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# REVIEW ON DESIGN OF MULTITASKING ROBOT FOR AGRICULTURE APPLICATION

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## ABSTRACT

This article presents a versatile farming robot created for the purpose of overseeing and managing crops. The robot comes with different sensors such as a camera, temperature and humidity sensors, and soil moisture sensors to keep track of crop health, growth, and yield. The robot comes with a robotic arm for activities such as pruning, weeding, and harvesting. It has been trialed on farms and proven to enhance yields and cut down on labor expenses. The findings show that multi-functional agricultural robots have the capability to enhance the effectiveness and output of farming tasks.

**Keywords**: Agricultural Robot, Crop Monitoring, Crop Management, Multi-Utility Robot, Precision Agriculture.

## I. INTRODUCTION

Agriculture is a key sector in feeding the world's population, but it faces many challenges including labor shortages, climate change, environmental degradation, etc. To address these challenges, precision agriculture, which uses advanced technologies to optimize yields, reduce waste, and promote sustainable farming practices, has emerged as a promising approach. Autonomous agricultural robots have shown great potential in precision agriculture, offering enhanced efficiency, accuracy, and flexibility in various farming tasks.

However, most existing agricultural robots are designed for specific tasks, such as planting, spraying, or harvesting, limiting their versatility and adaptability to diverse farming operations. To overcome this restriction, it is offer an agricultural robot with several obligations that can perform a number of tasks, including crop monitoring, pruning, weeding and harvesting. This robot seeks to provide farmers with a universal and effective tool for managing their cultures, reducing the cost of labor and assistance to sustainable agriculture. The proposed robot integrates advanced sensors, robotic arms, and machine learning algorithms to monitor crop health, detect issues, and perform tasks autonomously. This paper presents the design, development, and testing of the multitasking agricultural robot, highlighting its potential to transform farming operations and contribute to a more sustainable food system.

The highly developed, multifunctional agricultural robot Agro Max is poised to revolutionize farming methods. With the use of cutting-edge technology, Agro Max improves sustainable agriculture while lowering labor costs and raising crop yields. Agro Max uses robotic arms, sophisticated sensors, autonomous navigation, and machine learning to give real-time crop health, growth stage, soil moisture, and weather monitoring. Because it can do duties like pruning, weeding, harvesting, and planting, this sophisticated robot is a great choice for farmers, agricultural cooperatives, and research facilities. With its cutting-edge farming methodology, Agro Max is set to transform agricultural operations. Thanks to its sophisticated technology and wide range of uses, it is a useful tool for farmers looking to increase efficiency, sustainability, and production.

## II. METHODOLOGY

The intelligent farming robot can be guided in different directions such as forward, backward, left, and right. The user controls these instructions by selecting the relevant choices on the website. Upon receiving the instruction, the relay driver will transmit it to the microcontroller. The block diagram has been given in Figure 1. The microcontroller controls the motor driver circuit in order to make the robot move. Apart from these actions, various tasks such as pesticides spraying, planting seeds, watering, weather detection, and soil testing are carried out.

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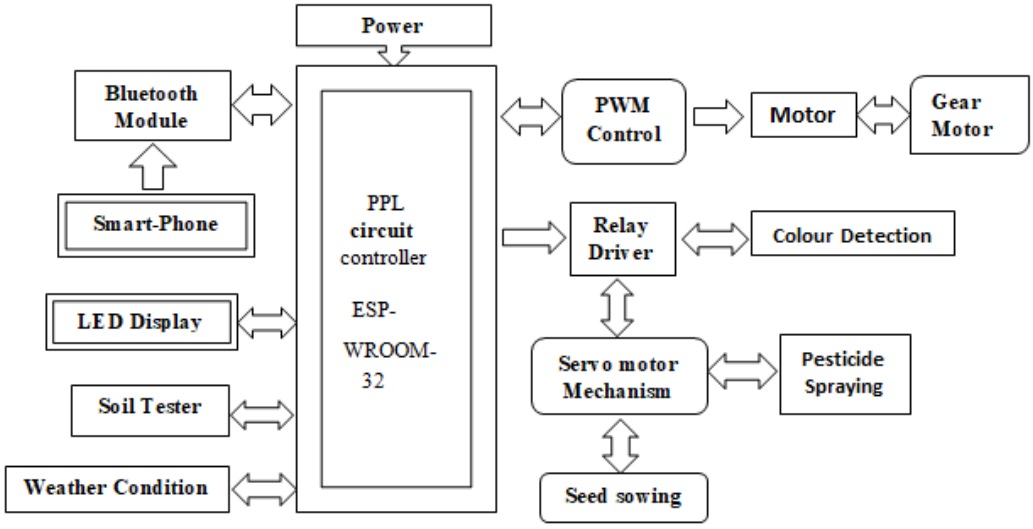


**Figure 1:** Block Diagram

**Flow Rate and Spray Pattern Adjustable:**

The flow rate and spray pattern of each nozzle can be changed separately. This guarantees accurate and effective application by enabling customization based on variables including crop variety, weather, and pesticide requirements.

**Soil tester:** NPK sensors are used for soil testing. By measuring the amounts of potassium, phosphorus, and nitrogen in the soil, the NPK sensor offers important information on soil fertility. The microcontroller receives the measured data from the sensor, processes it, interprets it, and displays it on the screen of the smartphone.

**Weather detection:** It provides useful information for agricultural decision-making by measuring the current weather, including temperature and humidity. Connecting a humidity sensor to a microcontroller allows users to remotely monitor and track temperature and humidity levels in real-time. The microcontroller interprets the humidity data and then delivers it to a smartphone over Bluetooth or Wi-Fi.

## III. RESULTS AND DISCUSSION

The outcomes of the tests show that the multipurpose agricultural robot offers real advantages in raising crop yields, cutting labor expenses, and enhancing farming productivity. For farmers seeking to boost output, lessen their impact on the environment, and enhance farming operations' sustainability, it has proven to be a useful tool. These findings demonstrate how autonomous agricultural robots have the potential to revolutionize conventional farming methods and support a more sustainable food supply.

## IV. CONCLUSION

The system can be enhanced for future expansion by extending its coverage to many acres of land. Additionally, the system can be integrated to track soil quality and crop growth. It is also feasible to detect and remove weeds from the soil. Multiple nodes can communicate wirelessly, and the sensors and microcontroller have been interfaced correctly. It is evident from all observations and experiments that this concept provides a complete solution to field operations and irrigation problems. There is little question that the field application of such a system may boost crop yields and general productivity.

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