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THE SMART AGRICULTURE ROBOT

[1] Samarth S. Pawar, [2] Prathamesh S. Patil, [3] Shubham C. Gurav, [4] Sagar S. Pawar, [5] A. G. Patil

1234BTECH Student,[5]Assistant Professor

[12345]Department of Electronics and Telecommunication Engineering,
[12345]Padmbhooshan Vasantraodada Patil Institute of Technology, Budhgaon(Sangli)

Abstract: The agricultural sector has witnessed a paradigm shift in recent years, owing to the integration of cutting-edgetechnologies such as robotics, artificial intelligence, and IoT. This project report delineates the design, development, and implementation of an autonomous robot tailored for precision farming in modern agriculture. The proposed smartagriculture robot is equipped with a plethora of sensors, actuators, and computational modules to facilitate real-time data acquisition, analysis, and decision-making. Leveraging machine learning algorithms, the robot is capable of identifying crops, detecting pests and diseases, and monitoring environmental parameters including soil moisture, temperature, and humidity. The core functionalities of the robot include seed planting, irrigation, fertilization, and weed control, all executed with precision and efficiency. By employing localization and mapping techniques, the robot navigates through the farm autonomously, optimizing routes and avoiding obstacles. Furthermore, the integration of wireless communication enables seamless interaction between the robot and the central farm management system, facilitating remote monitoring and control. The collected data is transmitted to the cloud for further analysis, enablingfarmers to make informed decisions and optimize resource utilization.

Index Terms – ESP 8266, Motor driver , Humidity Sensor, Soil moisture Sensor, Temperature Sensor,

I. INTRODUCTION

Agriculture is the backbone of India. The history of Agriculture in India dates back to Indus Valley Civilization Eraand even before that in some parts of Southern India. Today, India ranks second worldwide in farm output. The special vehicles play a major role in various fields such as industrial, medical, military applications etc., The special vehicle field are gradually increasing its productivity in agriculture field. Some of the major problems in the Indianagricultural are rising of input costs, availability of skilled labours, lack of water resources and crop monitoring. To overcome these problems, the automation technologies were used in agriculture. The automation in the agriculture could help farmers to reduce their efforts. The vehicles are being developed for the processes for ploughing, levelling,water spraying. We can expect the robots performing agricultural operations autonomously such as ploughing, seedsowing, mud closing and water spraying. Watching the farms day & night for an effective report, allowing farmers to reduce the environmental impact, increase precision.

II. LITERATURE REVIEW

1) Smith, J. (2020): The Impact of Smart Agriculture in Enhancing Crop Yields. Journal of AgriculturalTechnology, 12(3), 167-182. Farming faces challenges that increase the adverse effects on farms' economics, labor, and the environment. It may then discuss the significance of crop yields in agriculture,highlighting the importance of maximizing production to meet the growing global demand for food. This could include precision irrigation systems, soil sensors, data analytics, and AI-driven decision support systems.

Smart farming technologies (SFTs) are expected to assist in revertingthis situation. Inthis work, 1064 SFTswere derived from scientific papers, research projects, and industrial products.

2)Johnson, L., & Brown, E. (2019) Automation in Agriculture: Benefits, Challenges, and Opportunities.International Journal of Agricultural and Biological Engineering, 12(4), 1-10. Traditional top- down methods for resource management ask first what future conditions will be, then identify the best actionto take in response to that prediction. Even when acknowledging uncertainty about the future, standardapproaches characterize uncertainties probabilistically, then optimize objectives in expectation, and/or develop a small number of representative scenarios to explore variation in outcomes under different policy responses. Johnson and Brown might outline the benefits of automation in agriculture, includingincreased productivity, cost savings, labor efficiency, improved crop quality, and environmentalsustainability.

III. PROPOSED METHODOLOGY

In modern era, the main problem in agriculture field include lack of farm labor availability, lack of knowledge regarding soil testing, increase in labor wages, wastage of seeds and more wastage in water. To overcome all these disadvantagesthe robot for agriculture has been proposed. The main aim of agricultural robot is applying robotic technology in agricultural field. The agriculture robot efficiently perform spraying ,detect diseases on the crop automatically. The robot is a mechanical device which is capable of performing various tasks without human intervention. The robot works based on command given by the controller. Various sensors are used for sensing various parameters along the roboticpath. The microcontroller being the heart of the robotic system manipulates entire the action of the robotic system. It also controls a wheel motion by controlling the DC motors. Motor driving circuit is used to drive the DC motors which in turn control the wheel motion. The seeding robot for agricultural purpose is an autonomous robot which is controlledremotely through a wireless connectivity between the Smartphone and the robot. The basic aim of this project is to develop a multipurpose machine, which is used for detect soil moisture ,crop diseases detector and water sprayer to spray water with least changes in accessories with minimum cost.

IV. BLOCK DIAGRAM

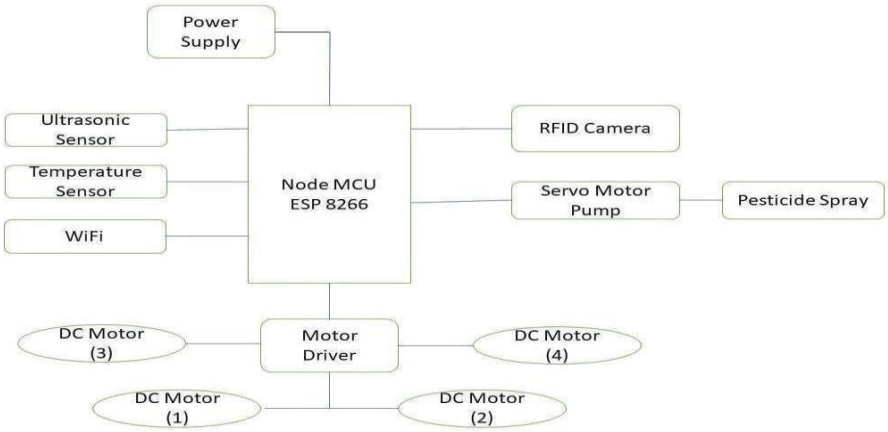
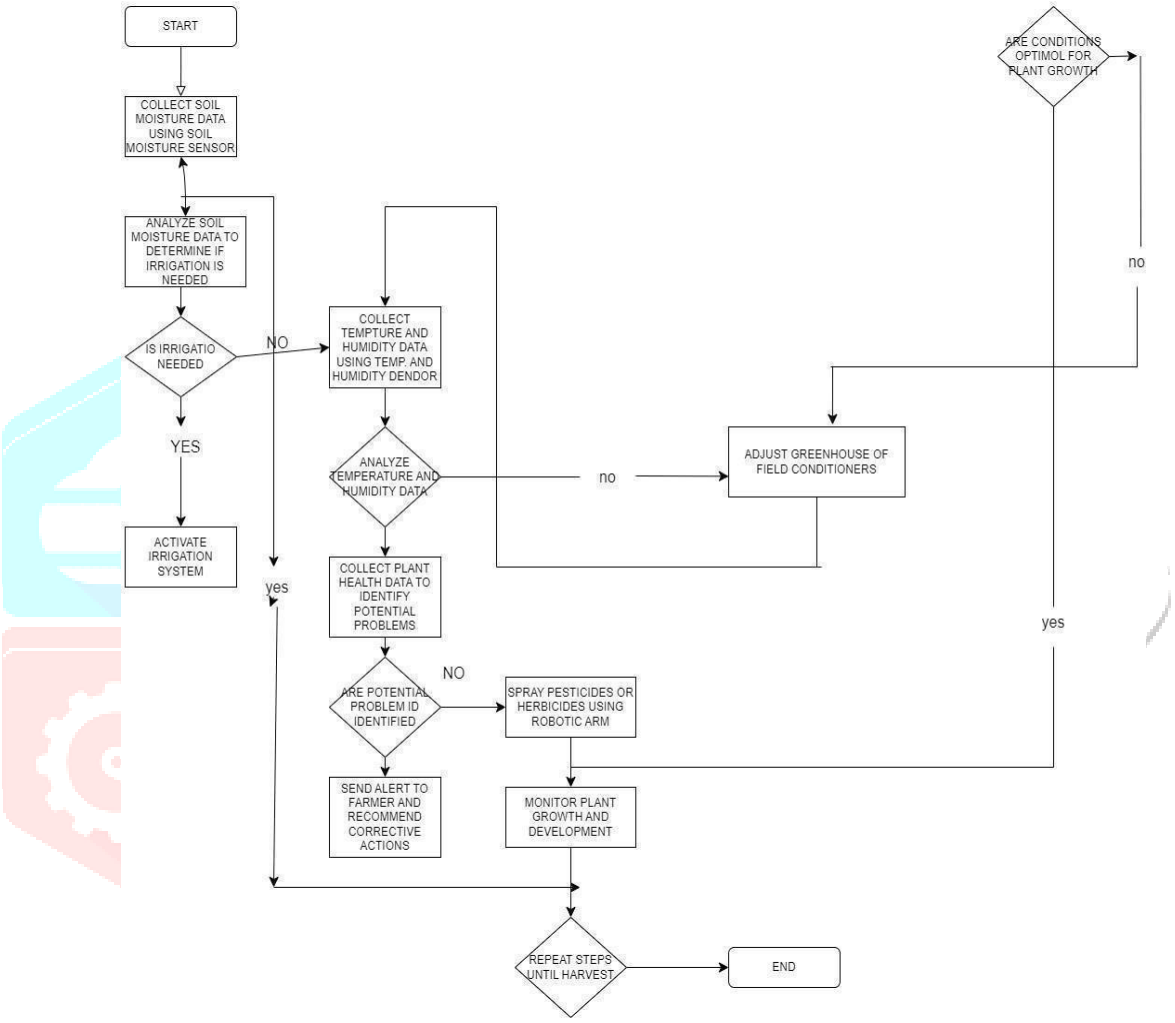


Figure 1: Block diagram

The block diagram of our system includes an microcontroller ESP8266, a temperature, ultrasonic, soil moisture and humidity sensor, motor driver, servo motor, motor driver, spray, RFID camera. The ESP8266 serves as the central processing unit of our project. The temperature and humidity sensor continuously monitors the temperature and provides this data as input to ESP8266.

V. FLOW CHART



VI. SIGNIFICANCE AND SCOPE

This paper Smart agriculture robots hold significant promise in revolutionizing the agricultural industry. Here are some of their key significance:

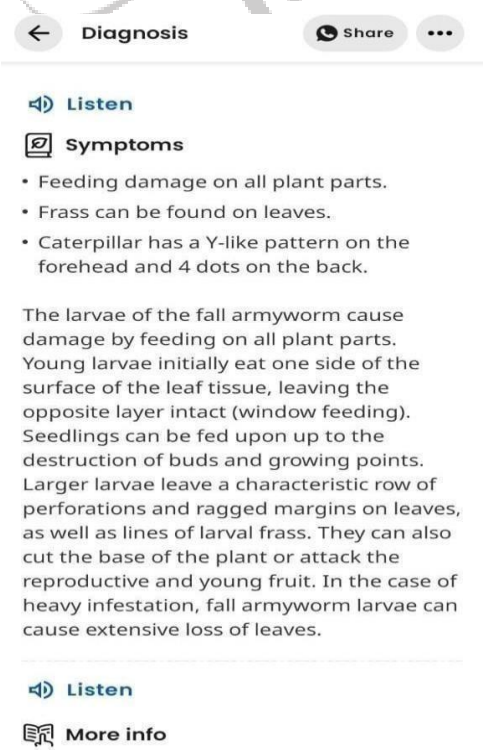
Increased Efficiency: Smart agriculture robots can perform tasks more efficiently than humans, leading to increasedproductivity and reduced labor costs. They can work around the clock without fatigue, helping farmers manage theiroperations more effectively.

Precision Agriculture: These robots enable precision agriculture practices by precisely planting seeds, applying fertilizers, and spraying pesticides only where needed. This reduces the use of resources such as water and chemicals,while maximizing crop yields. Data Collection and Analysis: Smart agriculture robots are equipped with sensors andcameras that can collect vast amounts of data about soil health, crop growth, and environmental conditions. This datacan be analyzed in real-time to make informed decisions about crop management, leading to better outcomes.

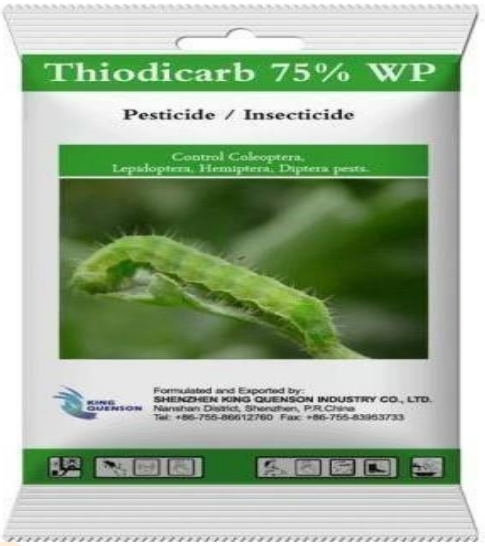
VII. RESULT

The picture is captured by plantix app. This app detects the disease on the plant on the basis of present condition ofplant or leaf and the color of leaf.

Sweet Corn: -



Required Pesticide:



1 Tempreture and Humidity Reading

Temperature	34 degree Celcius
Humidity	49%

2 Soil Moisture sensor Reading

Sr.no	Moisture	Result
1.	17	Dry soil (Need of Water)
2.	41	Wet Soil (No Needed of Water)
3.	69	Extra Wet Soil

VIII. CONCLUSIONS

The robot for agricultural purpose an Agrobot is a concept for near the performance and cost of product once optimized,will prove to be work through in the agricultural spraying operations. smart agriculture robots stand as pivotal tools revolutionizing the farming industry. With their advanced technology, these robots offer a myriad of advantages that significantly enhance agricultural practices. smart agriculture robots streamline laborintensive tasks, promoting efficiency and reducing reliance on manual labor. This not only saves time and resources but also ensures that farming operations are conducted with precision and accuracy. The data collected by smart agriculture robots provides valuable insights into crop health, yield predictions, and optimal farming practices. This data-driven approach enables continuous improvement and optimization of farming operations, ultimately leadingto increased productivity and profitability. Smart agriculture robots represent a transformative force in modern agriculture, offering a holistic solution to the challenges faced by farmers. By leveraging advanced technology and data-driven insights, these robots pave the way for a more sustainable, efficient, and productive future in farming.

REFERENCES

[1] https://www.researchgate.net/publication/369026915_SMART_AGRICULTURE_A_REVIEW:The Impact of Smart Agriculture in EnhancingCrop Yields Published by Smith, J. (2020)

[2] https://www.researchgate.net/publication/374168920_Smart_Farming_Automationand_Robotics_in_ Agriculture :Automation inAgriculture published by Jonhson,l. & Brown E(2019)

[3] https://www.mdpi.com/2071-1050/12/9/3853:TowardsSustainable Agriculture Published by AdamsR.,& Wilson D. (2018)

[4] https://www.electronicsforu.com :Agricultural Robots: The Next-Gen Farmers.

[5] https://nevonproject.com :Crop Irrigation Water Sprinkler Agriculture Robot.

[6] https://electronicshub.org :Auto Irrigation System Using Soil Moisture Sensor.

[7] https://ijcrt.org/papers/IJCRT2304172.pdf: iot and wireless sensor networkbasedautonomous farming robot