ASE PROJECT 1-PPT FOR END SEMESTER ASSESSMENT - 1st MARCH 2025

Project Topic : IoT-Driven Crop Monitoring for Enhanced Agricultural Analysis and Precision Farming

Div :-IT - E **ASEP1_Group No** :– 8 **Day** :-Saturday **Date** :- 1/03/2025

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Project Guide :-

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Proposed Research Area/Domain

- **Research Area**
  lot in Agriculture

- **Proposed Research Topic**

Develop a crop monitoring system using loT

Problem Statement

Traditional farming methods often lack real-time insights, leading to inefficient water usage, poor soil management, and reduced crop yields. Farmers rely on manual observations, which are prone to errors and delays, making it difficult to detect early signs of crop stress, soil deficiencies, or environmental hazards.

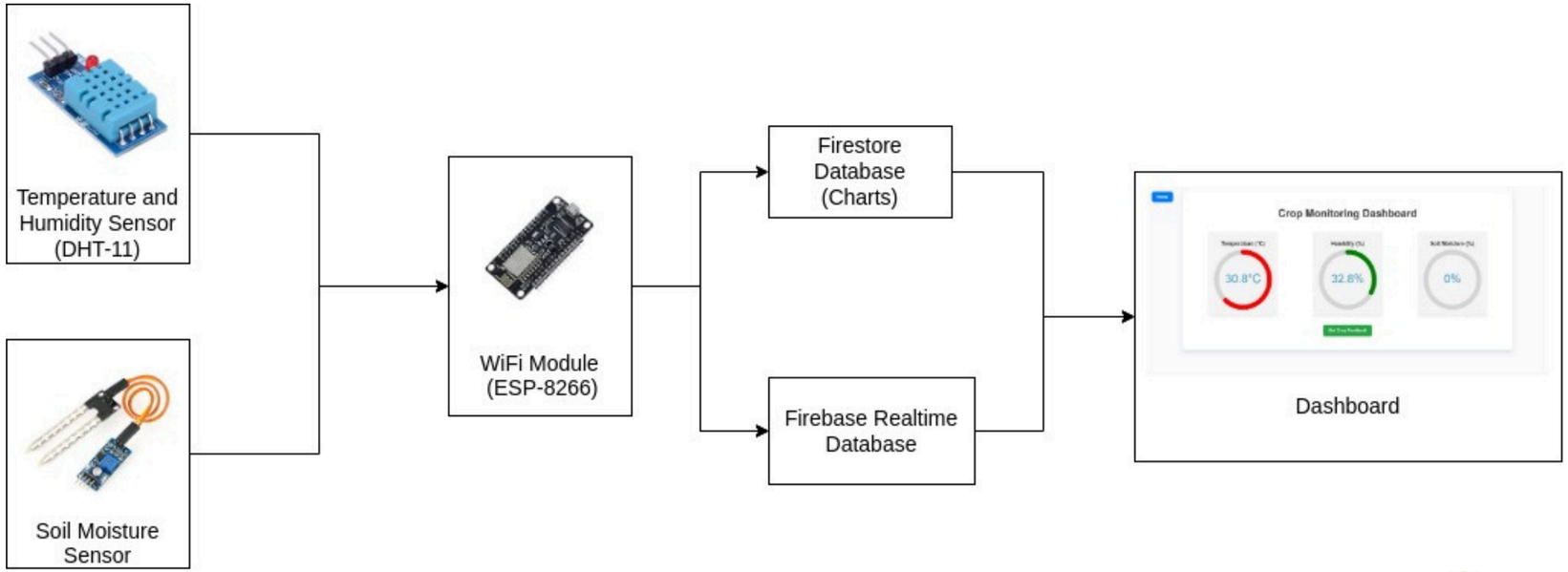
Motivation

- Precision Farming – Provides AI generated feedback for better decision-making.
- Water Efficiency – Prevents overwatering/underwatering as a result of real-time monitoring and optimizes resource use.
- Weather Adaptability – Helps farmers respond to climate changes and prevent crop damage.
- Reduced Human Effort – Minimizes manual errors with automated data collection.

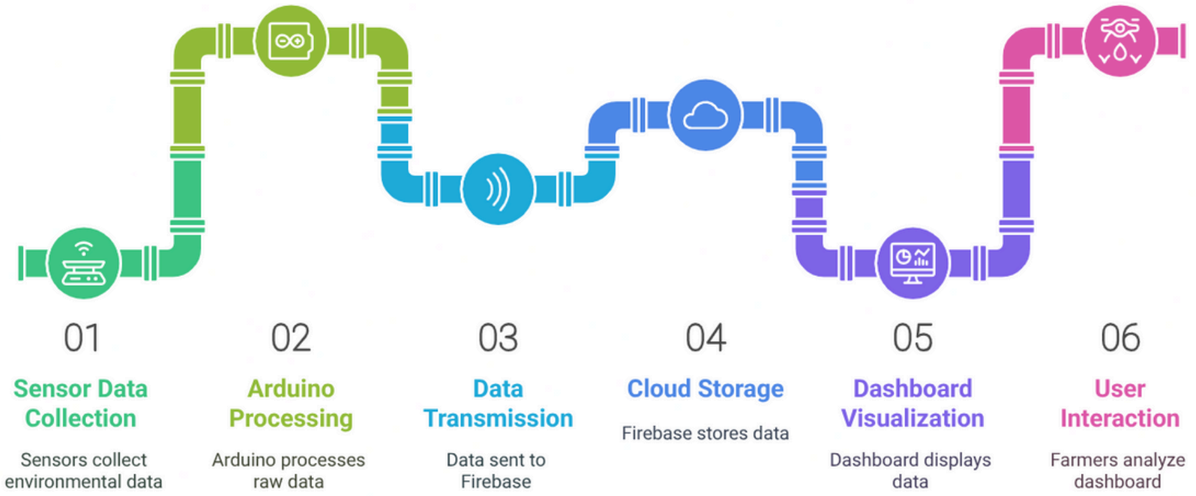
Research Objectives

- Develop an agricultural system to monitor soil moisture, temperature, and humidity in real time.
- Use JavaScript and Firebase as database to develop a website and display sensor data.
- Using line and bar charts for better visualization and understanding of environmental changes.
- Using Google Gemini to get feedback and suggest improvements based on sensor data.

Proposed Research Methodology



IoT-Driven Crop Monitoring System



Literature Survey

Sr.no	Title	Author's	Publication source	Year	Summary	Remarks
1.	IoT-based Smart Crop Monitoring System with Cloud Integration	Kaur,H., Gupta,A	IEEE Access	2022	The study highlights the role of cloud-integrated IoT sensors in real-time monitoring of soil moisture, temperature, and humidity for better crop management.	Demonstrates the importance of cloud platforms for remote access but highlights rural connectivity issues.
2.	Real-Time Crop Health Monitoring Using IoT and AI	Sharma, R., Kumar, V., & Gupta, S	Springer - Internet of Things (IoT) Journal	2022	Combines IoT sensors and AI to detect and predict crop diseases, enabling proactive crop health management.	Emphasizes AI's role in early disease detection but notes high deployment costs as a limitation.

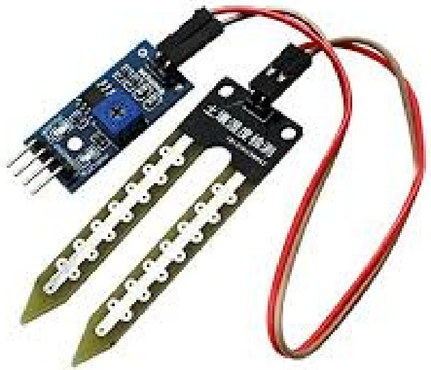
Sr.no	Title	Author's	Publication source	Year	Summary	Remarks
3.	IoT-Enabled Precision Agriculture for Crop Yield Optimization	Ahmed, S., et al.	MDPI Sensors Journal	2023	Uses IoT sensors and big data analytics to optimize irrigation and predict crop yields, improving resource efficiency.	Highlights precision agriculture’s benefits but faces power and infrastructure challenges.
4.	Edge-IoT for Smart Farming: Reducing Latency in Crop Monitoring	Zhang, Y., Li, F., & Wang, J.	Elsevier - Computers and Electronics in Agriculture	2023	Edge computing reduces latency by processing sensor data locally, enabling real-time farm decisions.	Shows the potential of edge computing but raises concerns about deployment costs and computing limitations.

Sr.no	Title	Author's	Publication source	Year	Summary	Remarks
5.	IoT-Driven Crop Monitoring with Machine Learning for Smallholder Farmers	Ncube, C., & Moyo, M.	IEEE Xplore (Conference	2023	Focuses on affordable IoT devices and lightweight machine learning to empower smallholder farmers with crop monitoring capabilities.	Provides a cost-effective solution for small farmers but highlights technical adoption challenges
6.	"Cloud-based tomato plant growth and health monitoring system using IOT."	Suneja, Bhavesh, et al	IEEE	2022	It utilizes soil moisture sensors to control irrigation, environmental sensors to track conditions, and a camera module for disease detection.	Efficient Crop Monitoring: The integration of IoT and cloud computing provides real-time monitoring

TOOLS

Soil Moisture Sensor

Measures water content in the soil.

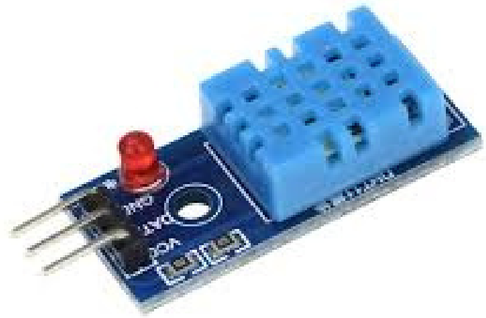


ESP8266 Wi-Fi Module

- Acts as the central processing unit.
- Collects and processes sensor data.
- Provides wireless connectivity to send sensor data to database.

DH11 (Temperature & Humidity) Sensor

Measures relative humidity and ambient temperature of the environment.



References

1. Kawre, Adesh, et al. "IoT Based Crop Monitoring System." International Research Journal on Advanced Engineering Hub (IRJAEH) 2.05 (2024): 1435-1440.
2. Tandel, Rajat, et al. "IoT-Based Plant Health Monitor Using NodeMCU and ESP8266." 2024 International Conference on IoT Based Control Networks and Intelligent Systems (ICICNIS). IEEE, 2024.
3. Suneja, Bhavesh, et al. "Cloud-based tomato plant growth and health monitoring system using IOT." 2022 3rd International Conference on Intelligent Engineering and Management (ICIEM). IEEE, 2022.
4. Mudholkar, Megha, et al. "A novel approach to iot based plant health monitoring system in smart agriculture." 2022 5th International Conference on Contemporary Computing and Informatics (IC3I). IEEE, 2022.
5. Rai, Vimal, and Sanjay Patidar. "IoT Based Plantation System for Smart Home Farming." 2023 International Conference on Electrical, Electronics, Communication and Computers (ELEXCOM). IEEE, 2023.

Thank you !