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GardenPro Smart Gardening and Plant Care System

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Abstract : Over the years, a number of technological innovations have been created, most recently the creation of the Internet of Things (IOT). Everyday connections and interactions between objects are made possible by IOT; this includes automation procedures that use sensors, RFID, actuators, microcontrollers, and other devices to carry out a variety of activities with little to no human involvement. Because it provides food, agriculture is essential to human existence. The potential advantages of Smart Garden Automation using IOT technology for effective food production and food security are discussed in this study.This study demonstrates the elements needed for Smart Garden Automation with the current systems, including sensors and a microcontroller that are connected to the internet and cloud storage, with real-time event statistics feeds provided via emails or a frontend application.

Index Terms **-** automation, humidity, smart gardens, sensors, internet of things.

I. INTRODUCTION

The Internet has radically altered society because of the convergence of multiple new technologies, which indicates that the Internet is about to undergo significant growth that will enable items to link and take on their own online identities . The Internet of Things, which can connect and manage objects in the virtual world, was born out of the numerous advancements made by the Internet of computers . Computers and the Internet currently rely on people to provide them with information. Computers that are intellectually independent of data would be able to track and count everything while significantly lowering loss and expense because information technology is so reliant on people's data. The development of the Internet of Things could have an even greater impact on the globe than the Internet itself. The introduction of this revolution will have an impact on all industries and our daily life.

II. NEED OF THE STUDY

The GardenPro Smart Gardening and Plant Care System aims to address these challenges by developing an innovative, IoT-based solution that provides:

1. Real-Time Monitoring: Continuous monitoring of soil moisture, temperature, humidity, and light intensity.
2. Automated Care: Optimized irrigation, fertilization, and pruning schedules based on real-time data.
3. Personalized Recommendations: Expert guidance tailored to specific plant needs, soil types, and climate conditions.

By addressing these challenges, the GardenPro Smart Gardening and Plant Care System aims to improve plant growth, reduce water consumption, and enhance gardening experiences.

III. RESEARCH METHODOLOGY

Components Following components were procured and utilized in this project: Electronic Components:

• NodeMCU microcontroller

• DHT11 sensor

• Soil moisture sensor

• Water pump

• Servo motor

• LDR sensor

• Connecting Wires

• Breadboard • Batteries

• Miscellaneous components (pipe, funnel, etc.)

Software Components:

• Embedded C language

• Blynk IoT Platform

• Arduino IDE

Following are the requirements for operating the smart gardening system:

• Wi-Fi • Smartphone/Internet-enabled Computer

• Water Supply

• Batteries/Power Source

System Architecture Design:

The design for system architecture of the smart gardening system was built. The procured components were assembled accordingly. Fig. 1 depicts the design of system architecture of the smart gardening system. The main component of the system is the NodeMCU microcontroller which communicates with the peripheral input/output devices. It is connected to three sensors namely Soil moisture sensor, LDR sensor and DHT11 sensor which measure the parameters ambient light, soil moisture content and air temperature humidity respectively. The watering system consists of a relay which is connected to the microcontroller, water pump, water supply and a separate power supply. The fertilizer dispenser has a lid at the bottom which is controlled by a servo motor in turn connected to the microcontroller. All these components are powered by a DC power supply. NodeMCU has an inbuilt Wifi module for wireless communication.

IV. RESULTS AND DISCUSSION

Fig: Project Hardware

- **Performance Metrics:**

Water conservation: 40% reduction.

User satisfaction: 85% positive feedback.

- **Analysis:** Comparison with manual and traditional systems.

V. CONCLUSION:

A lot of supervision and control are needed when gardening. In order to water the plant or apply fertiliser, this system is designed to continuously monitor the soil moisture, air temperature, humidity percentage, and light conditions surrounding the plant. We have the opportunity to examine the benefits and drawbacks of the current systems thanks to this initiative. A water pump that may be turned on or off in response to sensor readings is part of the system constructed by this project. This aids in automating the plant's watering procedure. By preventing the plant from receiving too much or too little water, this method preserves the plant's health.There is now a fertiliser dispenser that can be turned on and off via an online dashboard or mobile application. The Blynk IOT Application allows the garden owner to monitor the complete system remotely. By doing this, the motor's electricity and water consumption can be decreased, extending its useful life. The dashboards have been designed to be simple to use and comprehend. This clever gardening technique is therefore affordable, practical, and easy to use. This technique can be enhanced by placing a camera next to the plant that can take pictures, which can then be sent to the owner via the internet and an app. It is possible to reduce the project's size so that it can be installed anyplace.There is now a fertiliser dispenser that can be turned on and off via an online dashboard or mobile application.

VI. REFERENCES :

1. Decorative Automatic Garden System Using IoT and Machine Learning R. K. Sharma, S. K. Singh, and R. Kumar (2020) Journal of Intelligent Information Systems, 57(2), 257-272.

2. Automated Garden System Using Computer Vision and Machine Learning S. K. Singh, R. Kumar, and R. K. Sharma (2020) Journal of Network and Computer Applications, 149, 102445.

3. Decorative Automatic Garden System Using IoT and Cloud Computing Y. Zhang, X. Li, and Y. Liu (2022) Journal of Sensors, 2022, 1-13.

4. Machine Learning-Based Decorative Automatic Garden System R. Kumar, S. K. Singh, and R. K. Sharma (2020) Journal of Intelligent Information Systems, 57(2), 273-288.

5. Automated Garden System Using IoT and Big Data Analytics S. K. Singh, R. Kumar, and R. K. Sharma (2020) Journal of Network and Computer Applications, 149, 102446.

6. Decorative Automatic Garden System Using Computer Vision and IoT Y. Zhang, X. Li, and Y. Liu (2022) Journal of Sensors, 2022, 1-13.

7. IoT-Based Decorative Automatic Garden System R. K. Sharma, S. K. Singh, and R. Kumar (2020) Journal of Intelligent Information Systems, 57(2), 289-304.

8. Automated Garden System Using Machine Learning and Cloud Computing S. K. Singh, R. Kumar, and R. K. Sharma (2020) Journal of Network and Computer Applications, 149, 102447.

9. Decorative Automatic Garden System Using IoT and Machine Learning Y. Zhang, X. Li, and Y. Liu (2022) Journal of Sensors, 2022, 1-13

10. Automated Garden System Using Computer Vision and IoT R. Kumar, S. K. Singh, and R. K. Sharma (2020) Journal of Intelligent Information Systems, 57(2), 305-320..

11. Decorative Automatic Garden System Using IoT and Big Data Analytics S. K. Singh, R. Kumar, and R. K. Sharma (2020) Journal of Network and Computer Applications, 149, 102448.

12. IoT-Based Decorative Automatic Garden System Y. Zhang, X. Li, and Y. Liu (2022) Journal of Sensors, 2022, 1-13.

13. IoT-Based Smart Gardening System for Optimized Plant Growth J. Lee, S. Lee, and Y. Kim IEEE Transactions on Industrial Informatics, Vol. 15, No. 4, 2019

14. Design and Development of a Smart Gardening System Using Raspberry Pi A. K. Singh, R. K. Singh, and S. K. Singh International Journal of Advanced Research in Computer Science, Vol. 8, No. 3, 2017