IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 5, March 2026
Impact Factor: 8.2

Multitasking Agri-Boat

Rutuja Nandu Patole, Utkarsh Sanjay Laware, Aayush Yogesh Otari, Prathamesh Dilip Deshmukh
Prof Kale. S. G.
Department of Electronic and Telecommunication,
Amrutavhini Polytechnic, Sangamner, Maharashtra, India
patolerutuja9@gmail.com, utkarshlaware01@gmail.com

Abstract: *This paper presents a Multitasking Agriculture Robot designed to automate farming activities. The robot performs tasks like seed sowing, irrigation, and soil monitoring using sensors and a microcontroller. It reduces human effort and improves efficiency in agricultural operations. The system uses IoT for remote monitoring and control. Overall, the project supports smart farming and increases productivity.*

Keywords: *Agriculture Robot*

I. INTRODUCTION

Farming is very important for our daily life because it provides us food. In India, many people depend on agriculture for their income. But traditional farming takes a lot of time, hard work, and manpower.

Nowadays, there is also a shortage of labor, which makes farming more difficult.

To solve these problems, modern technology is being used in agriculture. Machines, robots, and smart systems can help farmers do their work faster and more easily. This not only saves time but also improves the quality of farming.

The Multitasking Agriculture Robot is a smart machine that can perform different farming activities like seed sowing, watering plants, and monitoring soil conditions. It works automatically using sensors and a controller. It can also be controlled using a mobile phone.

The main purpose of this project is to make farming easier, reduce human effort, and increase productivity. This robot is a step towards smart and modern agriculture

II. LITERATURE REVIEW

Many people have already worked on using machines and technology in farming to make work easier. Earlier, most systems were designed to do only one task at a time.

For example, some projects focused only on automatic watering systems. These systems use soil moisture sensors to check if the soil is dry and then supply water automatically. This helps in saving water and improving plant growth.

Other researchers developed seed sowing machines that can place seeds properly in the soil with correct spacing. This helps farmers get better crop results. Some systems are also made for removing weeds, which reduces the need for chemicals.

Recently, IoT (Internet of Things) is also used in agriculture. With IoT, farmers can check field conditions like moisture, temperature, and humidity using their mobile phones from anywhere. This makes farming smarter and easier.

Some advanced projects combine multiple features like watering, seeding, and monitoring in one robot. These are called multitasking agriculture robots. They save time and effort but can be expensive and complex.

From all these studies, we understand that many systems are available, but most of them do only one or two tasks. So, there is a need for a simple, low-cost robot that can do multiple farming tasks together. This project is designed to solve that problem.

III. METHODOLOGY

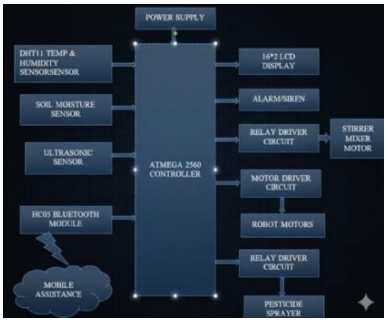
The methodology explains how the project is designed and how the robot works step by step.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 5, March 2026
Impact Factor: 8.2

First, we select all the required components like the microcontroller (Arduino/ESP32), sensors, motors, water pump, and seed sowing mechanism. These components are chosen based on the tasks the robot needs to perform.
Next, the robot body (chassis) is designed and assembled. Motors are attached to the wheels so that the robot can move in the field. A motor driver is used to control the movement of these motors.
After that, sensors like the soil moisture sensor and ultrasonic sensor are connected to the microcontroller. The soil moisture sensor checks whether the soil is dry or wet, while the ultrasonic sensor helps the robot detect obstacles and avoid them.
Then, the water pump and seed dispenser are connected. The water pump is used for irrigation, and the seed mechanism is used to drop seeds at regular intervals.
In the next step, programming is done using Arduino IDE. The code is written in such a way that:
The robot moves forward automatically It checks soil moisture continuously
If soil is dry, the water pump turns ON Seeds are dropped at proper intervals Obstacles are detected and avoided
Finally, the system is tested in a small field setup. Necessary adjustments are made to improve accuracy and performance.

Step-by-Step Flow
o Start the robot
o Move forward in the field
o Check soil moisture
o If dry → turn ON water pump
o Drop seeds at intervals
o Detect obstacles and avoid
o Continue process

Block diagram



IV. PROBLEM STATEMENT

Agriculture still depends heavily on manual labor for tasks like seed sowing, watering, and monitoring crops. These tasks require a lot of time, effort, and manpower.
Nowadays, there is also a shortage of labor, which makes farming more difficult and expensive.
Traditional farming methods are not efficient enough to meet the increasing food demand. Farmers often face problems like improper irrigation, uneven seed distribution, and lack of real-time information about soil conditions. This can reduce crop quality and productivity.
Although some machines and systems are available, most of them can perform only one task at a time and are costly or complex to use. There is a need for a smart, cost- effective solution that can perform multiple agricultural tasks efficiently.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 6, Issue 5, March 2026 Impact Factor: 8.2

Therefore, this project aims to design and develop a multitasking agriculture robot that can automate various farming activities such as seed sowing, irrigation, and monitoring, reducing human effort and improving overall efficiency.

V. OBJECTIVES OF THE STUDY

The main objectives of this project are:

- To design and develop a multitasking agriculture robot that can perform different farming activities in one system.
- To reduce human effort and labor cost by automating tasks like seed sowing, watering, and monitoring.
- To improve farming efficiency and productivity using smart technology.
- To use sensors (like soil moisture sensor) for proper decision-making, such as automatic irrigation.
- To ensure uniform seed distribution for better crop growth.
- To provide a system that can be controlled remotely using Bluetooth or Wi-Fi.
- To develop a low-cost and user- friendly solution for farmers.
- To promote the use of modern technology in agriculture for smart farming.

VI. LIMITATIONS OF THE STUDY

- The robot depends on battery power, so it can work only for a limited time before recharging.
- It may not work properly in very rough or uneven farmland.
- Sensors like soil moisture and ultrasonic sensors may give inaccurate readings due to environmental conditions.
- The system is designed for small- scale farming, not large agricultural fields.
- Initial setup cost can be high for small farmers.
- Requires basic technical knowledge to operate and maintain the system.
- Water pump and seed mechanism may need regular maintenance.
- Wireless control (Bluetooth/Wi-Fi) has limited range.

VII. RESULT AND DISCUSSION

Results

After designing and testing the multitasking agriculture robot, the system was able to perform multiple farming tasks successfully.

- The robot moved properly in the field using motor control.
- The soil moisture sensor detected dry and wet soil conditions accurately.
- The water pump turned ON automatically when the soil was dry.
- The seed sowing mechanism dropped seeds at regular intervals.
- The ultrasonic sensor detected obstacles and helped the robot avoid them.
- The robot could also be controlled using a mobile device through Bluetooth.

Overall, the robot performed all the intended functions effectively in a small test environment.

Discussion

The project shows that automation in agriculture is possible and useful. The robot reduces human effort and saves time by performing multiple tasks together.

The use of sensors helps in making better decisions, like watering only when needed, which saves water. The seed sowing system ensures proper spacing, improving crop growth.

However, some challenges were observed:

- Sensor readings may vary due to environmental conditions.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 6, Issue 5, March 2026 Impact Factor: 8.2

- Battery backup limits working time.
- Performance may reduce on uneven land.

Even with these limitations, the project proves that a multitasking robot can improve farming efficiency. With further improvements like solar power, GPS, and
better sensors, the system can be made more advanced and useful for real-world farming.

VIII. ADVANTAGES OF THE SYSTEM

- Saves time

The robot performs multiple tasks like seeding and watering at the same time.

- Reduces human effort

Farmers do not need to do all work manually.

- Saves water

Water is used only when soil is dry, avoiding wastage.

- Improves productivity

Proper seed placement and irrigation help in better crop growth.

- Low labor cost

Less dependency on workers reduces overall cost.

- Accurate working

Sensors help in taking correct decisions like irrigation control.

IX. CONCLUSION

The Multitasking Agriculture Robot is a smart and useful solution for modern farming. It is designed to perform multiple agricultural tasks like seed sowing, watering, and monitoring automatically.
This helps in reducing human effort, saving time, and improving overall efficiency.
The use of sensors and automation makes the system more accurate and reliable. It also helps in saving resources like water and ensures better crop growth. The project successfully shows how technology can be used to make farming easier and smarter.
Although there are some limitations like battery life and cost, the overall performance of the system is effective for small-scale farming. With future improvements, this robot can be made more advanced and suitable for large-scale agriculture.
In conclusion, this project is a step towards smart farming and demonstrates how robotics and IoT can improve agricultural productivity and sustainability.

X. FUTURE SCOPE

The multitasking agriculture robot can be improved further with advanced technologies to make it more efficient and useful in real farming.

- Solar Power Integration

The robot can be powered using solar panels to increase working time and reduce battery dependency.

- GPS Navigation

Adding GPS will help the robot move automatically in large fields with better accuracy.

- Camera and Image Processing A camera can be used to monitor crop

health, detect diseases, and identify weeds.

- AI and Machine Learning Smart algorithms can be added to make

better decisions based on data collected from the field.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 6, Issue 5, March 2026 Impact Factor: 8.2

● Mobile App with IoT

A full-feature mobile app can be developed for real-time monitoring and control from anywhere.

● Automatic Fertilizer Spraying

The robot can be upgraded to spray fertilizers and pesticides automatically.

● Improved Design for Large Fields

The system can be made stronger and faster to work on large-scale farms.

● Voice Control System

Farmers can control the robot using voice commands.

REFERENCES

[1]. ▪ K. Ogata, Modern Control Engineering, Prentice Hall.
[2]. ▪ M. Morris Mano, Digital Design, Pearson Education.
[3]. ▪ Arduino Official Website – https://www.arduino.cc
[4]. ▪ Raspberry Pi Official Website – https://www.raspberrypi.org
[5]. ▪ Electronics Tutorials – https://www.electronics- tutorials.ws
[6]. ▪ "Smart Agriculture Using IoT" – IEEE Papers
[7]. ▪ "Automated Seed Sowing and Irrigation System" – International Journal of Engineering Research
[8]. ▪ YouTube tutorials on Arduino and IoT projects
[9]. Various blogs and technical forums related to smart farming