

Industrial Internship Report on " Industrial Manufacturing and Production"

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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 (Tell about ur Project)

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.

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1 Preface

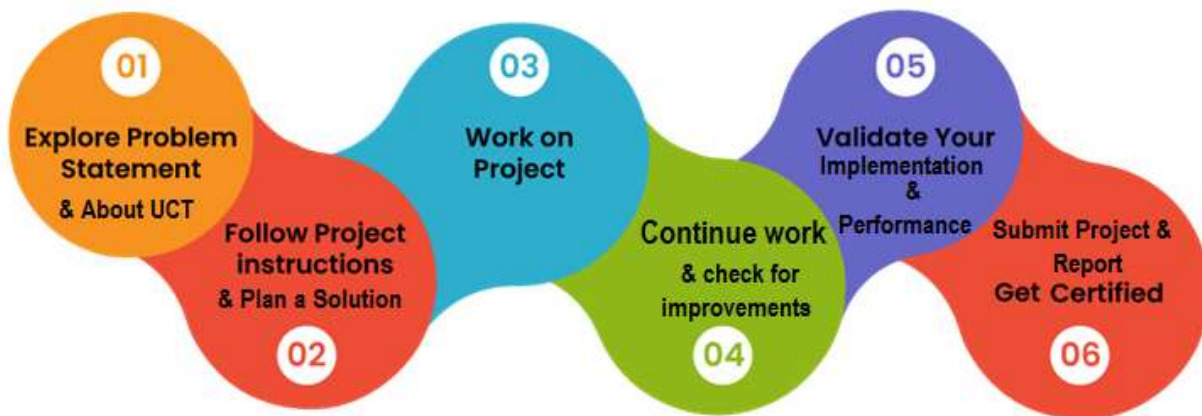
Summary of the whole 6 weeks' work.

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.



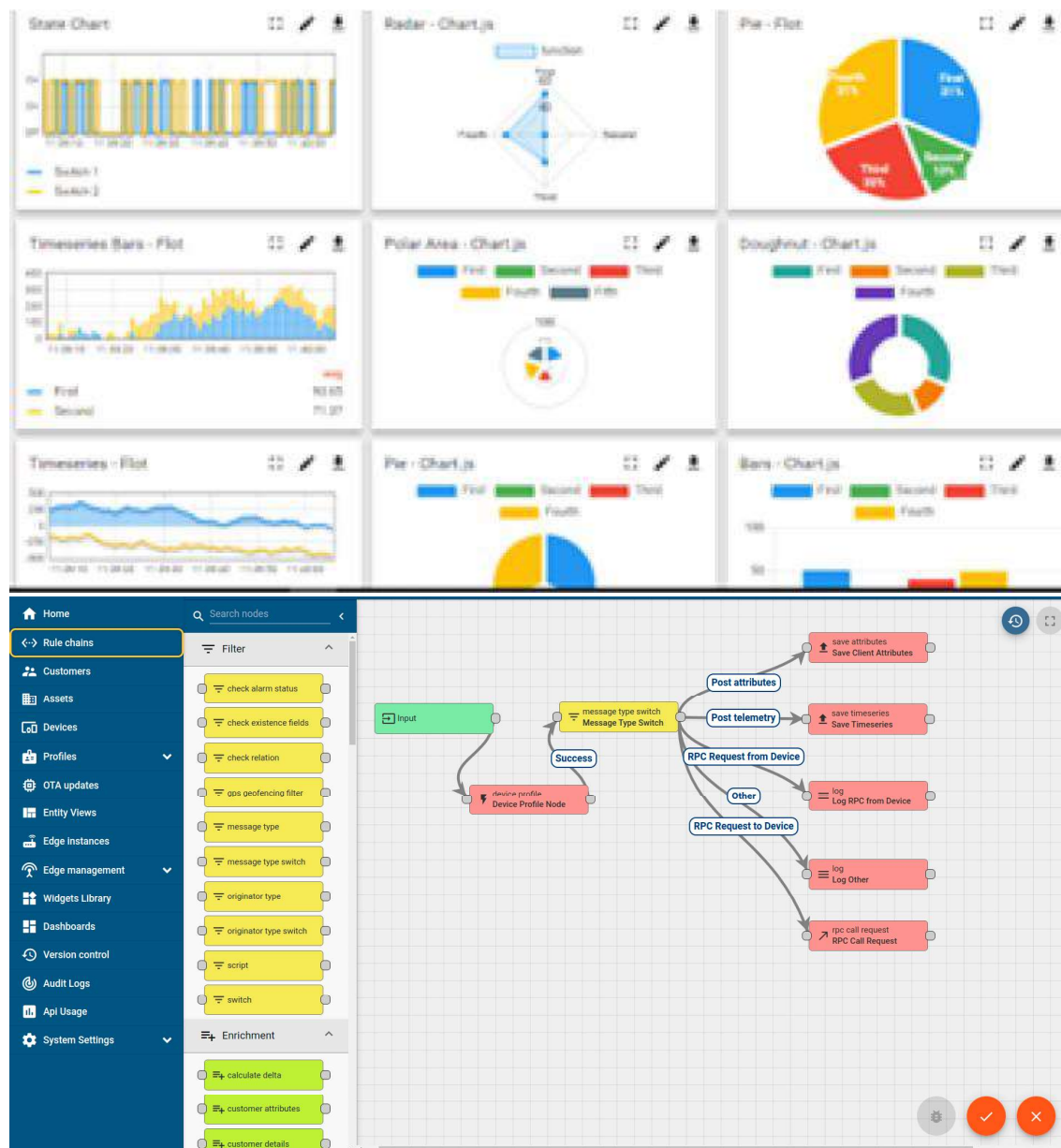
i. UCT IoT Platform ()

UCT Insight 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



FACTORY **WATCH**

ii. Smart Factory Platform ()

Factory watch is a platform for smart factory needs.

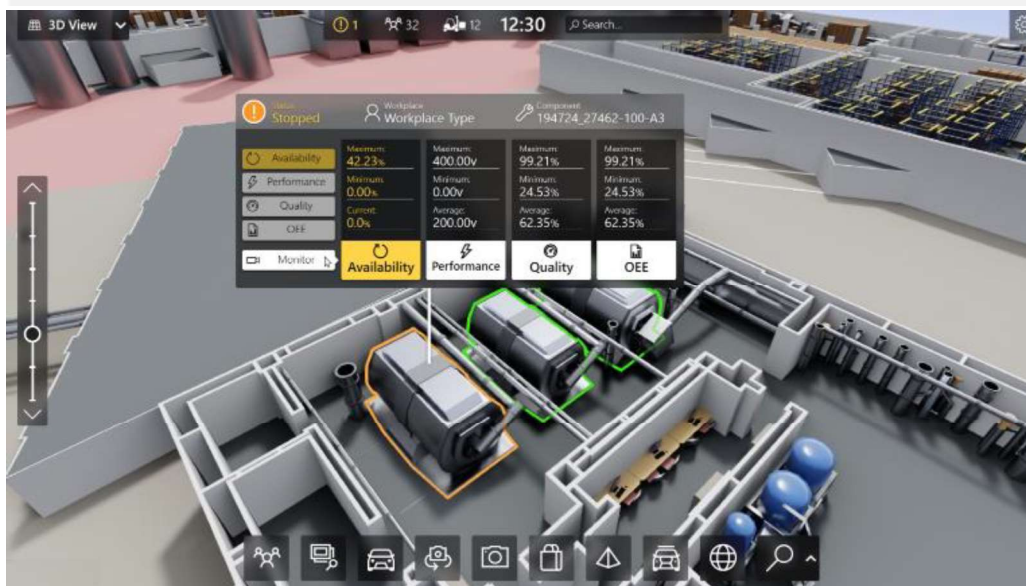
It provides Users/ Factory

- with a scalable solution for their Production and asset monitoring
- OEE and predictive maintenance solution scaling up to digital twin for your assets.
- to unleash 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 want 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



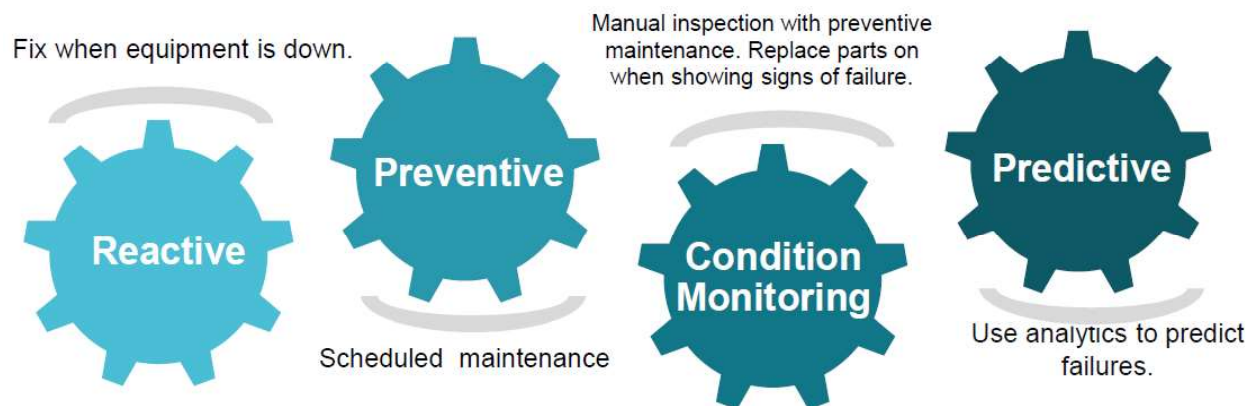


iii. LoRaWAN based Solution

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

iv. Predictive Maintenance

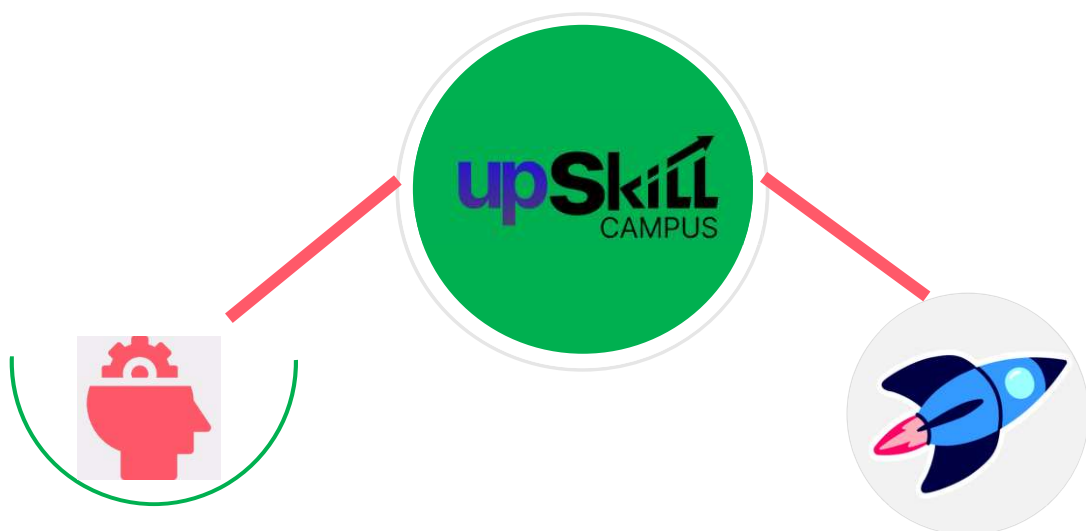
UCT is providing Industrial Machine health monitoring and Predictive maintenance solution leveraging Embedded system, Industrial IoT and Machine Learning Technologies by finding Remaining useful life time of various Machines used in production process.



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.

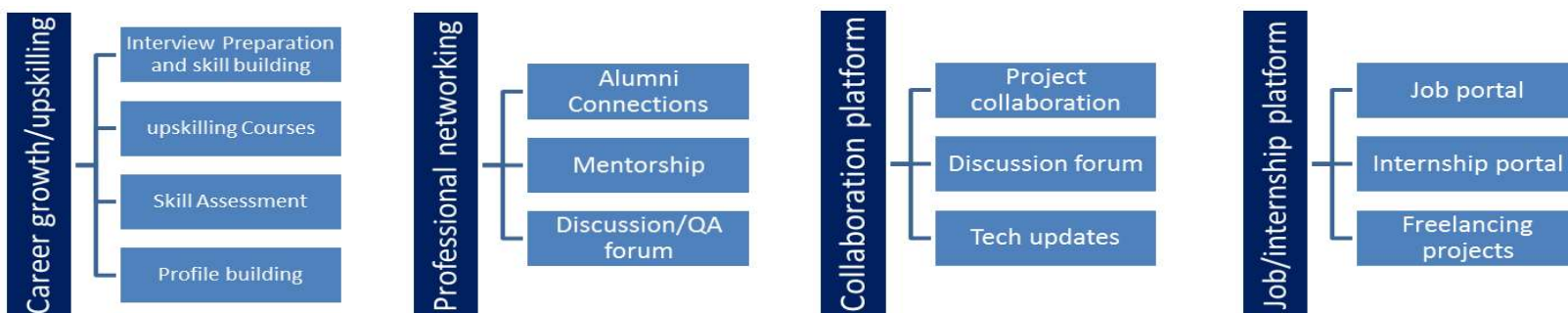
USC is a career development platform that delivers **personalized executive coaching** in a more affordable, scalable and measurable way.



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] Smith, J., & Doe, A. (2017). "Machine Learning Techniques for Predicting Quality in Mineral Processing." *Journal of Mining Science*, 53(2), 341-355.
- [2] Jones, M. (2018). "Data-Driven Approaches to Mineral Processing." *International Journal of Mining Engineering*, 42(1), 101-115.
- [3] "Industrial Data for Flotation Plant Analysis." (2017). Retrieved from [URL of the dataset or document]

2.6 Glossary

Terms	Acronym
Machine Learning	ML
Data Science	DS
Percentage of Silica	%Si
Percentage of Iron	%Fe
Concentrate	

3 Problem Statement

In the assigned problem statement

Mining operations, particularly those involving the extraction and processing of iron ore, rely heavily on the efficiency and precision of various processes. One crucial process in iron ore mining is the flotation process, which is used to concentrate the iron ore by removing impurities such as silica. The quality of the final product, specifically the percentage of silica in the iron ore concentrate, is a key metric that affects both operational efficiency and environmental impact.

1. Predict % Silica Concentrate Every Minute:

- Develop a predictive model that can estimate the percentage of silica in the iron ore concentrate on a minute-by-minute basis. This real-time prediction capability will empower engineers to make timely adjustments to the process, improving the overall quality of the output.

2. Determine Prediction Horizon:

- Evaluate how far into the future (in terms of hours) the percentage of silica in the concentrate can be accurately predicted. This will help engineers in planning and implementing proactive measures to maintain optimal process conditions.

3. Predict % Silica Without % Iron Concentrate:

- Investigate whether it is possible to predict the percentage of silica in the concentrate without using the percentage of iron in the concentrate as an input variable. Given the high correlation between these two variables, achieving this goal would demonstrate the robustness and versatility of the predictive model.



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

What is your proposed solution?

What value addition are you planning?

4.1 Code submission (Github link)

<https://github.com/vardhanpuli03/UPSKILLINTERNSHIP.git>

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

<https://github.com/vardhanpuli03/UPSKILLINTERNSHIP.git>

5 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.

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

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.

6.1 Test Plan/ Test Cases

6.2 Test Procedure

6.3 Performance Outcome

7 My learnings

You should provide summary of your overall learning and how it would help you in your career growth.

8 Future work scope

You can put some ideas that you could not work due to time limitation but can be taken in future.