Design and Implimentation of Agricultural Robotic Spray Machine Using Ai

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***Abstract*—**The agricultural sector faces increasing pressure to improve efficiency,reduce chemical usage,and minimize environmental impact. In response,robotics and artificial intelligence(AI)technologies offer promising solutions for precision agriculture. The system utilizes AI algorithoms to detect and identify crops,weeds,and pests in real-time,enabling precise application of fertilizer or pesticides only where needed**.**

Keywords—Agriculture Robotics,AI,Spray Machine,Precision Agriculture,Sustainability.

I. INTRODUCTION

Plant protection activities are the most important practices during crop production. Application of maximum pesticide products with the sprayer. The application of fungicides, herbicides, and insecticides is one of the most recurrent and significant tasks in agriculture. Conventional agricultural spraying techniques have made the inconsistency between economic growth and environmental protection in agricultural production. Spraying techniques continuously developed in recent decades. For pesticide application, it is not the only sprayer that is essential, but all the parameters like the type and area of the plant canopy, area of a plant leaf, height of the crop, and volume of plants related to plant protection product applications are very important for obtaining better results. From this point of view, the advancement in agriculture sprayer has been started in the last few decades. Robotics and automatic spraying technologies like variable rate sprayers, UAV sprayers, and electrostatic sprayers are growing to Increase the utilization rate of pesticides, reduce pesticide residues, real-time, cost-saving, and high compatibility of plant protection products application. These technologies are under the "umbrella" of precision agriculture. The mechanized spraying system, usually implemented by highly precise equipment or mobile robots, makes possible the selective targeting of pesticide application on desired time and place. These advanced spraying technologies not only reduce the labour cost but are also effective in environmental protection. Researchers are conducting experimental studies on the design, development and testing of precision spraying technologies for crops and orchards. First, confirm that you have the correct template for your paper size. This template has been tailored for output on the A4 paper size. If you are using US letter-sized paper, please close this file and download the file "MSW_USltr_format".

II.BACKGROUND AND REALED WORKS

2023-sandeep kumar, santha, kumarmohan, valeria skitova.The mobile manipulator was simulated on undulating terrain profiles using ADAMS software. 2023-Nabarun Dawn, Tania Ghosh, Alokesaha, Challenges and future scope related to this field. 2023-JohanAlexanderHuisman, ChristofHuebner, BerndSchilling, AnsgarWeuthenTDR(Time-domain reflectometry)measurement accuracy of the SMPS. 2023-ErsinElbasi, NourMostafa, Smart notification (Machine learning,IOT,image processing,computer version)in case of abnormalities. 2022ShripadBhatlawande, chetan,The bot sprinkles the pesticides covering all plants in the farm. 2021-Anirudha, Tadpatri, The method of filtering GPS data using a moving average filter to improvise on the autonomous navigation system of the robot. 2020-A.M.Kassim, M.F.M.Termezai, The development of unmanned pesticide sprayer can be

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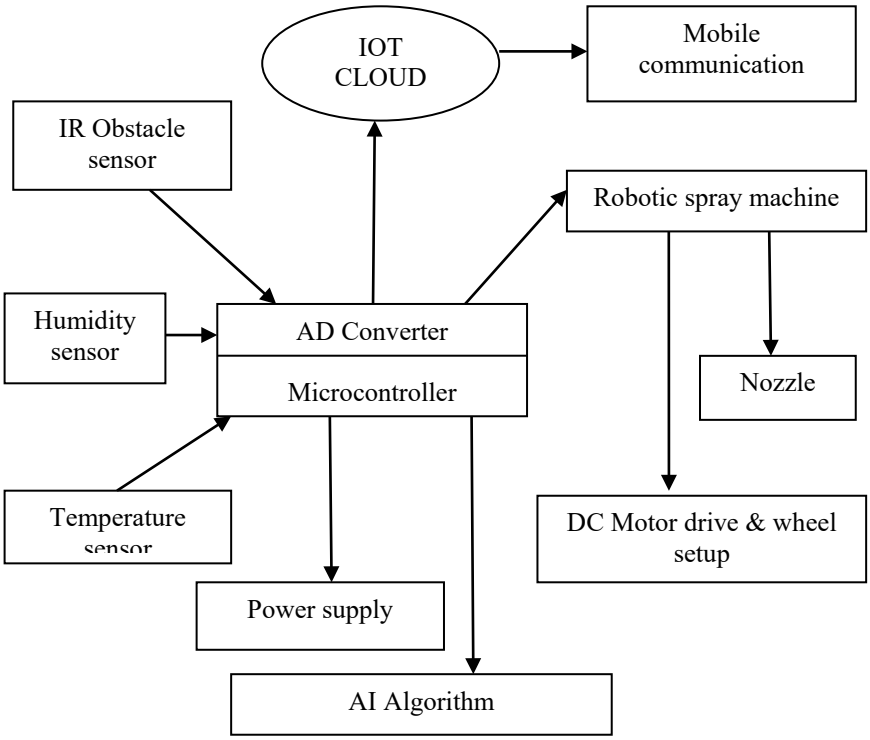
III.BLOCK DIAGRAM



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IV.METHODOLOGY

V.RESULTS AND DISCUSSIONS

1) Identify and target specific areas for spraying:

This can help to reduce the amount of spray that is used and to ensure that the spray is applied only where it is needed. For example, AI can be used to identify weeds in a field and to spray them with herbicide, while leaving the crops unharmed.

2)Optimize the spray pattern**:**

AI can be used to optimize the spray pattern based on factors such as the wind speed and direction, the type of liquid being sprayed, and the target area. This can help to ensure that the spray is applied evenly and efficiently.

3)Control the spray rate**:**

AI can be used to control the spray rate based on factors such as the type of liquid being sprayed, the target area, and the desired results. This can help to ensure that the correct an amount of liquid is applied and the desired results are achieved.

4)Agco:

Agco has developed a robotic spray machine called the Fendt Rogator 900 Series that uses AI to optimize the spray pattern and to control the spray rate. The machine is equipped with cameras and sensors that collect data about the wind speed and direction, the type of liquid being sprayed, and the target area. This data is used to calculate the optimal spray pattern and spray rate.

5)Artificial intelligence**:**

AI is still a relatively new technology in the field of agricultural robotics, but it has the potential to revolutionize the way that crops are sprayed. AI can help to reduce the amount of spray that is used, improve the accuracy of spraying, and reduce the environmental impact of agriculture.

This chaptor presents the results of soil moisture level at the brinjal garden. The integration of AI into agricultural robotics presents a promision solution to the challenges faced by conventional spraying methods. By leveraging AI-driven decision-making, the system achieves higher precision, efficiency, and sustainability in crop protection practices. However, challenges such as robustness in varied environmental conditions, scalability to large-scale farming operations, and acceptance by farmers need to be addressed for widespread adoption.

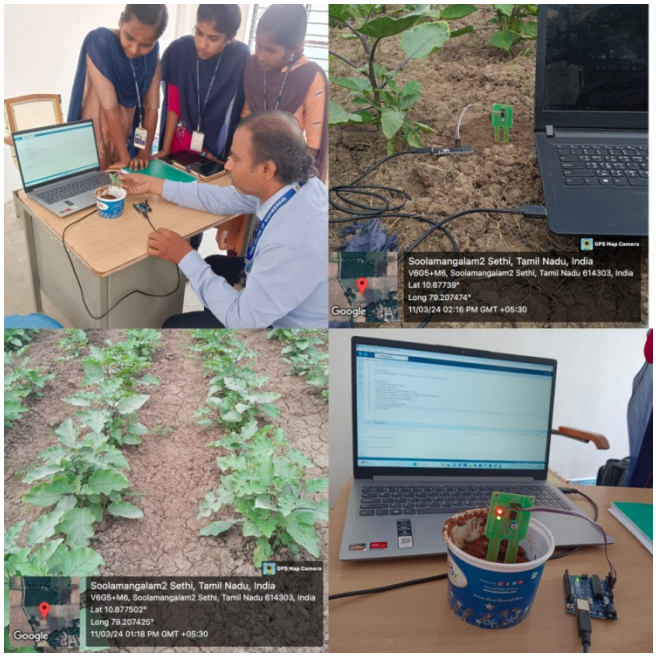

Fig: Soil moisture measurement

FIELD VISIT

PERCENTAGE	SOIL MOISTURE	WATER LEVEL
TEST 1	35%	55%
TEST 2	25%	60%
TEST 3	40%	75%

Tabular column

VI.CONCULSION

The design and implementation of an AI-powered agricultural robotic spray machine represent a promising approach to enchase pesticide application practices in farming. Future research may focus on further improving AI algorithms, integrating additional sensing capabilities, and scaling up deployment to benefit a wider range of agricultural settings. The successful implementation of this robotic spray machine underscores its potential to revolutionize pest management in agricultural. By reducing pesticide usage, improving efficiency, and ensuring safer working conditions for farmers, it addresses key challenges facing the agricultural industry. Moving forward, continued research and development effects will further refine AI algorithms, enhance system capabilities, and enable widespread adoption of this transformative technology. Overall, the design and implementation of an AI- powered agricultural robotic spray machine represent a significant and environmentally conscious farming practices in the 24 century.

VII.REFERENCES

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