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Industrial Internship Report on

"Crop Production Prediction using Machine Learning"

Prepared by

G SAI VAISHNAVI

Executive Summary
This report provides details of the Industrial Internship provided by Upskill Campus and The IoT Academy in collaboration with the industrial partner UniConverge Technologies Pvt Ltd (UCT).   The internship was focused on a project/problem statement provided by UCT and was required to be completed along with the report within the stipulated time.   The selected project titled "Crop Production Prediction using Machine Learning" focuses on analyzing historical agriculture data to predict future crop production trends. The internship provided valuable exposure to industrial problem solving, design, and implementation of data-driven solutions   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

This section summarizes the overall work carried out during the internship period.

The internship highlighted the importance of relevant industrial exposure for career development.

The opportunity provided by Upskill Campus and UniConverge Technologies Pvt Ltd enabled hands-on experience in solving a real-world problem statement using machine learning techniques.

The internship program was well planned and structured, enabling continuous learning and professional growth.

I would like to thank all coordinators and mentors who supported me directly or indirectly during this internship.

This experience has been highly beneficial and I encourage juniors and peers to actively participate in such industry-oriented programs.

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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.

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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

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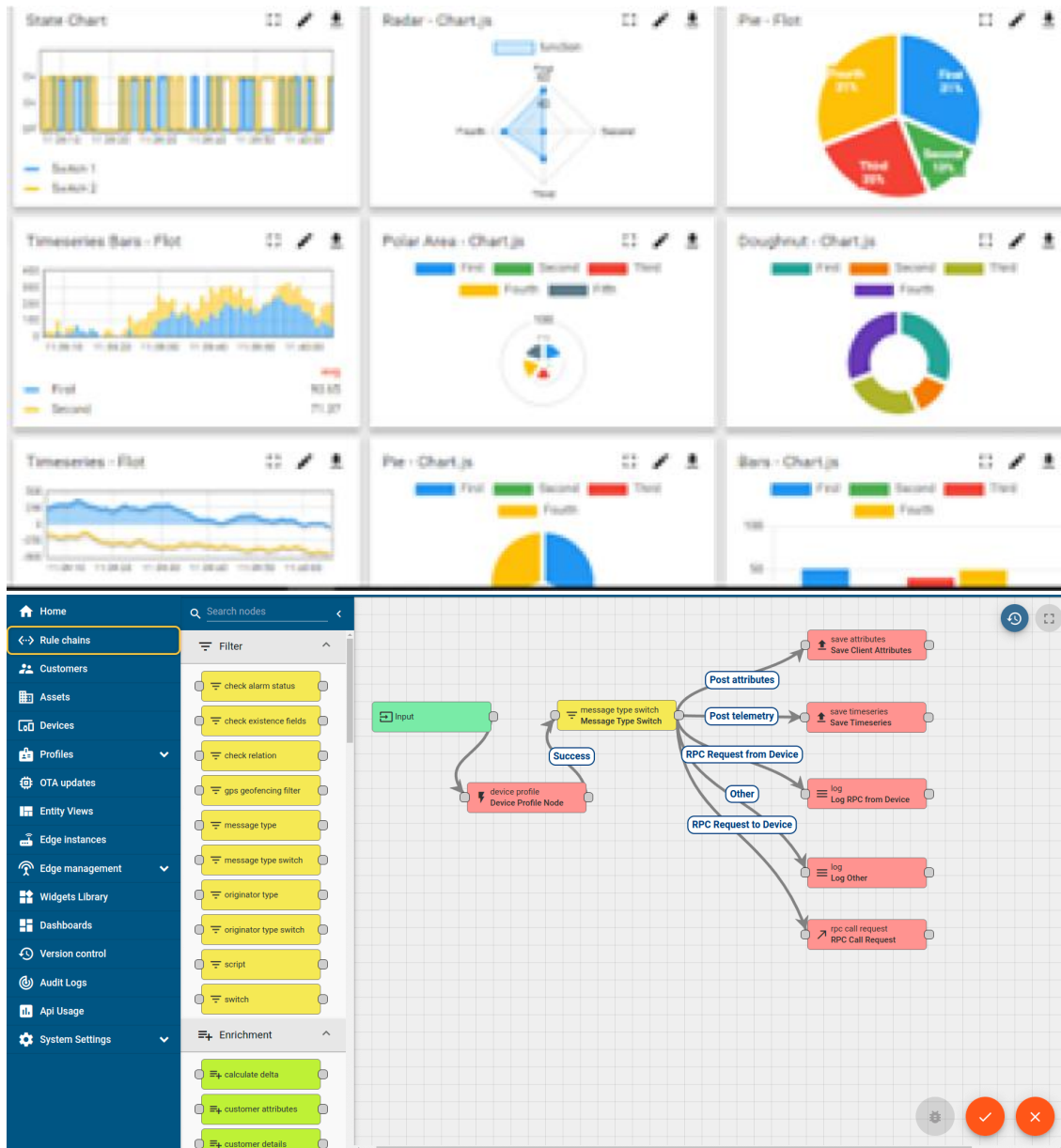
FACTORY WATCH

ii.   Smart Factory Platform (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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| 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

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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.
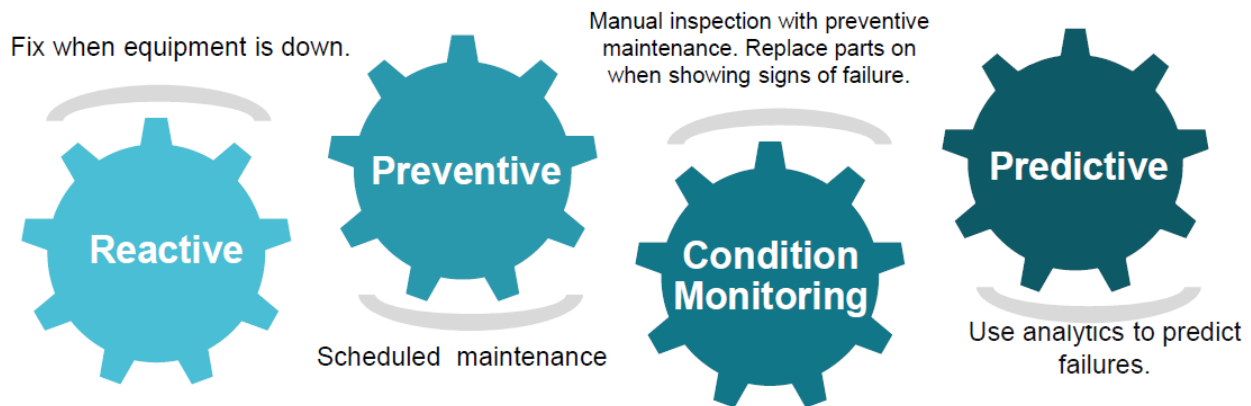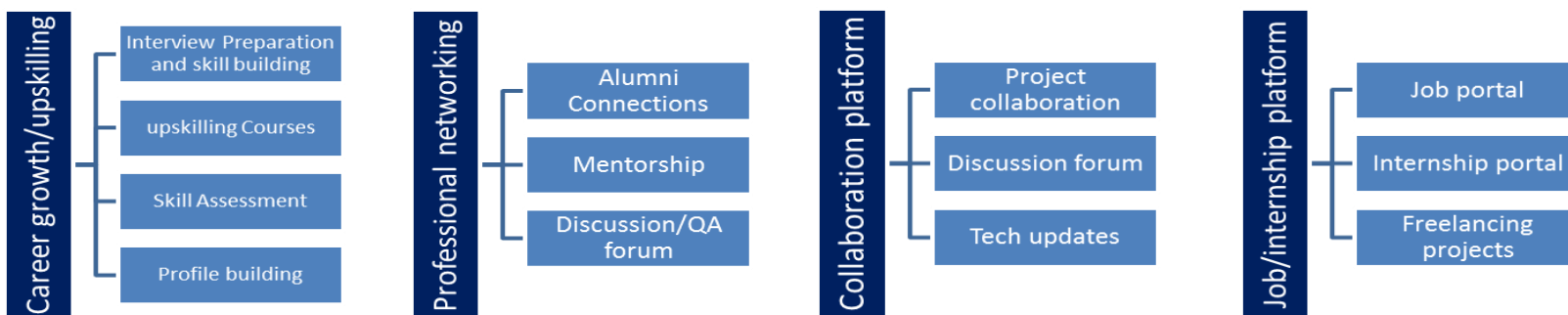

2.2   About upskill Campus (USC)

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.

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Career growth/upskilling

- Interview Preparation and skill building
- upskilling Courses
- Skill Assessment
- Profile building

Professional networking

- Alumni Connections
- Mentorship
- Discussion/QA forum

Collaboration platform

- Project collaboration
- Discussion forum
- Tech updates

Job/internship platform

- Job portal
- Internship portal
- Freelancing projects

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.

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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] machine learning documentation

[2] agriculture data analysis resources

[3] learning materials provided during the internship.

2.6   Glossary

Terms	Acronym
ML	Machine Learning
IoT	Internet of Things
UCT	UniConverge Technologies Pvt Ltd

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3 Problem Statement

Agricultural crop production is influenced by various factors such as climate, resources, and cultivation practices. Manual estimation methods are often inaccurate and inefficient. The problem addressed in this project is to predict future crop production using historical data through a machine learning approach.

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4   Existing and Proposed solution

Existing and Proposed Solution Existing solutions rely on manual estimation and experience-based analysis, which may not provide accurate predictions.

 The proposed solution uses a data-driven machine learning model to analyze historical data and predict future crop production more efficiently. Proposed Design / Model The solution follows a structured design flow consisting of data collection, preprocessing, model training, prediction, and visual

4.1   Code submission (Github link)

https://github.com/Vaishnavi20006/upskillcampus/blob/main/upskill/CropProductionPrediction.java

4.2   Report submission (Github link) :
https://github.com/Vaishnavi20006/upskillcampus/tree/main/upskill

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4.3   https://github.com/Vaishnavi20006/upskillcampus/tree/main/upskill

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

5.3   Interfaces (if applicable)

The project uses Python interfaces and libraries such as Pandas, Matplotlib, and Scikit-learn.

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6   Performance Test

The model performance was evaluated based on prediction capability and execution efficiency.

6.1

Test Plan / Test Cases Testing involved validating predictions using historical data.

6.2

Test Procedure The dataset was used to train the model and predictions were generated for future years.

6.3

Performance Outcome The model produced meaningful predictions and clear trend visualization, demonstrating its effectiveness.

My Learnings

Through this internship, I gained hands-on experience in machine learning, data preprocessing, model implementation, and professional documentation. This experience improved my confidence in applying theoretical knowledge to real-world problems.

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7   Future work scope

Future enhancements can include additional parameters such as weather and soil data, and the use of advanced machine learning algorithms to improve prediction accuracy