side pin D0, D1, D2, D3, are connected to output side. At the fertilizer dumping unit we connect motor driver L293d to ESP8266 to the pin of D4, D5 and for that we are using two virtual pins which is V3. For pesticides spraying we are using V4 as virtual pin and corresponding pins are D6 and D7. In this project we are specially using IoT based controlling. So, we are using BLYNK server to connect our hardware to our mobile device as we showing in block diagram. In mobile device we create BLYNK server app which is give us ability to form a victual remote to operate this robot. In this all system we also monitor using long range camera which also connected to internet we are able to command world-wide. This camera having 360degree horizontal rotation and 180-degree vertical rotation

IV. RESULTS

Case 1: Robot forward Run turn operation:

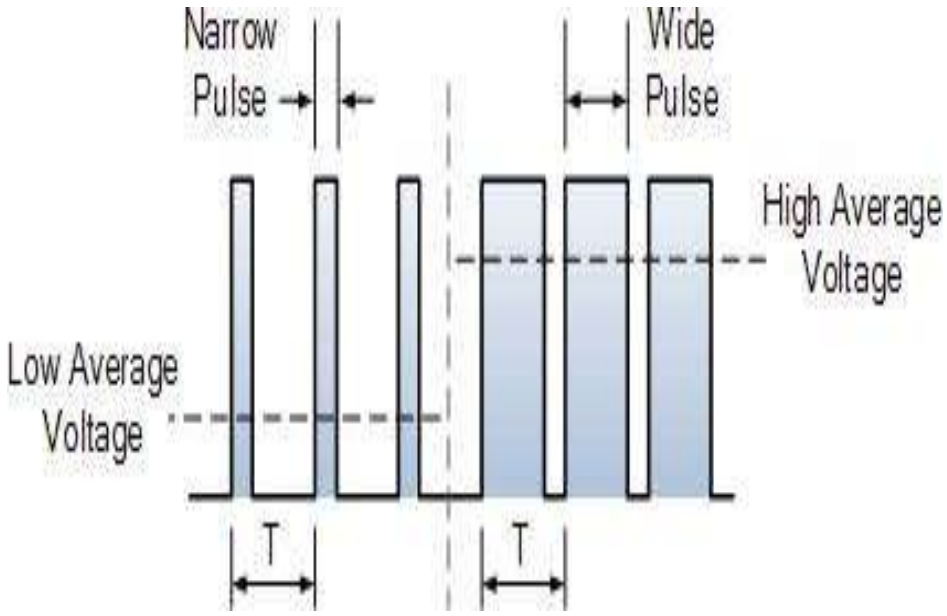


Fig.3. Switching Control

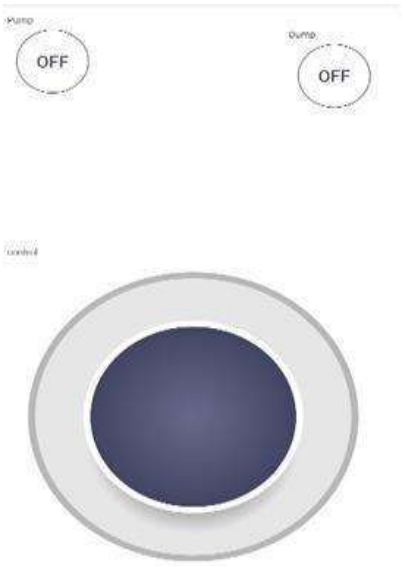


Fig.4 Joystick control

In this operation our main task is to control our robot autonomously in field. We are using IoT as connectivity that's way we control or we are able to drive our robot from any ware from world. This is our main advantage in this project. For controlling we are using BLYNK server. Above fig. shown our compilation or remote control of our project.

As we know we are working on PWM modulation for speed control of robot so, above waveform shown how we control motor speed by using PWM. In this narrow pulse shows us low output voltage means motor will run on low voltage and robot speed is low. Same when in wide pulse give us high voltage so motor speed is increases and robot will run at pick speed.

For controlling robot, we using joystick which is virtual joystick shown in above fig. when we slide joystick to upward direction x and y parameter will change its value. And digital signal sends from mobile device to IoT server to run robot to forward direction. Signal will reach to hardware and ESP32 will process the signal and send order to motor driver to power up the motors to forward direction.

Case 2: Robot reverse Run turn operation:

When we sliding this joystick to downward direction, x and y parameter will change and data will send to server. Server send data to hardware and in hardware ESP8266 will send order to motor driver to power up motor to reverse direction.

Case 3: Robot right Run turn operation:

When we sliding this joystick to right side direction, x and y parameter will change and data will send to server. Server send data to hardware and in hardware ESP8266 will send order to motor driver to power up motor to right side direction.

Case 4: Robot left Run turn operation:

When we sliding this joystick to left side direction, x and y parameter will change and data will send to server. Server send data to hardware and in hardware ESP8266 will send order to motor driver to power up motor to left side direction.

Case 5: Robot Pesticide motor turn operation:

For spraying fertilizer in compilation, we placing a button for that when we press that button data will send to server. Server send data to hardware and in hardware ESP8266 will send order to motor driver to power up motor.

Case 6: Robot camera operation:

In this project we installing IoT camera for monitoring our farm and robot direction. This camera is connected to internet and give us massive world-wide range for monitoring. This camera connected directly to internet connection and transferring video to mobile device.

V. CONCLUSION

The agricultural industry faces various challenges such as lack of effective irrigation systems, weeds, issues with plant monitoring due to crop height and extreme weather conditions. But the performance can be increased with the aid of technology and thus these problems can be solved. It can be improved with different iot driven techniques like remote sensors for soil moisture content detection and automated irrigation. The problem faced by farmers was that precision weeding techniques overcome the large number of crops being lost during the weeding process. Not only do these autonomous robots

improve efficiency, they also reduce the need for unnecessary pesticides and herbicides. Besides this, farmers can spray pesticides and herbicides effectively in their farms with the robot, and plant monitoring is also no longer a burden. For starters, shortages of resources and jobs can be understood with the aid of man-made brain power in agribusiness issues. In conventional strategies huge amount of labour was required for getting crop characteristics like plant height, soil texture and content, in this manner manual testing occurred which was tedious. With the assistance of various systems examined, quick and non-damaging high throughput phenotyping would occur with the upside of adaptable and advantageous activity, onrequest access to information and spatial goals

VI. REFERENCES

[1] "Automated Farming Using Microcontroller and Sensors" (IJSRMS) ISSN: 23493371 (Abdullah Tanveer, Abhishek Choudhary, 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).