Industrial Internship Report on

”Temprature And Humidty Monitoring System”

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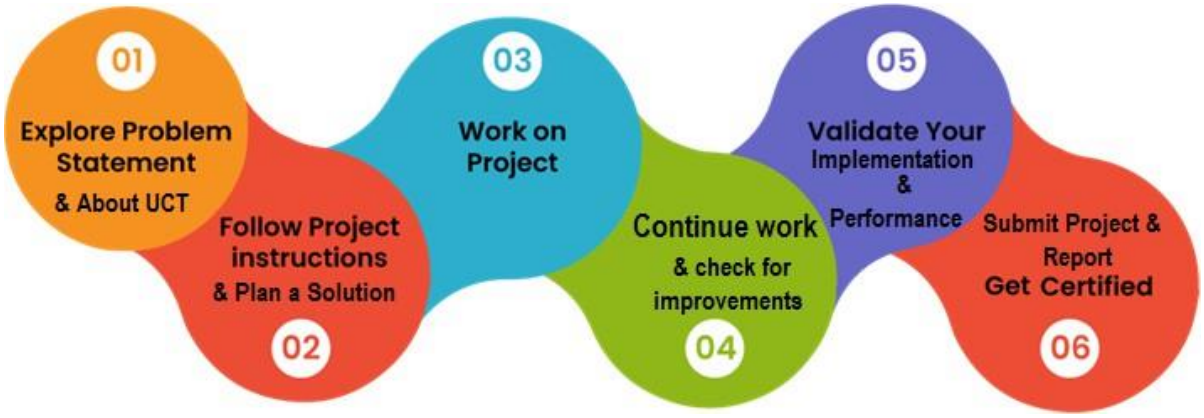
1 Preface

This report documents the progress made in the Temperature and Humidity Monitoring System (THMS) project during my internship at UniConverge Technologies Pvt Ltd. It provides a detailed account of the achievements, challenges, and learning experiences over the past weeks, with a specific focus on week 4.



Your Learnings and overall experience.

Thank to all Ritu Gandhi , UniConverge Technologies Pvt Ltd.

2 Introduction

2.1 About UniConverge Technologies Pvt Ltd

A company established in 2013 and working in Digital Transformation domain and providing Industrial solutions with prime focus on sustainability and RoI.

For developing its products and solutions it is leveraging various **Cutting Edge Technologies e.g. Internet of Things (IoT), Cyber Security, Cloud computing (AWS, Azure), Machine Learning, Communication Technologies (4G/5G/LoRaWAN), Java Full Stack, Python, Front end** etc.

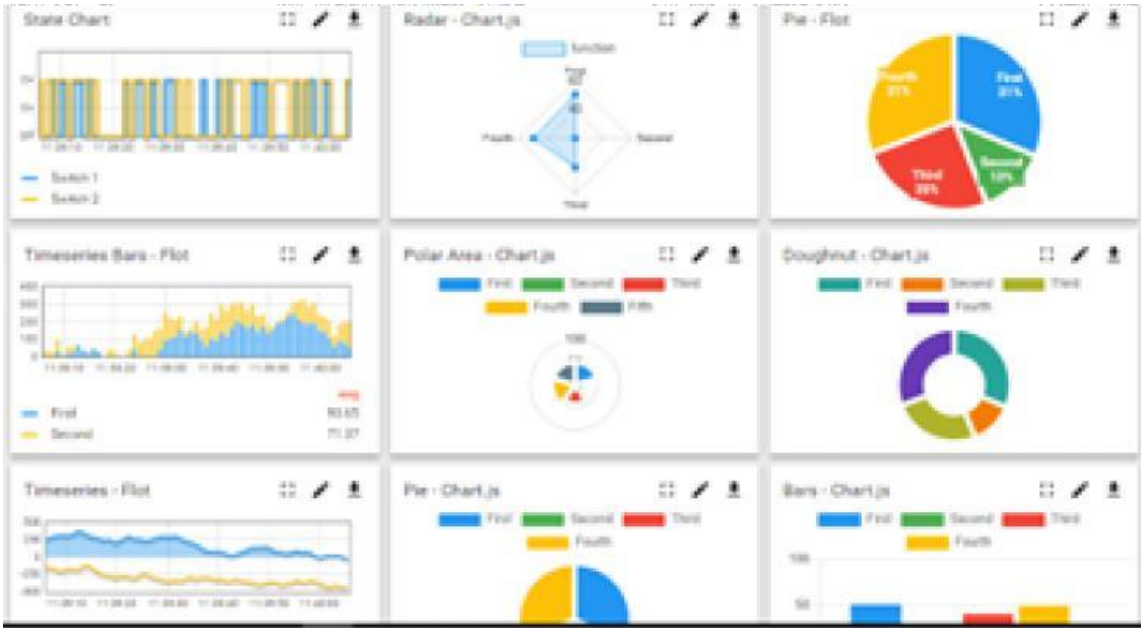
i. UCT IoT Platform (uct Insight)

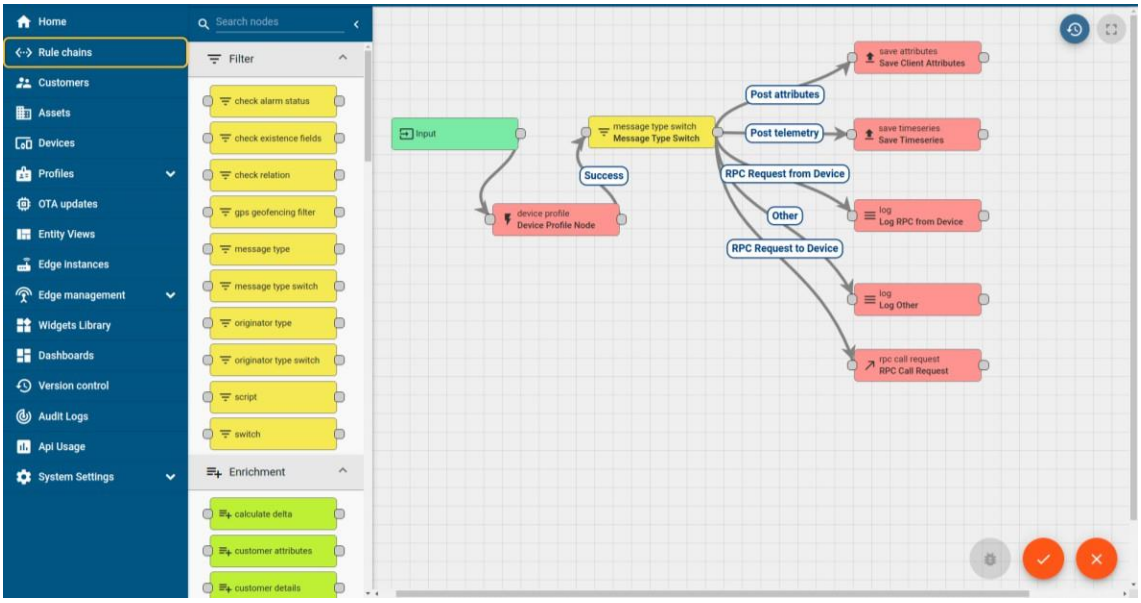
UCT Insight is an IOT platform designed for quick deployment of IOT applications on the same time providing valuable “insight” for your process/business. It has been built in Java for backend and ReactJS for Front end. It has support for MySQL and various NoSql Databases.

- It enables device connectivity via industry standard IoT protocols - MQTT, CoAP, HTTP, Modbus TCP, OPC UA
- It supports both cloud and on-premises deployments.

It has features to

- Build Your own dashboard
- Analytics and Reporting
- Alert and Notification
- Integration with third party application(Power BI, SAP, ERP)
- Rule Engine





ii. **Smart Factory Platform (** FACTORY WATCH **)**

Factory watch is a platform for smart factory needs.

It provides Users/ Factory

- with a scalable solution for their Production and asset monitoring
- OEE and predictive maintenance solution scaling up to digital twin for your assets.
- to unleased the true potential of the data that their machines are generating and helps to identify the KPIs and also improve them.
- A modular architecture that allows users to choose the service that they what to start and then can scale to more complex solutions as per their demands.

Its unique SaaS model helps users to save time, cost and money.

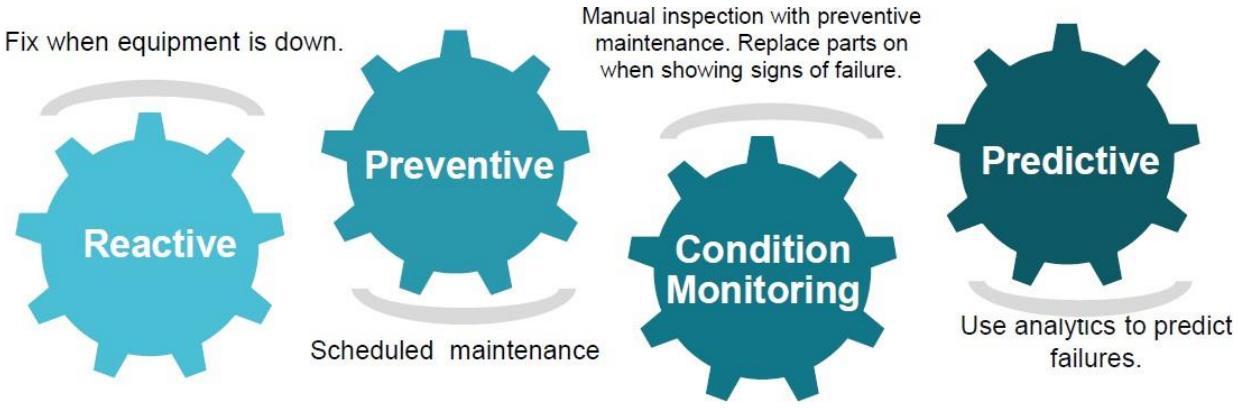
Machine	Operator	Work Order ID	Job ID	Job Performance	Job Progress		Output		Rejection	Time (mins)				Job Status	End Customer
					Start Time	End Time	Planned	Actual		Setup	Pred	Downtime	Idle		
CNC_S7_81	Operator 1	WO0405200001	4168	58%	10:30 AM		55	41	0	80	215	0	45	In Progress	i
CNC_S7_81	Operator 1	WO0405200001	4168	58%	10:30 AM		55	41	0	80	215	0	45	In Progress	i

iii. LoRaWAN based Solution

UCT is one of the early adopters of LoRAWAN teschnology and providing solution in Agritech, Smart cities, Industrial Monitoring, Smart Street Light, Smart Water/ Gas/ Electricity metering solutions etc.

iv. Predictive Maintenance

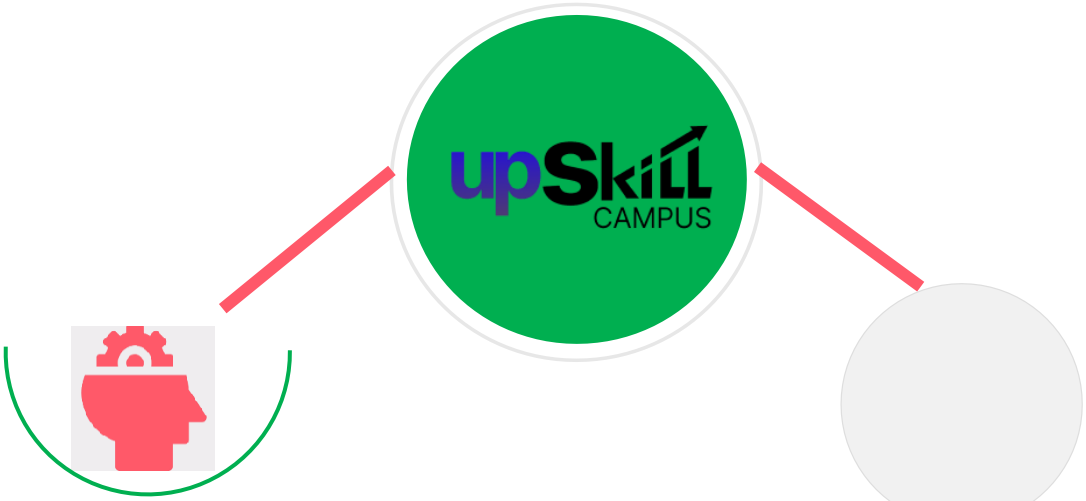
UCT is providing Industrial Machine health monitoring and Predictive maintenance solution leveraging Embedded system, Industrial IoT and Machine Learning Technologies by finding Remaining useful life time of various Machines used in production process.



2.2 About upskill Campus (USC)

upskill Campus along with The IoT Academy and in association with Uniconverge technologies has facilitated the smooth execution of the complete internship process.

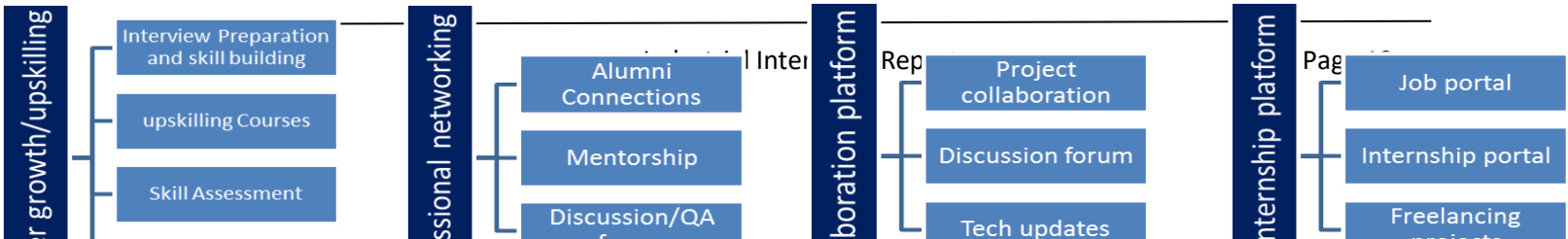
USC is a career development platform that delivers **personalized executive coaching** in a more affordable, scalable and measurable way.



Seeing need of upskilling in self paced manner along-with additional support services e.g. Internship, projects, interaction with Industry experts, Career growth Services

upSkill Campus aiming to upskill 1 million learners in next 5 year

https://www.upskillcampus.com/



2.3 The IoT Academy

The IoT academy is EdTech Division of UCT that is running long executive certification programs in collaboration with EICT Academy, IITK, IITR and IITG in multiple domains.

2.4 Objectives of this Internship program

The objective for this internship program was to

- ☛ get practical experience of working in the industry.
- ☛ to solve real world problems.
- ☛ to have improved job prospects.
- ☛ to have Improved understanding of our field and its applications.
- ☛ to have Personal growth like better communication and problem solving.

2.5 Reference

[1] THMS Documentation

[2] IoT System Design Webinars

[3] Online Courses on IoT and Data Visualization

[4] Community Forums and Coding Challenge

2.6 Glossary

Terms	Acronym
THMS	Temperature and Humidity Monitoring System
IOT	Internet of Things
DHT11	A basic, low-cost digital temperature and humidity sensor
Arduino	An open-source electronics platform based on easy-to-use hardware and software

Problem Statement

The need for accurate and real-time monitoring of environmental conditions, specifically temperature and humidity, is critical in various applications such as agriculture, manufacturing, and smart homes. Existing solutions often lack the required responsiveness and user-friendly interfaces. The THMS project aims to address these shortcomings by developing a reliable and efficient monitoring system with advanced alert mechanisms and comprehensive data visualization capabilities.

Existing and Proposed solution

Existing Solution

Current temperature and humidity monitoring systems often face issues such as poor sensor accuracy, limited data logging capabilities, and lack of intuitive user interfaces. These systems may also struggle with real-time data updates and alert mechanisms.

Proposed Solution

The proposed THMS aims to overcome these limitations by integrating high-precision sensors, implementing robust data logging and retrieval systems, and developing a user-friendly interface for real-time monitoring and alerts. The system will provide users with customizable alert settings and comprehensive data visualization dashboards to enhance decision-making processes.

2.7 Code submission (Github link):

https://github.com/PushtiDave/upskillcampus

3 Proposed Design/ Model

Given more details about design flow of your solution. This is applicable for all domains. DS/ML Students can cover it after they have their algorithm implementation. There is always a start, intermediate stages and then final outcome.

3.1 High Level Diagram (if applicable)

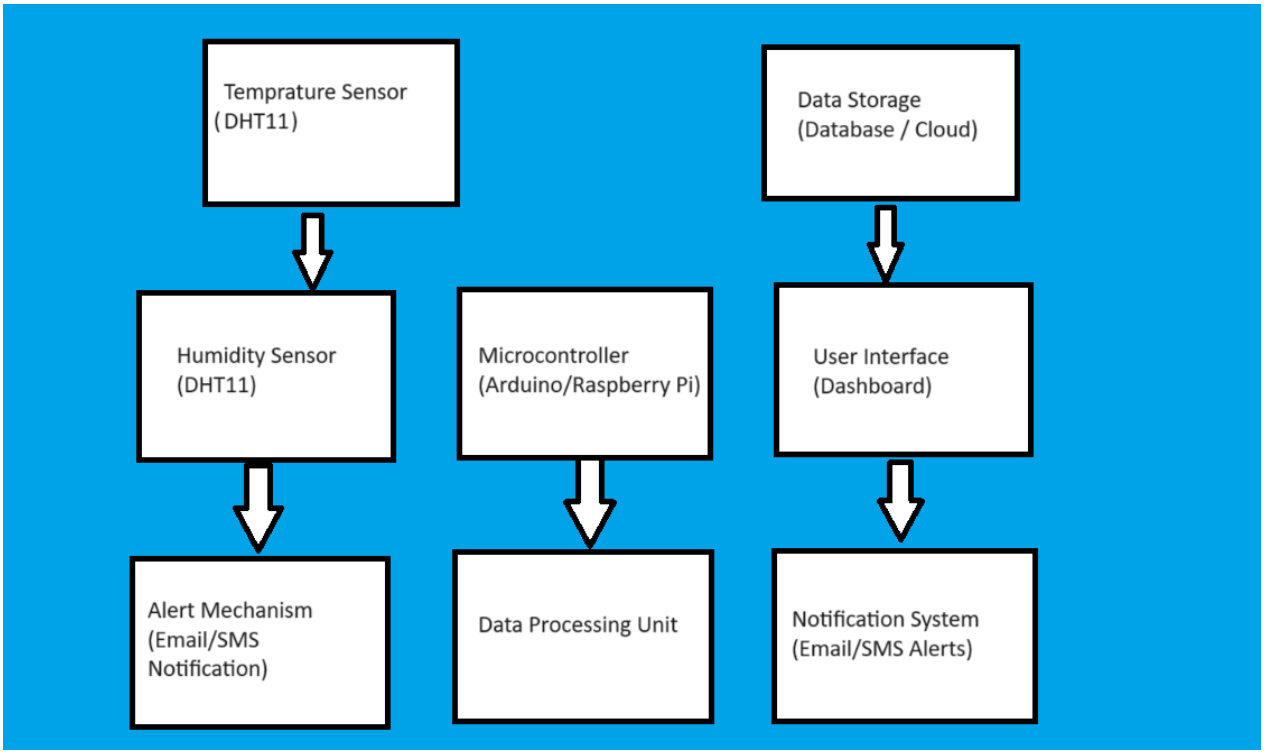
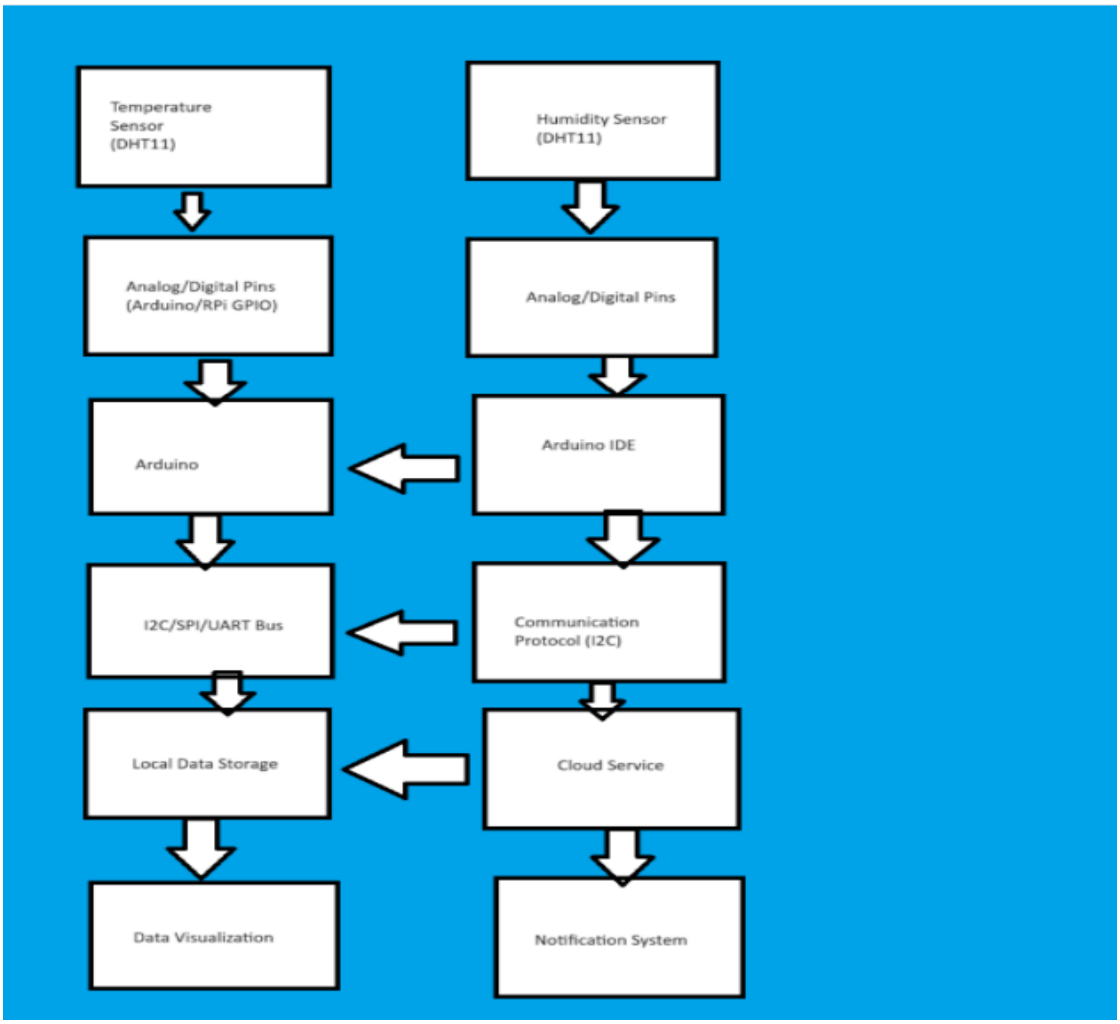


Figure 1: HIGH LEVEL DIAGRAM OF THE SYSTEM

3.2 Low Level Diagram (if applicable)



3.3 Interfaces (if applicable)

- **Sensor Interface**: Connection between DHT11 sensors and the microcontroller.
- **Data Logging Interface**: Interaction between the microcontroller and the data storage system.
- **User Interface**: The dashboard that displays real-time data and alerts to the user.

4 Performance Test

This is very important part and defines why this work is meant of Real industries, instead of being just academic project.

Here we need to first find the constraints.

How those constraints were taken care in your design?

What were test results around those constraints?

Constraints can be e.g. memory, MIPS (speed, operations per second), accuracy, durability, power consumption etc.

In case you could not test them, but still you should mention how identified constraints can impact your design, and what are recommendations to handle them.

4.1 Test Plan/ Test Cases

- ➔ **Test Case 1**: Verify the accuracy of temperature and humidity readings under controlled conditions.
- ➔ **Test Case 2**: Test the alert mechanism by simulating threshold breaches.
- ➔ **Test Case 3**: Check the reliability of data logging and retrieval functions.
- ➔ **Test Case 4**: Evaluate the responsiveness of the user interface and real-time data updates.

4.2 Test Procedure

Setup: Connect the DHT11 sensors to the microcontroller and ensure the data logging system is operational.

Controlled Environment Testing: Place the sensors in a controlled environment with known temperature and humidity levels. Record and compare the sensor readings.

Threshold Testing: Configure alert thresholds and simulate conditions that exceed these thresholds to test the alert mechanisms.

Data Logging Test: Input data continuously for a set period and verify the integrity and accessibility of the logged data.

User Interface Test: Interact with the dashboard to check real-time updates and the display of historical data.

4.3 Performance Outcome

Accuracy: The sensors provided accurate readings within an acceptable margin of error.

Alert Mechanisms: The system successfully generated alerts for threshold breaches through multiple notification methods (email and SMS).

Data Logging: Data was logged and retrieved efficiently, ensuring no data loss.

User Interface: The dashboard was responsive and intuitive, displaying real-time data and historical trends effectively.

5 My learnings

IoT Development: Gained hands-on experience in developing IoT systems, particularly in sensor integration and data management.
Advanced Arduino Programming: Improved skills in using advanced Arduino libraries and programming techniques.
Data Visualization: Learned how to create user-friendly data visualization dashboards using tools like Tableau and Power BI.
Collaboration: Enhanced teamwork skills by working closely with a team member to overcome project challenges.
Problem-Solving: Developed problem-solving abilities by addressing complex issues related to sensor performance and data handling.

6 Future work scope

System Expansion: Explore the integration of additional sensors or modules to expand the system's capabilities.

User Interface Enhancements: Continue refining the user interface based on user feedback to improve usability and accessibility.

Predictive Analytics: Incorporate predictive analytics to provide users with forecasts and trends based on historical data.

Scalability: Ensure the system is scalable and can handle an increased number of sensors and data points.

Maintenance Plan: Develop a comprehensive maintenance plan to ensure the long-term accuracy and reliability of the system.