Industrial Internship Report on

"Crop Production Prediction in Agriculture"

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 (The crop production prediction in agriculture in which we predict the specific crop production in the year according to the rainfall average, pesticides used, temperature in this area) 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

In this Internship of Data Science and Machine Learning, I have learned the basic knowledge of this domain, and gained the information about Uniconverge Technologies. In this process first, I have decided the topic for project which is Prediction of Crop Yield production in Agriculture where was challenging work for me to do according to requirement of the project, but by studying on these then I thought for solution and after that I started to work on this project separately. This internship helps to boost practical knowledge in this field and builds a basic for career development.

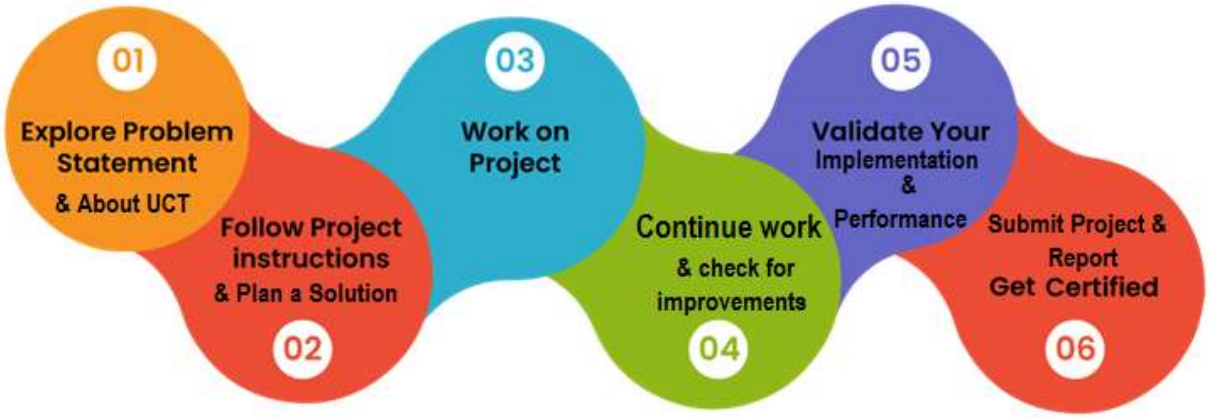
When I worked on this project, I have learned that the project is not only about developing as they work but its also about its designing implementation in the proper way is the important thing for any developer. I tried to follow software development lifecycle that's why this project is very helpful for me to learn new things.

Brief about Your project/problem statement:

A project "Prediction of Agriculture Crop Production in India" can resolves many problems regarding agricultural crops. Prediction of its production depends on a various factor such as crops, its variety, state, quantity, production, season, and it's cost by which it can give an ultimate idea to optimize production.

Opportunity given by USC/UCT:

I have not much knowledge about the machine learning and data science but UCT gives me the opportunity to learn the practical knowledge about machine learning and data science that's why I am so thankful to Uniconverge Technology, IOT Academy, Upskill Campus and Edunet Foundation for giving me this opportunity.



Your Learnings and overall experience:

I have learned so many new things in this internship and I have tried to apply maximum of these skills like different logic , algorithms, Data models and processing, big data, machine learning frameworks , different tools and learning techniques, etc. for the project which was very helpful for me and I had got a very great experience with UCT and I am also awaiting for more opportunities from UCT and that's why I gave my best for this internship.

Your message to your juniors and peers:

I suggests to all that it's a really great opportunity to learn the industrial knowledge and some professional manners and also chance to gain a profitable knowledge and the all team is very co-operative so I am very thankful for that to everyone.

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.

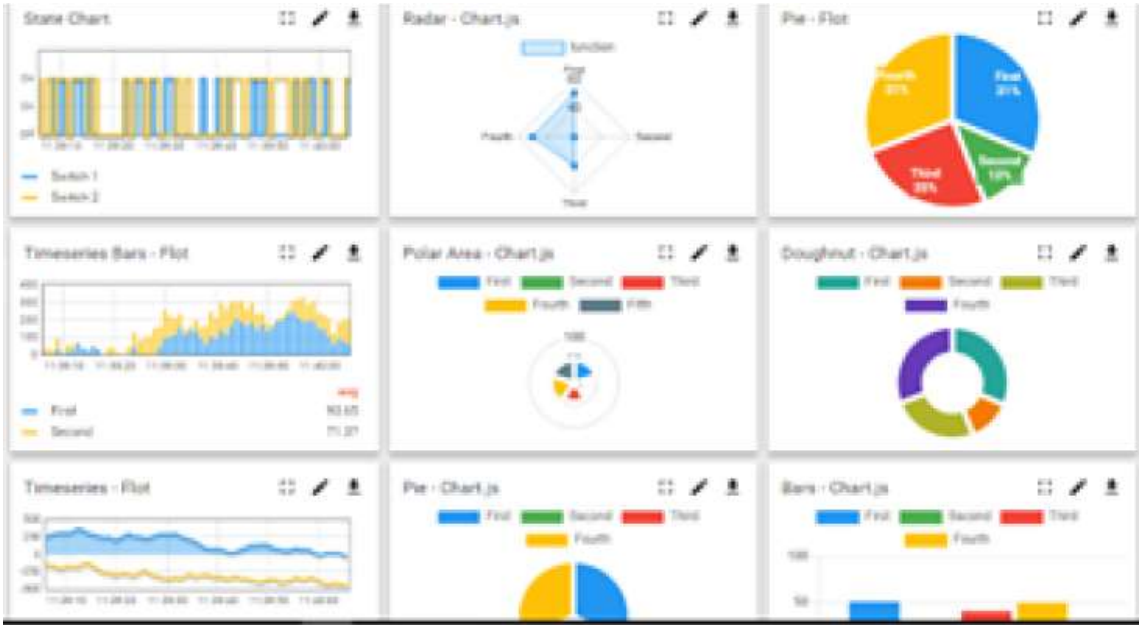
i. UCT IoT Platform (uct Insight)

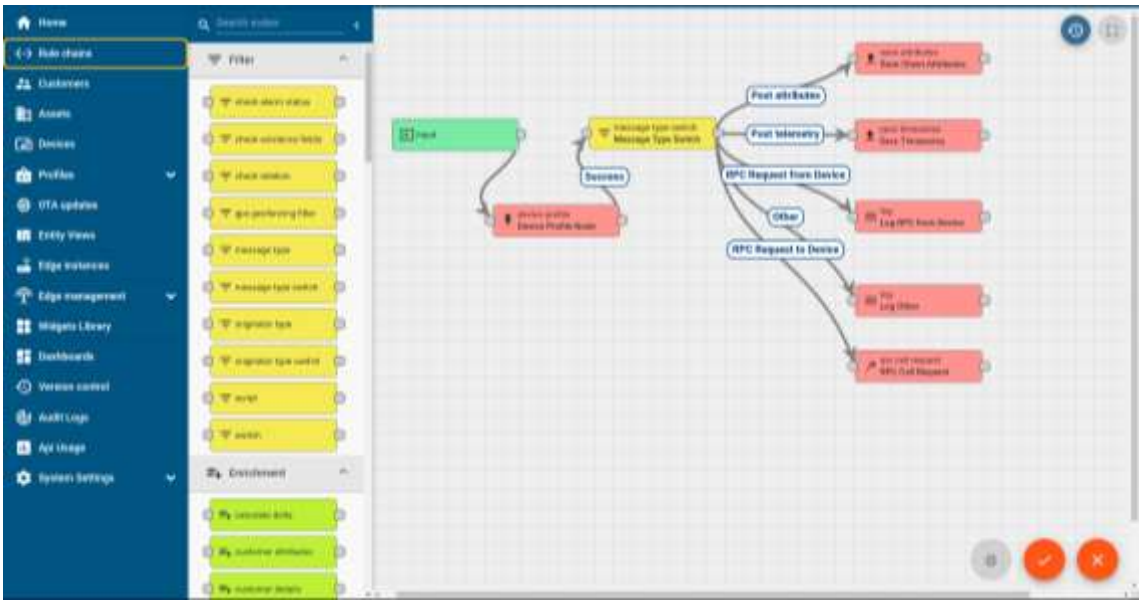
UCT Insight is an IOT platform designed for quick deployment of IOT applications on the same time providing valuable "insight" for your process/business. It has been built in Java for backend and ReactJS for Front end. It has support for MySQL and various NoSql Databases.

- 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.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Utilization
Utilization
Utilization


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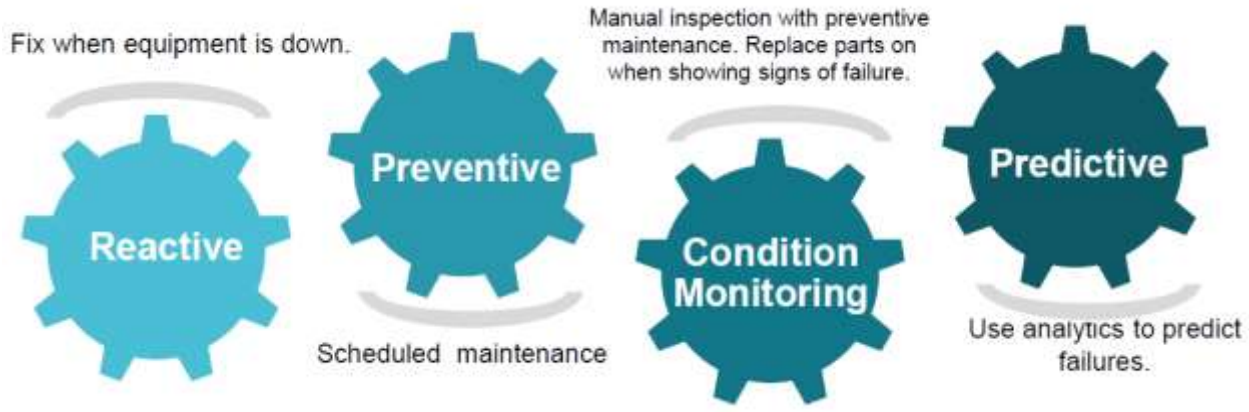
iii. LoRaWAN based Solution

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

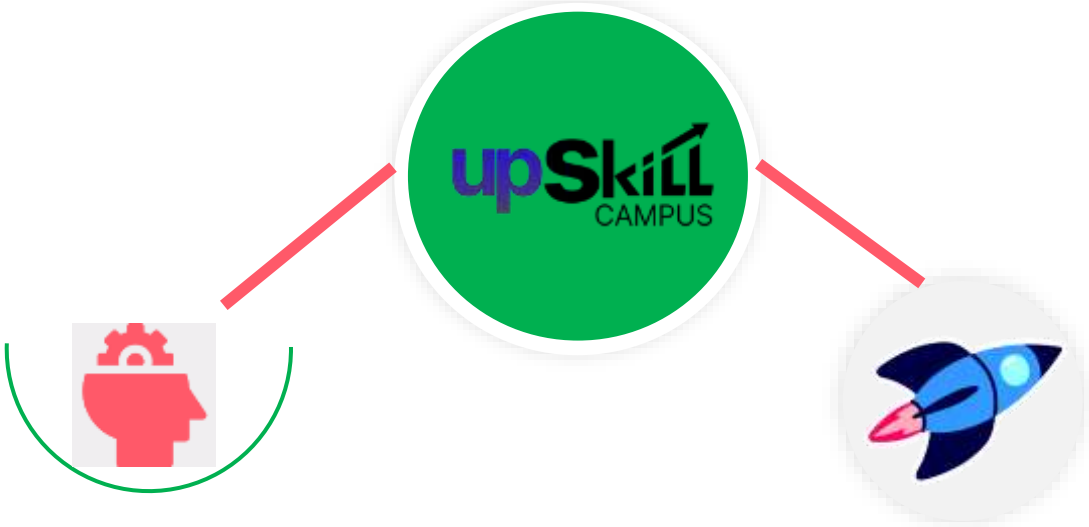
UCT is providing Industrial Machine health monitoring and Predictive maintenance solution leveraging Embedded system, Industrial IoT and Machine Learning Technologies by finding Remaining useful life time of various Machines used in production process.



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.

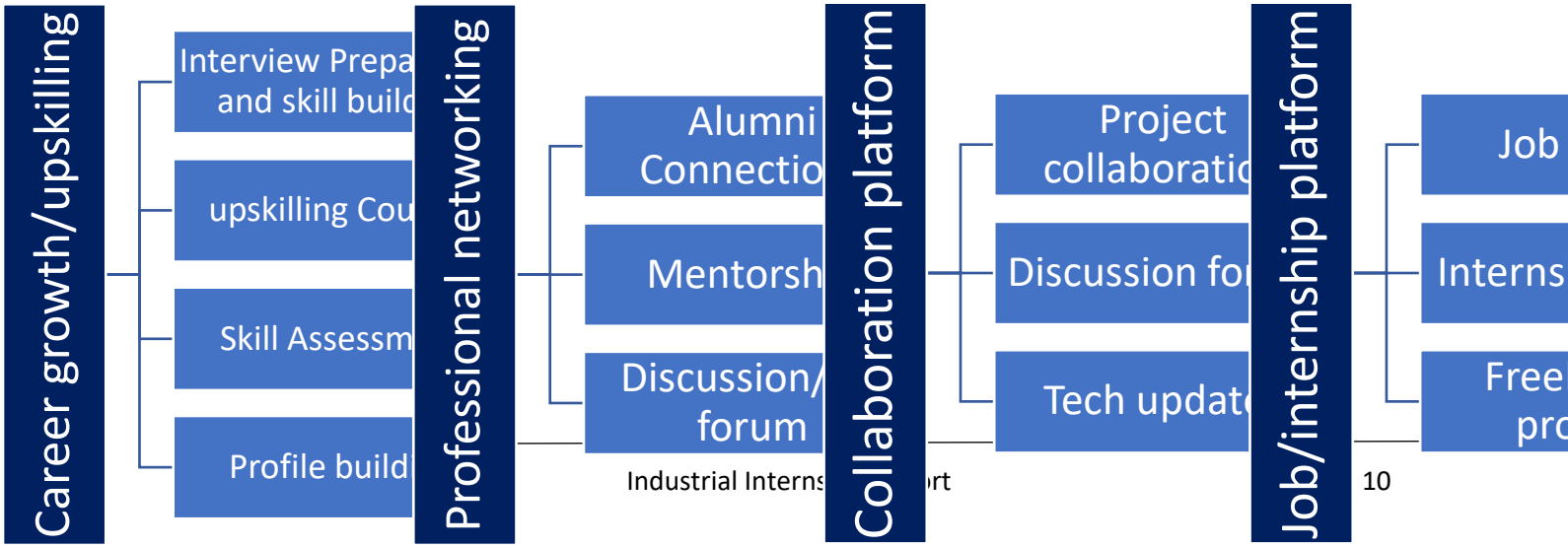
USC is a career development platform that delivers **personalized executive coaching** in a more affordable, scalable and measurable way.



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] IoT Academy

[2] Upskill Campus Course Dashboard

[3] Kaggle and GitHub

[4] Uniconverge Technologies

3 Problem Statement

In the assigned problem statement

The main objective of this project is to predict crop-yield which can be extremely useful to farmers in planning for harvest and sale of grain. This project focuses on implementing a machine learning algorithm that gives better prediction of suitable crop for the corresponding region and crop season in our country using previously collected datasets. This project aims to predict yields based on location, crop type, temperature, humidity, and area of agricultural field data.

3.1 Code submission (Github link)

3.2 Report submission (Github link) :

4 Proposed Design/ Model

- Linear Regression model
- Decision Tree Model
- Random Forest Algorithm

Logistic Regression:

Logistic regression is a supervised learning classification algorithm used to predict the probability of target variable.

Random Forest Algorithm:

Random Forest has the ability to analyse crop growth related to the current climatic conditions and biophysical change

5 My learnings

This project gives me lot of experience which I have not experienced before, and this gives an idea about the industrial things and how the industry work on the project and how they handle all challenges and overcome the problems with finding the good solutions on it. Developing that project was really rigour to do and riveting for me. I also enjoyed using various libraries and tools such as pandas, Flask, numpy, PyMySQL, scikit, sklearn, jupyter notebook etc.

6 Future work scope

In coming years, can try applying data independent system. That is whatever be the format our system should work with same accuracy. Integrating soil details to the system is an advantage, as for the selection of crops knowledge on soil is also a parameter. Proper irrigation is also a needed feature crop cultivation. In reference to rainfall can depict whether extra water availability is needed or not. This research work can be enhanced to higher level by availing it to whole India.