IJIRCCE

e-ISSN: 2320-9801 | p-ISSN: 2320-9798

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

Volume 12, Issue 2, April 2024

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 8.379

International Journal of Innovative Research in Computer and Communication Engineering

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.379 | Monthly Peer Reviewed & Refereed Journal |

|| Volume 12, Issue 2, April 2024 ||

International Conference on Recent Development in Engineering and Technology – ICRDET 24

Organized by

Dhaanish Ahmed Institute of Technology, KG Chavadi, Coimbatore, Tamilnadu, India

IOT Plant Monitoring and Care System with Telegram Alert

Dr. V. Gowrishankar, U. Shanjitha, R. Shanmugamani, S. Sneka, K. Thiyagarajan

Associate Professor Department of ECE VCET-Velalar college of Engineering and Technology, Erode,

Tamil Nadu, India.

Student Department of ECE VCET-Velalar college of Engineering and Technology, Erode, Tamil Nadu, India.

ABSTRACT: The IoT Plant Monitoring and Care System is a versatile solution catering to various indoor and outdoor plants, including rare species and endangered species. It ensures optimal growth conditions and monitors plant health for preservation. It integrated with the IoT platforms and sensors like soil moisture, Temperature and Humidity, Light intensity and soil pH sensor. It enhance surban green spaces and biodiversity. With cost efficiency and real-time monitoring, it alerts users of environmental deviations and automates actions like watering based on sensor data. Image of the plants end to the telegram bot along with sensor values. By integrating with existing platforms, it maximizes sustainability efforts and supports individual gardener sand urban sustainability goals.

KEYWORDS: Internet of Things, bot, sensors, Smart irrigation, cloud.

I. INTRODUCTION

In the current scenario, the traditional plant care method is transferred through the integration of internet of things (IOT) technology..Agriculture has been one of the primary occupations of man since early civilizations and even today manual interventions in farming are inevitable . Plants plays a vital role in maintaining the ecological cycle and forms the food chain and thus to maintain the plant growth and health adequate monitoring is required. Peasant of long-term growing plants and endangered plants are getting suffered by irregular monitoring of plants growth and unable to monitor the nutrient level in the soil whether it sufficient for plant growth. Hence, the aimat making IOT plant monitoring and care system using telegram alerts. this topic undergoes monitoring the soil miniaturization, temperature and humidity around the plants and nutrient level present in the soil.

The computerize water system framework with IOT is practically and financially sufficient for planning water resource for plantation. By using the automatic water system framework we can reduce the utilization of water for various plantations.

Our idea is to bring the smart plant monitoring that is most useful for the peasant to monitor the plants in real time. Here we are going to provide an efficient and dependent product to peasant to provide information about plants using advanced technologies. Web server is used to store the captured images and send information through the server by using the mobile application.

II. RELATEDWORKS

The project aims to transform conventional agricultural practices through the implementation of smart irrigation and crop monitoring systems, announcing the era of precision agriculture. By utilizing cutting-edge technologies such as Internet of Things (IoT), data analytics, and remote sensing, the goal is to optimize resource utilization, enhance productivity, and ensure sustainability in farming practices. The smart irrigation system utilizes IoT sensors to continuously monitor soil moisture levels and weather conditions in real-time, enabling the precise determination of irrigation schedules. This automation of the irrigation process not only improves efficiency but also conserves water resources by minimizing wastage.

In parallel, the crop monitoring system utilizes remote sensing technologies to capture high-resolution imagery of agricultural fields, which is then analyzed using advanced machine learning algorithms. This analysis facilitates the

early detection and diagnosis of crop diseases, nutrient deficiencies, and pest infestations, empowering farmers to take proactive measures to mitigate risks and optimize yields. The integration of these systems offers collaborative benefits, allowing for customized irrigation strategies based on specific crop needs and field conditions. By combining real-time data on soil moisture levels and crop health with weather forecasts and predictive analytics, farmers can make informed decisions to maximize water efficiency and crop productivity. Overall, the project endeavors to promote sustainable agriculture practices, preparing the way for a more tough and productive future in farming.

The integration of smart irrigation and crop monitoring systems offers collaborative benefits, allowing for customized irrigation strategies based on specific crop needs and field conditions. By combining real-time data on soil moisture levels and crop health with weather forecasts and predictive analytics, farmers can make informed decisions to maximize water efficiency and crop productivity. This inclusive approach to precision agriculture not only improves resource utilization but also enhances the resilience of farming operations against environmental challenges such as droughts and pests.

Furthermore, the project contributes to sustainable agriculture practices by reducing the environmental impact of farming activities. By minimizing water usage, chemical inputs, and crop losses, smart irrigation and crop monitoring systems promote soil health, water quality, and biodiversity conservation. This proactive approach to crop management ensures the long-term feasibility of agricultural operations while mitigating the risks posed by climate change and other environmental stressors. Overall the project represents a significant step forward in the quest for sustainable and resilient agriculture, offering a glimpse into the future of farming where technology and innovation converge to ensure food security and environmental responsibility.

III. SYSTEM DESIGN

The above figure 1 shows the block diagram of the system. If there is any variation in the environment, such as changes in temperature, humidity, light intensity, or soil pH the sensors embedded in the Smart Plant Monitoring and Care System detect these fluctuations. Once detected, the microcontroller, specifically an ESP32, processes this data and triggers the transmission of the information to Firebase, a cloud- based database platform.

In Fire base, the data is stored securely and made accessible for further analysis and action. This triggers a chain of events facilitated by IFTTT integration, where predefined conditions are set to automate actions based on the received sensor data.

For instance, if the soil moisture level decreases below a specified threshold, IFTTT activates the water pump to ensure adequate hydration for the plants. This seamless integration of sensor data, microcontroller processing, and cloud-based automation ensures timely responses to environmental variations, ultimately promoting optimal plant health and growth.

The block diagram outlines the Smart plant monitoring and care system. Sensors detects environmental changes, triggers the microcontroller to process data.

International Journal of Innovative Research in Computer and Communication Engineering

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.379 | Monthly Peer Reviewed & Refereed Journal |

|| Volume 12, Issue 2, April 2024 ||

International Conference on Recent Development in Engineering and Technology – ICRDET 24

Organized by

Dhaanish Ahmed Institute of Technology, KG Chavadi, Coimbatore, Tamilnadu, India

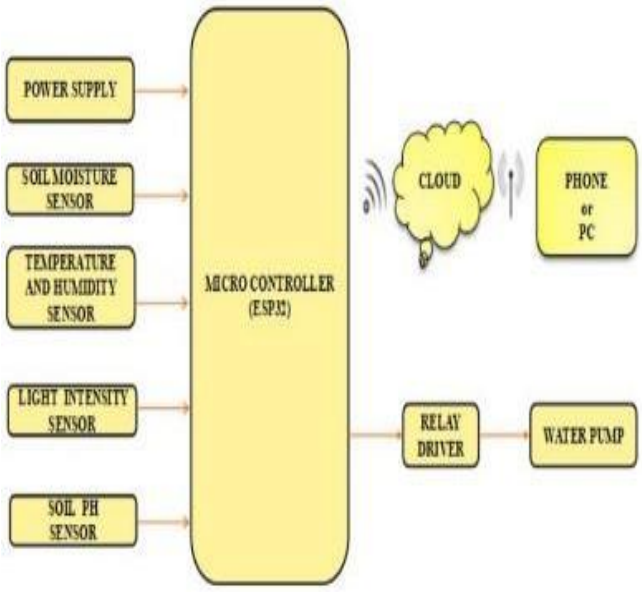

Fig1Block Diagram of the Proposed System of Crop monitoring system

3.1 Crop monitoring system

The plant monitoring and care system is an innovative and cost-effective solution designed to save the end angered plants and long term growing plants .The system uses an ESP-32 CAM module to capture the image and sensors get integrated with the microcontroller which automatically getup loaded to the cloud.

The image gets captured in a interval of time period and store sit in flash memory. The image is then uploaded to Firebase and a URL for the image is generated. Using IFTTT applet, the URL of the image is sent to Telegram via web hook along with a default message.

To make it more convenient, a Telegram group was created, and peasant were added. When an image and value is detected, peasant will receive a snap of the plant and sensor values along with the default message in real-time.

The circuit diagram and connection diagram for the plant monitoring and care system with the sensor along the microcontroller in the fig .

3.2 Plant Monitoring System

The IOT plant monitoring and care system is user friendly, affordable and reliable solution that ensures the safety measurement for the endangered plants. With this system the peasant can monitor the plans whenever they want. The above fig 3 explains the working description of the plant monitor and care system.

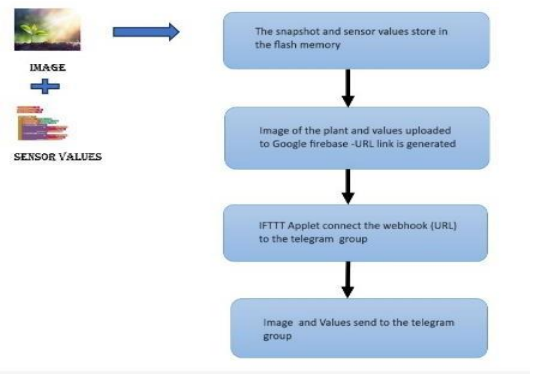

Fig2 Plant monitoring system

International Journal of Innovative Research in Computer and Communication Engineering

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.379 | Monthly Peer Reviewed & Refereed Journal |

|| Volume 12, Issue 2, April 2024 ||

International Conference on Recent Development in Engineering and Technology – ICRDET 24

Organized by

Dhaanish Ahmed Institute of Technology, KG Chavadi, Coimbatore, Tamilnadu, India

IV. RESULTS AND DISCUSSION

4.1 Result of plant monitoring system

The result of the IOT plant monitoring and care system is a functional and cost-effective solution for enhancing the safety measurement for the endangered plants and long term growing plants. The image of the plant and sensor values automatically uploaded to the cloud and send to a telegram group.

This system provides several benefits and operates using low power consumption. The fig 4 shows the output of the plant monitoring and care system.

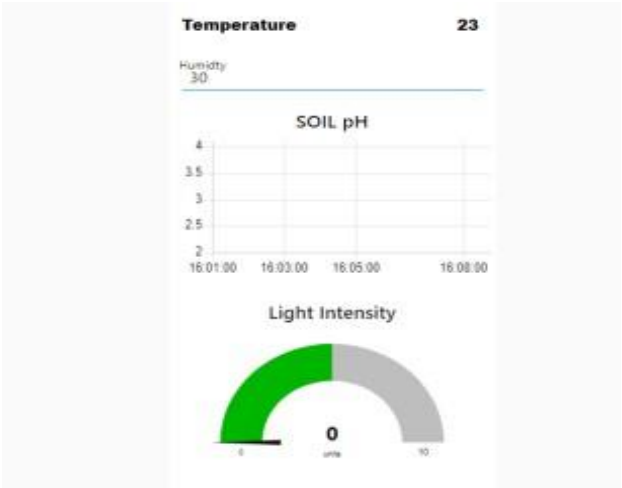

Fig3.Representation of sensor reading

This fig4 shows the readings that are measured by the temperature and humidity sensor.

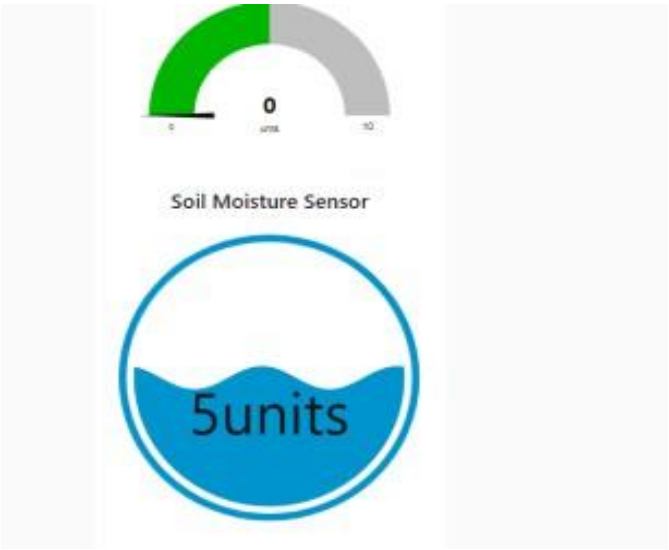

Fig4 Representation of water level

This fig 5 shows the water moisture of the soil. These readings are used to find the moisture level of the soil to determine the watering level of the plant.

4.2 Result of Telegram bot

The image will be taken when the variations are occurred from the default values. If there is any variations the microcontroller sends the acknowledgment to the cloud. Then the cloud which is integrated with telegram bot through IFTTT will sends the image and the default alert message with the sensor readings.

V. CONCLUSION

A system to monitor temperature, light intensity, moisture levels in the soil, pH vales was designed and the project provides to study the existing systems, along with their features. Agriculture is one of the most water consuming activities. The proposed system can be used to switch the motor (on/off) depending on condition of plants i.e., sensor values, thereby automating the process of irrigation. which is one of the most time efficient activities in farming, which helps to prevent irrigation of soil thereby avoiding crop damage. The peasant can monitor the process through telegram group.

VI. FUTURESCOPE

The Plant Monitoring and Care system has several potential future scope opportunities for the further development and improvements. Here are some possible areas for future scope. Adding soil nutrient sensor: Adding soil nutrient sensor to find the nutrient level present in the soil whether it's sufficient for plant growth. Developing a mobile app: Developing a mobile app could provide a more user-friendly interface for managing the system. Compact size product :Compact size product that can be suited for any places. Expanding to other areas: This System for plant monitoring could be expanded to other areas beyond large area farms.

REFERENCE

[1] D. Chaparro, Merce Vall-llossera, M. Piles, A. Camps, C. Rudiger and R. Riera-Tatch, "Predicting the Extent of Wildfires Using Remotely Sensed Soil Moisture and temperature and humidity Trends, "IEEE journal of selected topics in applied earth observations and remote sensing, vol.9, 2016

[2] SMARTPLANTMONITORINGSYSTEM",
International Journal of Advance Research in Science and Engineering, Vol. No. 7. [2] Prof. Prachi Kamble, "IOT Based Plant Monitoring System", ITIIRD, Vol. No. 2.

[3] Boonnam N, Pitakphongmetha J, Kajornkasirat S, Horanont T, Somkiadcharoen D, Prapakornpilai J. Optimal plant grow thin smart farm hydroponics system using the integration of wireless sensor networks into internet of things. Adv. Sci. Technol. Eng. Syst. J. 2017;2(3):1006-12

[4] C. J. H. Pornillos et al., "Smart Irrigation Control System Using Wireless Sensor Network Via Internet- of-Things," 2020 IEEE 12th International Conference on Humanoid, Nanotechnology, Information Technology, I. Khan et al.– 222 – Communication and Control, Environment, and Management (HNICEM), 2020,pp.16,doi:10.1109/HNICEM51456.2020.9399995

[5] Salim TI, Alam HS, Pratama RP, Anto IA, Munandar A. Portable and online PLANT monitoring system using wireless sensor network. In 2017 2nd International Conference on Automation, Cognitive Science, Optics, Micro Electro-Mechanical System, and Information Technology

30[6] Abhishek Gupta, Shailesh Kumawat, Shubham Garg, "Automated Plant Watering System", Vol-2, Issue-4, 2016 ISSN: 2454 - 1362.

[7]. Boonsit Yimwadsana, Pichamon Chanthapeth, Chanyanuch Lertthanyaphan, Antika Pornvechamnuay,"An IOT Controlled System for Plant Growth", International Journal For Technological Research In Engineering Volume 4, Issue 4,pp.668- 671,December2016

[8] Taylor Francis Group, "Automated Plant Watering System", LLC, pp.59-69, 16 September 2016.Taylor Francis Group,"Automated Plant Watering System", LLC, pp.59-69, 16 September 2016.

[9] T. Thamaraimanalan , S.P. Vivekk, G. Satheeshkumar, P. Saravanan," Smart Garden Monitoring System Using IOT", IEEE, pp.5- 10,2018.

[10] Arul Jai Singh, Raviram, Shanthosh Kumar, "Embedded Based Green House Monitoring system using pic Microcontroller", IEEE Trans. Syst, Man, Cybern. Systems and Humans, vol. 41, no. 6, pp.1064- 1076, November 2019. Conditioning ends in Research and Innovation for Social Welfare (WCFTR '16) Vol. 3, Issue 2, 2018.

[11]. B. Shri Hariprasad, Dr. Vimalathithan Rathinasabapathy,"A smart IOT system for monitoring solar PV

powerMs. SwapnaliB.Pawar, Prof. Priti Rajput, Prof. AsifShaikh– "Smart Irrigation System Using IOT And Raspberry Pi", 2018 International Research Journal of Engineering and Technology (IRJET)-have taken three different pests (Powdery mildew, yellow rust and aphids) in winter wheat for their observance. The most and the least specific wave lengths for different diseases have been extracted using RELIEF-F algorithm.

[12] Sateesh K.Peddoju- 2020 International Journal of Advanced Trends in Computer Science and Engineering, proposes a mobile vision based plant leaf recognition system which monitor crop diseases having various patterns. It identifies its appropriate class which can be used to help the botanical students in their research work. The feature factor used in the system proposed by the author in this work has a huge computation cost. Shadow and season affect the quality of the captured image and correct prediction of the leaf disease.

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

INNO SPACE SJIF Scientific Journal Impact Factor

doi crossref

निस्केयर NISCAIR

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

9940 572 462 6381 907 438 ijircce@gmail.com

www.ijircce.com

Scan to save the contact details