Industrial Internship Report on

”Hill and Valley predictions”

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 about predicting the hill and valley on the basis of the given dataset. I made whole project by using the techniques and methods of data science and machine learning. 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

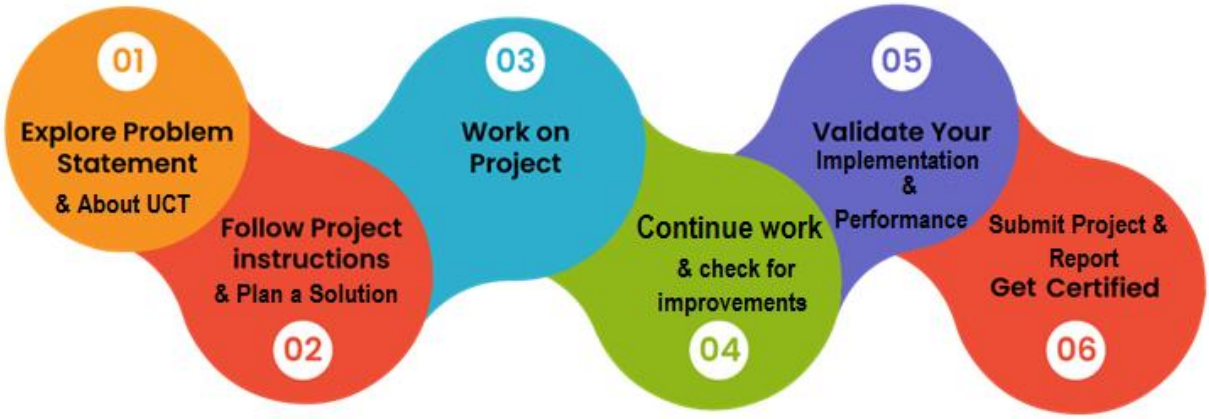
Summary of the whole 6 weeks' work.

About need of relevant Internship in career development.

My project was regarding the hill and valley predictions on the basis of given dataset provided to us and giving predictions out of it.

Opportunity given by USC/UCT.

How Program was planned



My learnings and overall experience was very good with the course . Throughout the course I learned a lot and implemented the same thing in mu project too.

I want to Thank all faculties, who have helped you directly or indirectly.

My message to my juniors and peers is that I have learned a lot from this course and I am sure that you will learn too from it as well.

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.

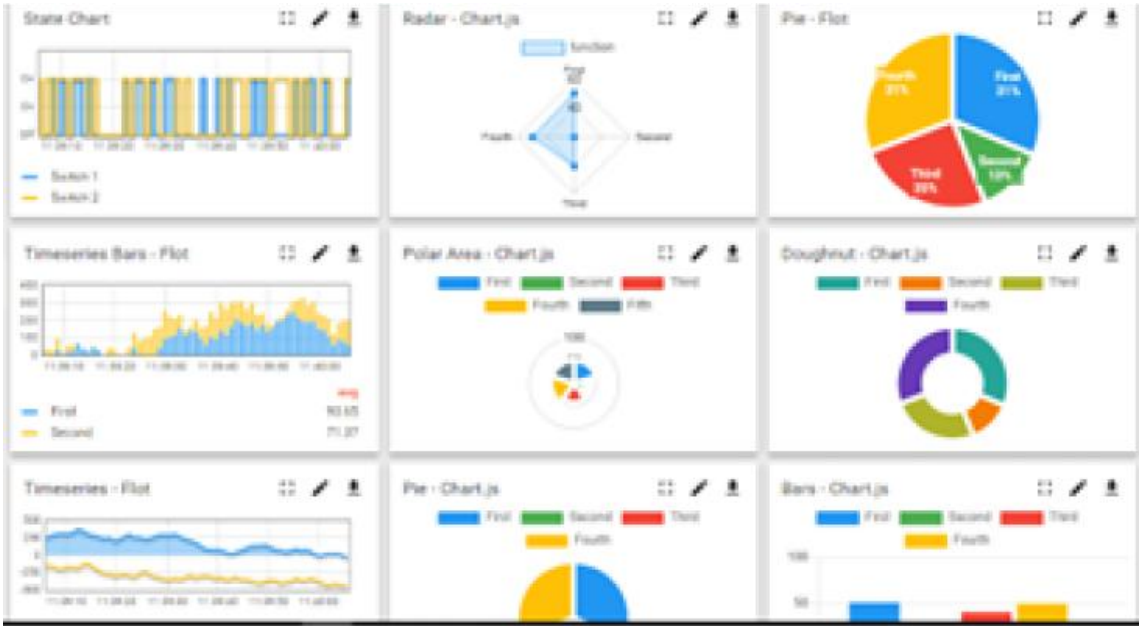
i. UCT IoT Platform (UCT Insight)

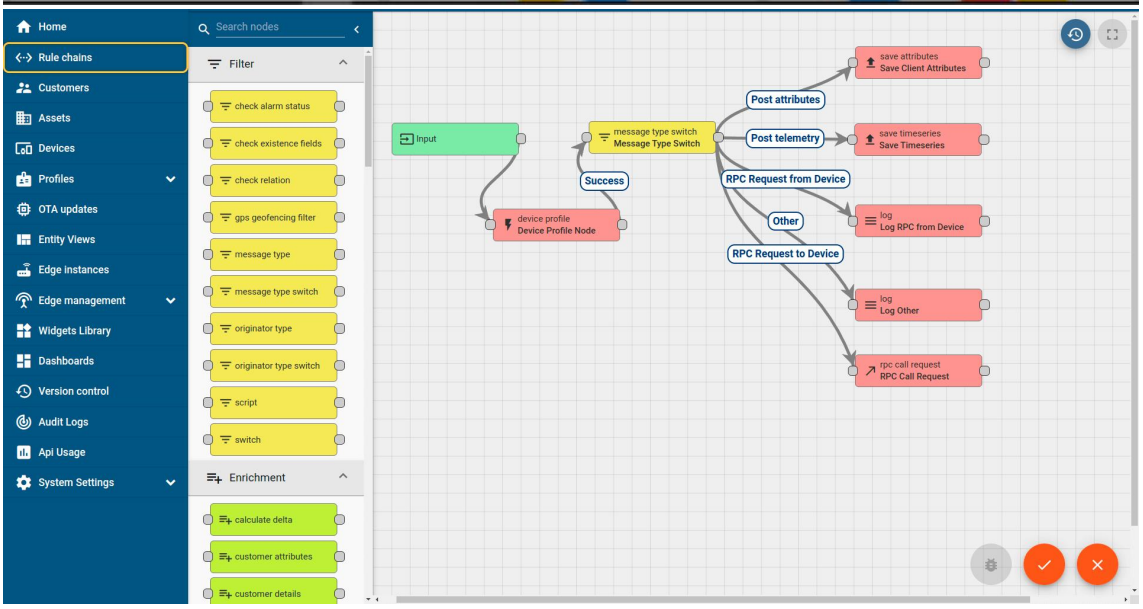
UCT Insight is an IOT platform designed for quick deployment of IOT applications on the same time providing valuable "insight" for your process/business. It has been built in Java for backend and ReactJS for Front end. It has support for MySQL and various NoSql Databases.

- 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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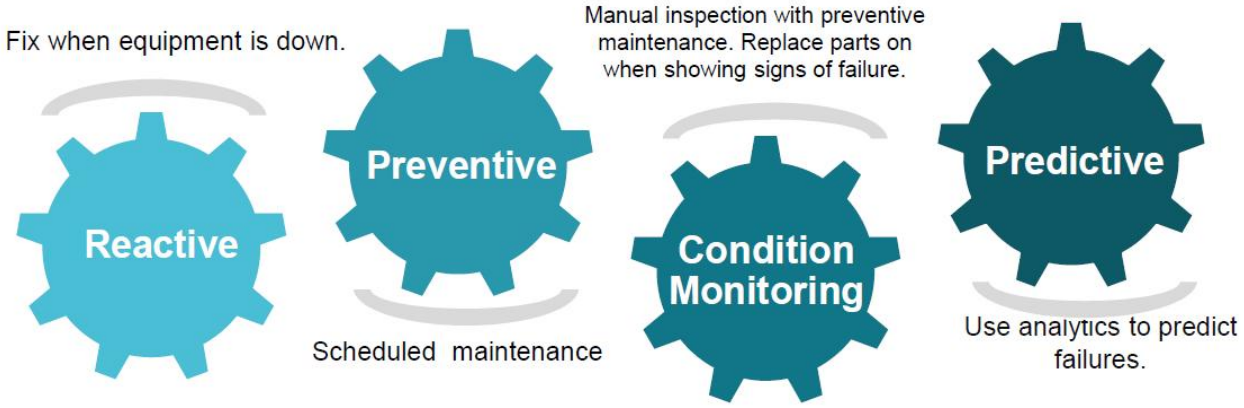
iii. LoRaWAN based Solution

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

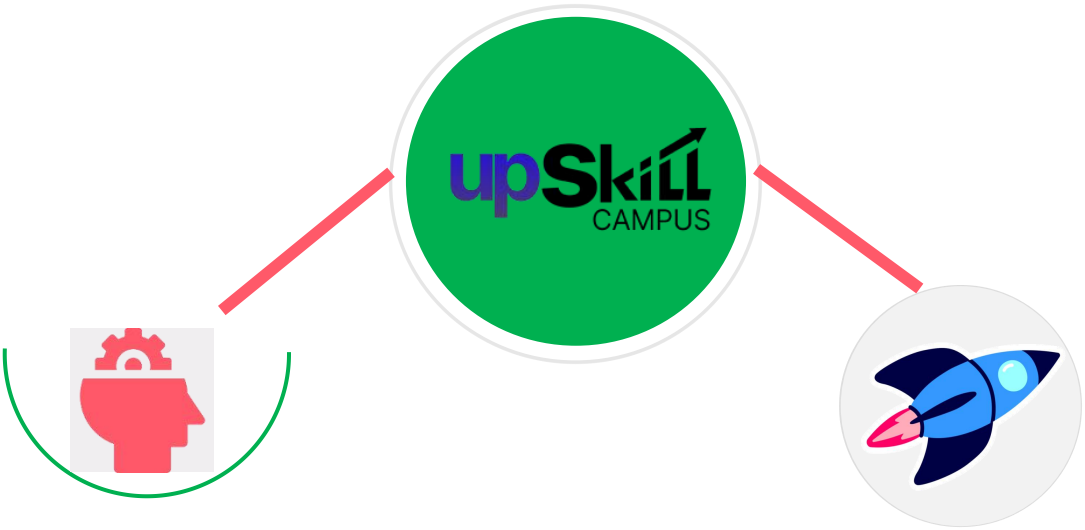
UCT is providing Industrial Machine health monitoring and Predictive maintenance solution leveraging Embedded system, Industrial IoT and Machine Learning Technologies by finding Remaining useful life time of various Machines used in production process.



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.

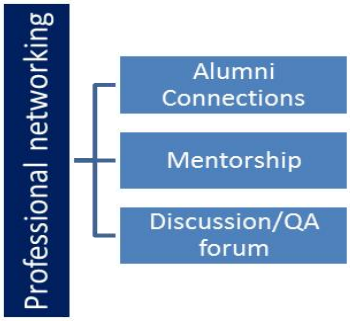
USC is a career development platform that delivers **personalized executive coaching** in a more affordable, scalable and measurable way.

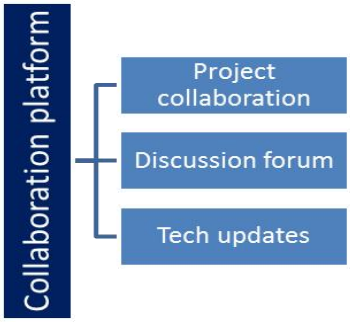


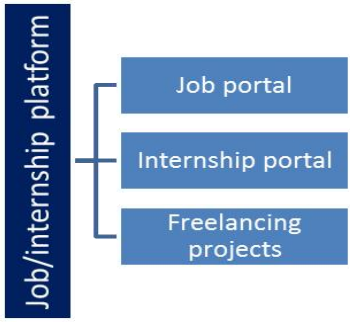
Seeing need of upskilling in self paced manner along-with additional support services e.g. Internship, projects, interaction with Industry experts, Career growth Services

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.

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3 Problem Statement

In the assigned problem statement

My problem statement was to identify that on the basis of given dataset to check that on the particular area whether there is a hill or a valley by going through certain algorithms we can predict the same thing with much higher accuracy.

4 Existing and Proposed solution

I proposed my solution basically by the use of logistic regression model and algorithm I concluded certain value from the dataset by the help of which I wa able to predict the areas having hill and the areas having valley.

The current existing solution are images that are captured from the satellites and their visulizations in the form of graphs and figures.

4.1 Code submission (Github link): https://github.com/arya-dev-singh/upskillCampus.git - repository link of github

Project link that is submitted in my repository - https://github.com/arya-dev-singh/upskillCampus/blob/e0d83aace300ddd338689d88d72d6f8c4dfb005d/arya_dev_singh_final_upskill_project.ipynb

4.2 Report submission (Github link) : https://github.com/arya-dev-singh/upskillCampus.git - repository link of github

Report link that is submitted to my repository - https://github.com/arya-dev-singh/upskillCampus/blob/b6211fe0d2ed5d0534f41e202913f06b4638ccdc/arya-dev-singh_final_InternshipReport_USC_UCT.pdf

5 Proposed Design/ Model

My proposed design and modal is based on the logistic regression modal that is usually used for non linear type modals that is the datasets which shows non linear pattern in that logistic regression modals are used and I have used in it also and it also work great and given the output with a great accuracy.

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 :Hill and Valley prediction modal the main contraints were a huge number of numerical data and I handled that contraint by using numpy module.

6.2 Test Procedure: importing logistic regression modal and predicting the valuable output from the dataset

Performance Outcome: I predicted the new predicted outcomes with a good accuracy.

7 My learnings

I seriously learned a lot from this course ,I learned how to import different data sets and modals ,I learned how to import different libraries and to import different modals and features from that library and to perform train test split of the dataset given and to obtain the useful output from it. It was overall a great learning experience and I gain much more knowledge and insights from the modules that were provided to us by the faculities . thank you gor all this.

8 Future work scope:

I can put more number of data into this program and apply more visualization tools so it will become more easy to understand and will be useful for people living in such areas.