[Your College Logo]

Industrial Internship Report on

” Smart Home Automation System using IoT”

Prepared by

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Executive Summary
This report provides details of the Industrial Internship provided by upskill Campus and The IoT Academy in collaboration with Industrial Partner UniConverge Technologies Pvt Ltd (UCT). This internship was focused on a project/problem statement provided by UCT. We had to finish the project including the report in 6 weeks’ time. My project was My project was to design a Smart Home Automation System using Embedded C and IoT principles. The system automatically controls home lighting based on human presence detection and monitors room temperature in real-time. This solution aims to reduce energy wastage in residential and industrial buildings This internship gave me a very good opportunity to get exposure to Industrial problems and design/implement solution for that. It was an overall great experience to have this internship.

TABLE OF CONTENTS

1 Preface

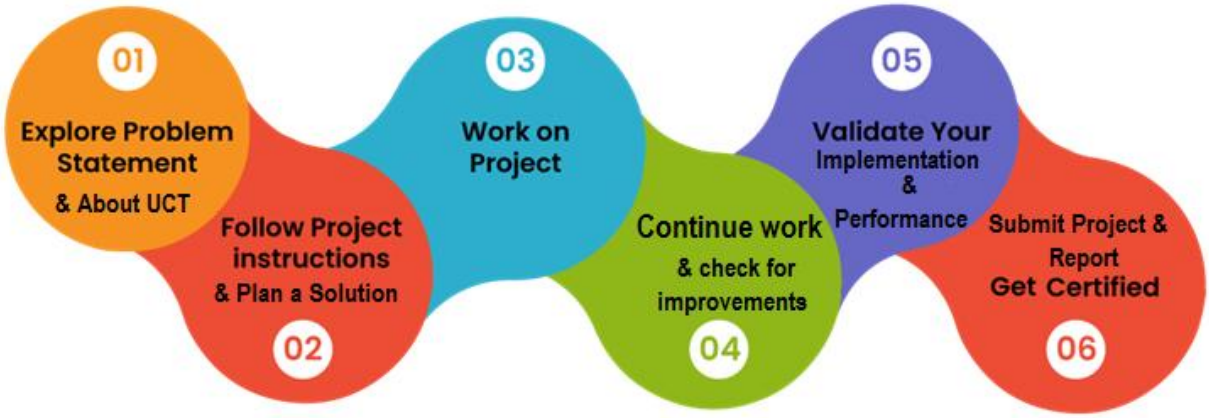
Summary of the whole 6 weeks' work.

About need of relevant Internship in career development.

Brief about Your project/problem statement.

Opportunity given by USC/UCT.

How Program was planned



Your Learnings and overall experience.

Thank to all (with names), who have helped you directly or indirectly.

Your message to your juniors and peers.

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.

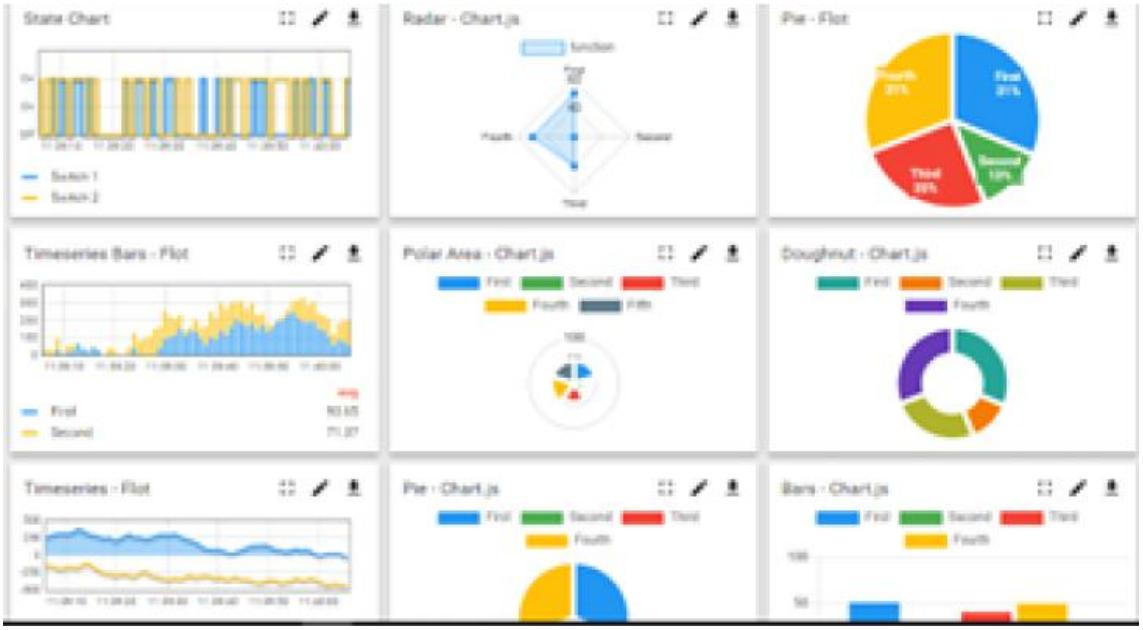
i. UCT IoT Platform (UCT Insight)

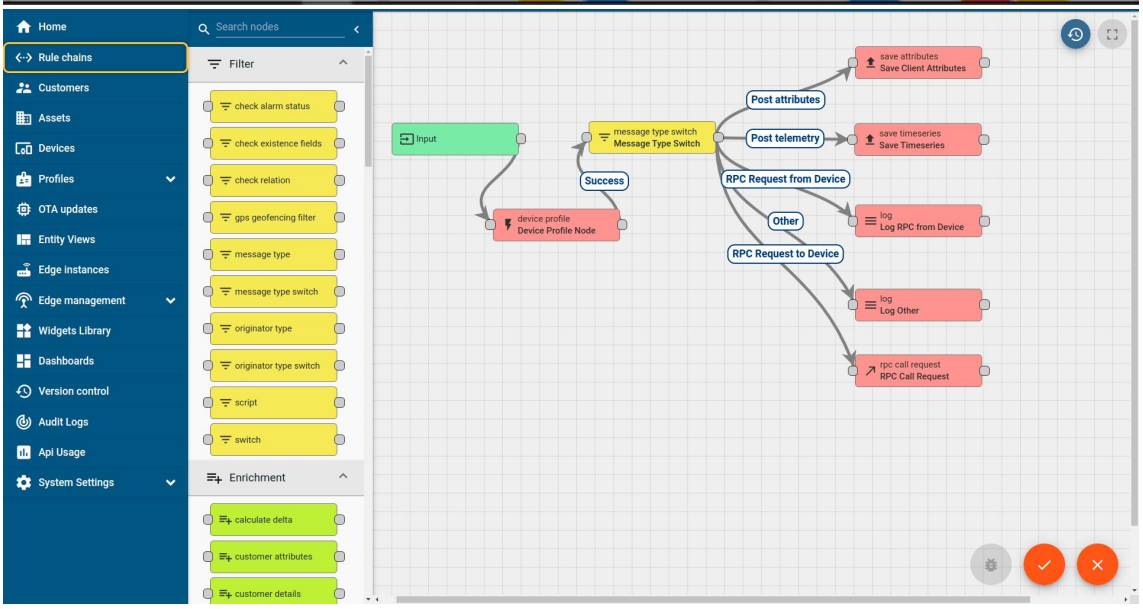
UCT Insight is an IOT platform designed for quick deployment of IOT applications on the same time providing valuable "insight" for your process/business. It has been built in Java for backend and ReactJS for Front end. It has support for MySQL and various NoSql Databases.

- 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
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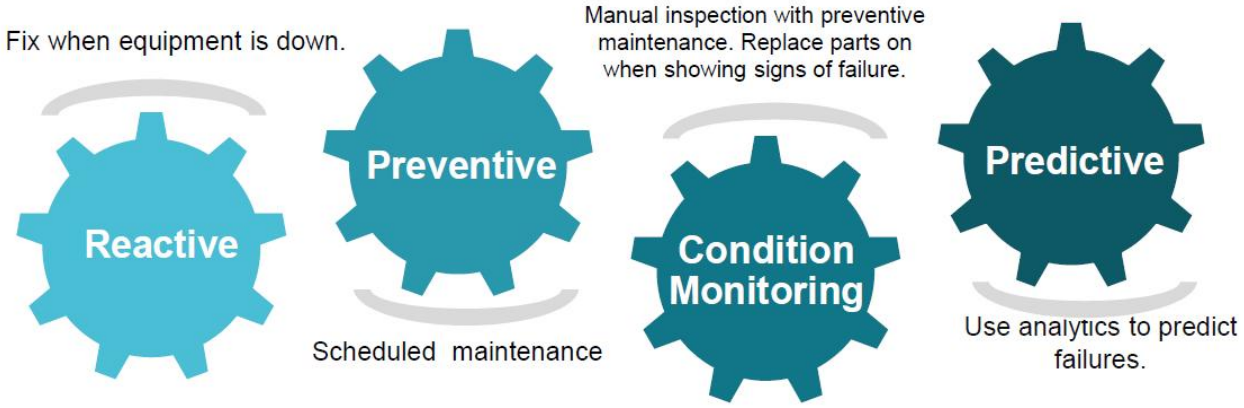
iii. LoRaWAN based Solution

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

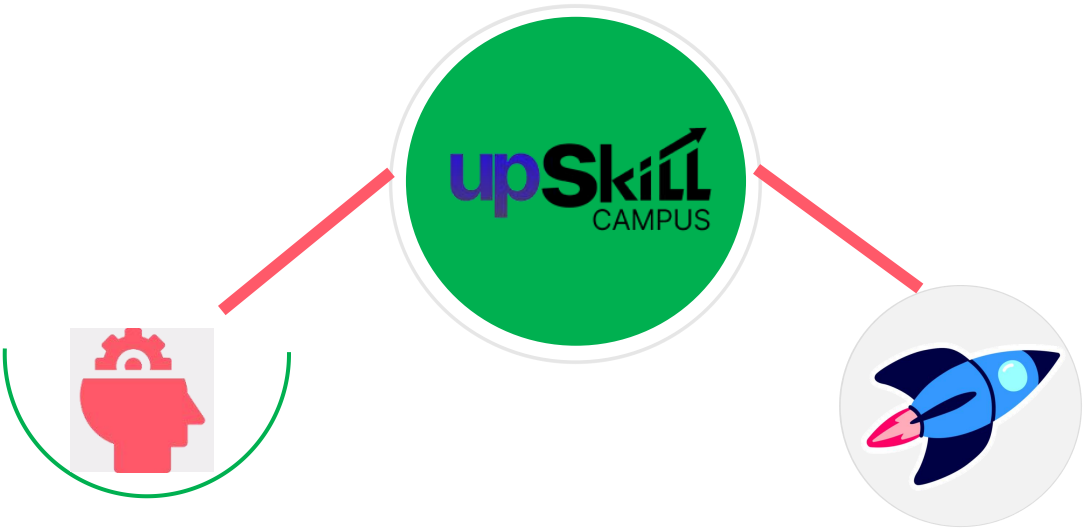
UCT is providing Industrial Machine health monitoring and Predictive maintenance solution leveraging Embedded system, Industrial IoT and Machine Learning Technologies by finding Remaining useful life time of various Machines used in production process.



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.

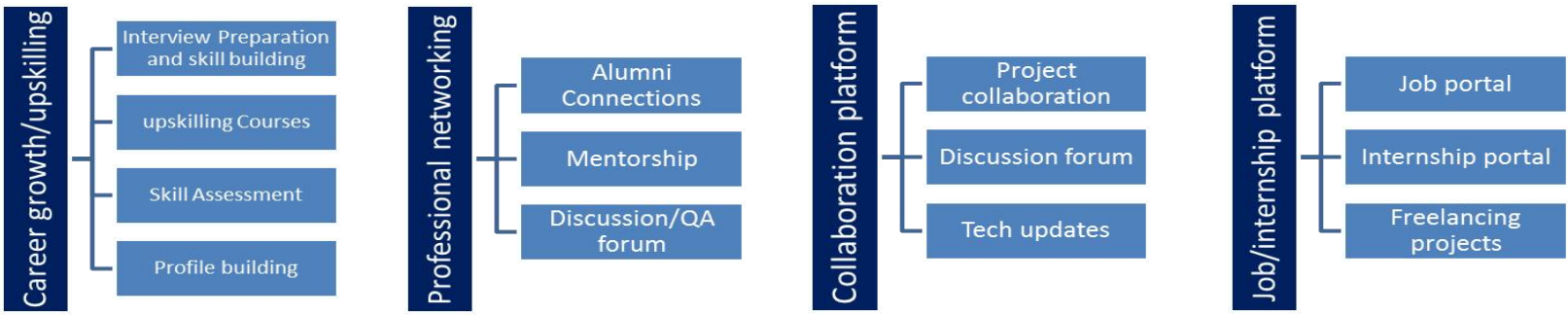
USC is a career development platform that delivers **personalized executive coaching** in a more affordable, scalable and measurable way.



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]

[2]

[3]

2.6 Glossary

Terms	Acronym

3 Problem Statement

In the assigned problem statement

"In modern infrastructure, a significant amount of electricity is wasted due to human negligence, such as leaving lights on in empty rooms. Additionally, manual monitoring of environmental parameters like temperature is inefficient. The problem addressed in this project is the lack of affordable, automated energy management systems for residential homes, which leads to higher electricity bills and unnecessary power consumption."

4 Existing and Proposed solution

Provide summary of existing solutions provided by others, what are their limitations?

"Currently, most homes rely on manual switches to operate appliances. Some existing automation solutions exist but are often too expensive, complex to install, or require high-end proprietary hubs."

What is your proposed solution?

"My proposed solution is a microcontroller-based automation system. It uses a PIR sensor to detect motion and automatically toggle lights, ensuring they are only on when needed. It also continuously monitors temperature data."

What value addition are you planning?

"The system is low-cost, easy to deploy, and uses standard IoT protocols (Serial Communication) which can be easily upgraded to Wi-Fi based monitoring in the future."

4.1 Code submission (Github link)

https://github.com/faisalmd0608-ctrl/upskillcampus/blob/main/SmartHomeSystem.ino

4.2 Report submission (Github link) : first make placeholder, copy the link.

5 Proposed Design/ Model

"The design consists of three main stages: Input, Processing, and Output.

1. **Input:** Sensors (LM35 and PIR) gather data from the environment.
2. **Processing:** The Arduino microcontroller processes this data using the logic defined in the embedded C code.
3. **Output:** The Relay module switches the electrical load (Lights), and data is sent to the Serial Monitor for display."

5.1 • High Level Diagram (if applicable)

Figure 1: HIGH LEVEL DIAGRAM OF THE SYSTEM

5.2 Low Level Diagram (if applicable)

5.3 Interfaces (if applicable)

Update with Block Diagrams, Data flow, protocols, FLOW Charts, State Machines, Memory Buffer Management.

6 Performance Test

Constraints:

"The primary constraint was the sensitivity range of the PIR sensor (approx. 7 meters) and the delay time for sensor stability."

Test Results:

"The system was tested in a simulated environment. The motion sensor successfully triggered the relay within 1 second of detecting movement. Temperature readings were consistent with room temperature benchmarks."

6.1 Test Plan/ Test Cases

6.2 Test Procedure

6.3 Performance Outcome

7 My learnings

"During this internship, I learned how to interface analog and digital sensors with microcontrollers. I gained practical experience in Embedded C programming and understood the importance of energy efficiency in IoT design. I also learned how to manage version control using GitHub.".

8 Future work scope

"In the future, this system can be upgraded by adding an ESP8266 Wi-Fi module to send data to the cloud (like ThingsBoard). This would allow users to control their home appliances remotely via a smartphone app."