**Industrial Internship Report on**

**”Telecom Churn Prediction”**

**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 (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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# 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.

# Introduction

## 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.



1. 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



1. **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 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.



1. 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.

1. 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.



## 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

<https://www.upskillcampus.com/>

upSkill Campus aiming to upskill 1 million learners in next 5 year



## 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.

## 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.

## Reference

[1]

[2]

[3]

## Glossary

|  |  |
| --- | --- |
| Terms | Acronym |
|  |  |
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|  |  |
|  |  |
|  |  |

# Problem Statement : Churn Prediction

Customer churn, also known as customer attrition, refers to the phenomenon where customers stop using a product or service. It's a significant concern for businesses as it can impact revenue and growth. The problem statement here is to predict whether a customer is likely to churn or not based on their historical interactions and behavior with the company.

# Existing and Proposed solution

**Existing Solutions:**

Various approaches have been used to address customer churn prediction, including logistic regression, decision trees, random forests, and neural networks. These models analyze customer data such as transaction history, customer demographics, and usage patterns.

**Limitations:**

- Some models might not handle imbalanced datasets well.

- Traditional approaches might struggle with capturing complex nonlinear relationships in the data.

**Proposed Solution:**

Develop a machine learning model using a gradient boosting algorithm (such as XGBoost or LightGBM) that can handle imbalanced data and capture complex relationships. Additionally, feature engineering and selection techniques will be employed to improve model performance.

**Value Addition:**

The proposed solution aims to provide higher prediction accuracy and better handling of imbalanced data compared to traditional models.

## Code submission (Github link)

https://github.com/MohammedIrfan-Github/Telecom-Churn-Prediction.git

# Proposed Design/ Model

Below are High-Level and Low-Level diagrams will specify the Design Model.

## High Level Diagram (if applicable)

High-level architecture diagram showing data flow, preprocessing, model training, and evaluation stages.

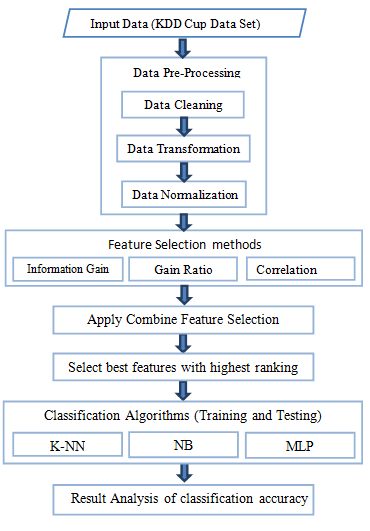


Figure 1: HIGH LEVEL DIAGRAM OF THE SYSTEM

## Low Level Diagram (if applicable)

Low-level architecture diagram depicting data preprocessing steps, feature engineering, model training, hyperparameter tuning, and validation.

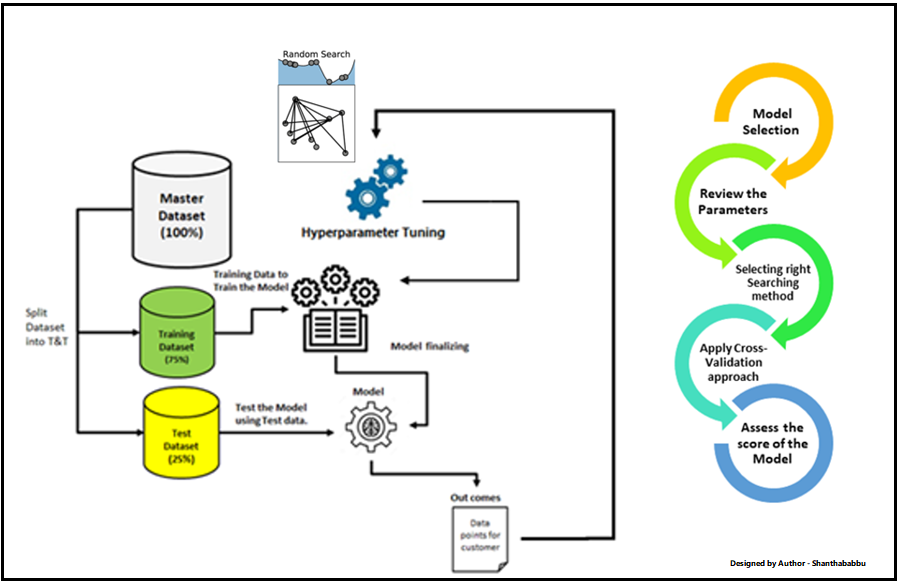


Figure 2: LOW LEVEL DIAGRAM OF THE SYSTEM

## Interfaces (if applicable)

Flowcharts illustrating the data pipeline, data transformation steps, and model deployment process

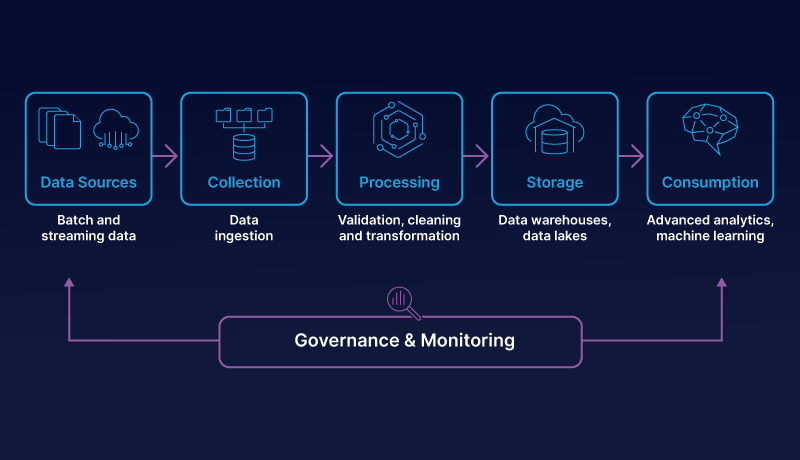


Figure 3: INTERFACES

# 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.

## Test Plan/ Test Cases

- Split the dataset into training and testing sets.

- Implement k-fold cross-validation to evaluate model performance.

- Define evaluation metrics: accuracy, precision, recall, F1-score, ROC AUC.

- Assess model performance on an imbalanced dataset.

## Test Procedure

- Preprocess the data, engineer relevant features.

- Train the gradient boosting model on the training set.

- Tune hyperparameters using cross-validation.

- Evaluate the model using test data and the defined metrics.

## Performance Outcome

- Compare the model's performance metrics against the baseline models.

- Assess the model's capability to handle imbalanced data.

- Provide insights into the trade-offs between precision and recall.

# My learnings

Through this project, I gained a deeper understanding of data preprocessing, feature engineering, and the importance of choosing the right evaluation metrics. I also learned how to handle imbalanced datasets and how different machine learning algorithms perform in real-world scenarios.

# Future work scope

- Incorporate more advanced techniques such as deep learning and ensemble methods.

- Explore time-series features to account for temporal patterns.

- Implement a real-time prediction system using the trained model.