2026 Volume: 02 Issue: 06 www.ijrpa.com ISSN 2456-9995 Review Article

International Journal Research Publication Analysis

Page: 01-03

SMART PLANT HEALTH SURVEILLANCE SYSTEM FOR PRECISION AGRICULTURE

***Sushmita Roy, Prittisha Ghosal, Chandrima Koner, Moupriya Bhowmick, Sumanta Karmakar**

ECE Department *Asansol Engineering College. (ECE)*

Article Received: 9 May 2026
Article Revised: 29 May 2026
Published on: 19 June 2026

***Corresponding Author: Sushmita Roy**
ECE Department Asansol Engineering College. (ECE)

DOI: https://doi-doi.org/101555/ijrpa.4487

ABSTRACT

Agriculture plays a crucial role in food production, yet plant diseases, improper irrigation,and unfavorable environmental conditions significantly reduce crop yield. The Smart Plant Health Monitoring System is designed to monitorplant health parameters such as soil moisture, temperature, humidity, and light intensity in real time using IoT technology. Sensors collect environmental data and transmit it to a microcontroller,whichprocessestheinformation and sends it to a cloud platform for remotemonitoring.Thesystemalertsuserswhen abnormal conditions are detected, enabling timely actiontoimproveplantgrowthandpreventdiseases.Byautomatingplantmonitoring,the system reduces manual effort, optimizes resource usage, and enhances crop productivity, making it suitable for smart agriculture and home gardening applications.

INTRODUCTION

Agricultureisthebackboneofmanyeconomies,and maintainingplanthealthisessentialforachievinghigh cropyieldandquality.Traditionalfarmingmethodsrely heavilyonmanualobservation,whichistime-consuming, inaccurate,andinefficient.Factorssuchassoilmoisture, temperature,humidity,andlightintensitydirectlyaffect plantgrowth,butcontinuousmonitoringofthese parametersisdifficultusingconventionalmethods.

PROBLEMANALYSIS

- Manualplantmonitoringistime-consumingand inaccurate
- Over-irrigationorunder-irrigationdamagesplant health

- Lackofreal-timeenvironmentaldata
- Difficultyinearlydetectionofplantstressordisease

OBJECTIVES OF THE SYSTEM

- Tomonitorsoilmoisture,temperature, humidity, and light intensity
- Toprovidereal-timeplanthealthdata
- Toalertuserswhenparametersexceedsafe limits
- Toreducewaterwastagethroughsmart irrigation
- Toimproveplantgrowthandproductivity

SYSTEM ARCHITECTURE

TheSmartPlantHealthMonitoringSystemfollowsanIoT-based layered architecture that enables real-time sensing, processing, communication, and monitoring of plant health parameters.

1. *SensingLayer*

This layer is responsible for collecting real-time environmental data from the plant surroundings using various sensors.

2. *ProcessingLayer*

Thislayerprocessesthedatareceivedfromthesensors and makes decisions based on predefined threshold values.

3. *Communication Layer*

Thislayerenableswirelessdatatransmissionbetweenthe hardware system and the cloud platform.

ACKNOWLEDGEMENT

We would like to express our sincere gratitude to our project guide for their valuable guidance, constantencouragement,andinsightfulsuggestions throughout the development of the Smart Plant Health Monitoring System. Their expertise and support played a crucial role in the successful completion of this project.

WearealsothankfultotheHeadoftheDepartment and all faculty members of our department for providinguswiththenecessaryresources,technical knowledge,andacademicsupportduringthecourse of this work. Their cooperation and motivation greatly contributed to enhancing our learning experience.

FUTURE SCOPE

TheSmartPlantHealthMonitoringSystemhas significant potential for future enhancements with the advancement of technology. In the future, the system can be integrated with artificial intelligence and machinelearningtechniquestoanalyzesensordataand predict plant diseases, nutrient deficiencies, and growth trends at an early stage. This would help farmers take preventive measures and reduce crop losses.

CONCLUSION

The Smart Plant Health Monitoring System successfully demonstrates the application of InternetofThings(IoT)technologyinmodernagriculture.The system effectively monitors critical environmental parameters such as soil moisture, temperature, humidity,andlightintensity,whichplayavitalrolein plant growth and health. By providing real-time data and alerts, the system helps users take timely actionsto maintain optimal conditions for plants

REFERENCES

1. A. Kumar, R. Singh, and P. Sharma, “IoT Based Smart Plant Monitoring System,” International Journal of Engineering Research and Technology (IJERT), vol. 9, no. 4, pp. 112–116, 2020.
2. S. R. Patel and D. R. Shah, “Smart Agriculture Monitoring System Using IoT,” International Journal of Advanced Research in Computer Engineering & Technology (IJARCET), vol. 8, no. 6, pp. 987–991, 2019.
3. M. A. Khan, S. Abbas, and N. Ahmad, “Plant Health Monitoring Using Wireless Sensor Networks,” IEEE International Conference on Smart Computing, pp. 145–149, 2018.
4. Arduino, “Arduino Uno Technical Specifications,” [Online]. Available: https://www.arduino.cc
5. ESPressif Systems, “ESP8266 Wi-Fi Module Datasheet,” [Online]. Available: https://www.espressif.com
6. DHT Sensor Documentation, “Temperature and Humidity Sensor,” [Online]. Available: https://components101.com
7. ThingSpeak, “IoT Analytics Platform Documentation,” [Online]. Available: https://thingspeak.com
8. K. Ashton, “That ‘Internet of Things’ Thing,” RFID Journal, 2009.