



Industrial Internship report on

“CORE JAVA”

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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.

There were three projects given during this industrial training.

- (i) Banking Information System
- (ii) Music player application
- (iii) Human Resource Management System

This internship gave me a very good opportunity to get exposure to Industrial problems and design/implement solutions for that. It was an overall great experience to have this internship.



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1. Preface

Internship Execution Plan: 6 Weeks Project



My Industrial Internship program is divided into 6 weeks .

1st week ,i explore problem statement and know about UCT

In the 2nd week of training I followed project instructions and made a plan on how to solve problems with the help of my mentor.

In the 3rd week of training , I work on a project .

During the 4th week of training ,I continue work on my project and also check where I improved or not, also a weekly quiz organised by our mentor.



5th week of training , validation of my implementation and also check my performance.

6th week of training , I submitted my project and report

2. Introduction

2.1 About UniConverge Technologies Pvt Ltd

A company established in 2013 and working in the 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.

IIOT Products
We offer product ranging from Remote IOs, Wireless IOs, LoRaWAN Sensor Nodes/ Gateways, Signal converter and IoT gateways

IIOT Solutions
We offer solutions like OEE, Predictive Maintenance, LoRaWAN based Remote Monitoring, IoT Platform, Business Intelligence...

OEM Services
We offer solutions ranging from product design to final production we handle everything for you..



i. UCT IoT Platform

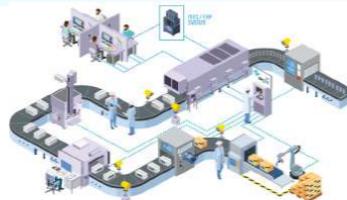
UCT Insight is an IOT platform designed for quick deployment of IOT applications at the same time providing valuable “insight” for your process/business. It has been built in Java for backend and ReactJS for Front end. It has support for MySQL and various NoSql Databases.

- 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

INDUSTRY 4.0 SOLUTION



MACHINE MONITORING & OEE

We provide machine monitoring solutions with our wide range of products like sensors, IO converters and edge gateway which can collect data from sensors, PLCs, HMI, CNC Controllers and others. With our IoT platform, we can take data from LoRaWAN, Modbus, OPC UA, HTTP, and MQTT protocols.



ENERGY MONITORING SOLUTION

We provide energy monitoring solutions by using our wired and wireless sensors and gateways. We utilize LoRaWAN base devices to reduce the complexity and cost of the overall project and save critical time in deployment.



PREDICTIVE MAINTAINANCE

UCT offers a solution that collects data from all the deployed machinery in the industry and sends that data to a database server through different networking mediums like Ethernet, WiFi, 4G, and 5G. For monitoring and analysis and predicts the current state of the machine and detects any anomaly in the system. Presently, we had collaborated with IIT Jodhpur for Predictive Maintenance & Digital twin.

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.
- Unleashed 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.





iii. based Solution

UCT is one of the early adopters of LoRAWAN technology and provides solutions 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.

LoRaWAN BASED SOLUTION



SMART STREET LIGHT

LoRaWAN based smart street light controller which can be used for dimming and scheduling the lights on and off. With our intelligent smart street light platform a user can control and monitor the lights from anywhere and can get data related to lamp failure and energy consumption. Platform has also smart profiles for energy consumption.



SMART WATER METERING SOLUTION

We provide smart metering solutions using our LoRaWAN-based water meter and Gateway and using our IoT platform we can generate a detailed report of consumption as well as provide billing solutions.



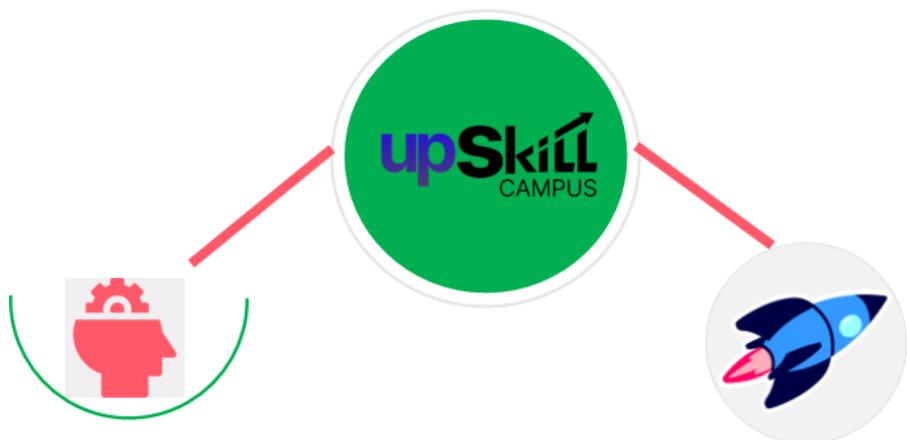
SMART IRRIGATION SOLUTION

We are OEM of a wide range of irrigation products and solutions for filtration, irrigation and fertilization. We provide various wireless IO and sensors with LoRaWAN along with that we provide cloud based irrigation automation software for smart city applications.

2.2 About upskill Campus (USC)

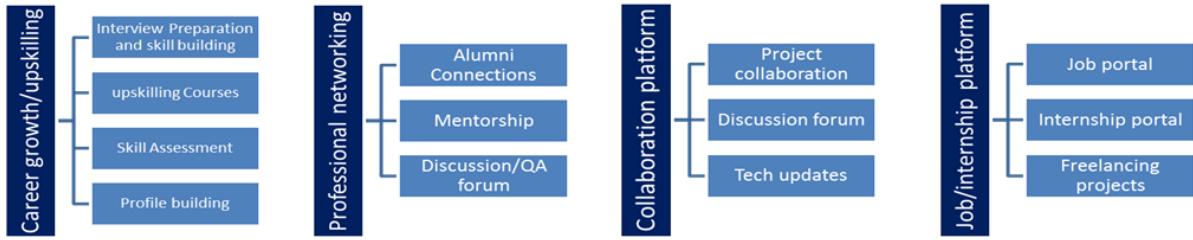
upskill Campus along with The IoT Academy and in association with Uniconverge technologies has facilitated the smooth execution of the complete internship process.

USC is a career development platform that delivers **personalised 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



2.3 The IoT Academy

The IoT academy is the 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

- (i) .Upskill Campus
- (ii). By industrial internship program schedule
- (iii). Google

3 Problem Statement

1. Problem Statement for the Project: Banking Information System

Develop a prototype of a Banking Information System in Core Java that provides a working preview of the key functionalities of a real banking system. The prototype should demonstrate the core features and flow of the system, showcasing its functionality and usability.

2. Problem Statement for the Project: Music player application

Develop a music player application that allows users to play, manage, and enjoy their music collection. The music player should provide essential functionalities for organizing and playing music files in various formats.

3. Problem Statement: Human Resource Management System (HRMS)



Develop a console-based Human Resource Management System (HRMS)

using Java core that allows organizations to manage employee information, attendance, and leave records efficiently. The HRMS should provide essential functionalities for HR administrators to perform employee-related tasks.

4 Existing and Proposed solution

There are six constraints in project management.

1. Cost
2. Risk
3. Scope
4. Quality
5. Time
6. Resources

Understand your constraints: You can't manage your project constraints unless you understand what they are. Once you know your project constraints, you can plan around them

Plan and strategize: When you consider all six of the most common constraints in your project plan, you can move forward with a better perspective for what's ahead.

Control project quality: You can control project quality by regularly monitoring your project plan and processes

Manage risk: Use risk analysis to identify, assess, and prepare for potential project risks. With a strong risk



management plan in place, you can keep the most damaging project risks at bay and prepare for any unexpected risks that may occur.

Communicate effectively: Team communication is essential for successful management of project constraints. Without strong communication, you may think you're balancing your constraints while another team member is unknowingly disrupting your hard work.

Embrace flexibility: You must embrace flexibility in order to effectively balance project constraints. There will be times when you'll need to compromise on project elements in order to stay within scope.

What value addition are we planning?

Focusing on the customer: Customers are always a key element to success in any business.

Building a great team: The team is a project's biggest asset. A successful project manager knows that and takes the time to understand each person's motivations, strengths, and weaknesses.

Fostering relationships and communication: Maintaining customer satisfaction and building a great team are two ways that you, as a project manager, can add value to a project.



Managing the project: When you build teams, each person is generally assigned specific project tasks.

Project Management is the application of knowledge, skills, tools, and techniques to meet the project requirements and achieve the desired outcome.



4.1 Code submission

<https://github.com/Priyanka21130/report1.git>

4.2 Report submission (Github link) :

5 Proposed Design/ Model

Algorithm Of banking system:

advance security algorithm: develop an algorithm that employs encryption access control and real time monterey to ensure the security of transaction and customer data.

Optimised transaction processing: create algorithm that uses optimised data structures and parallel processing techniques to accelerate transaction processing and minimise delays.

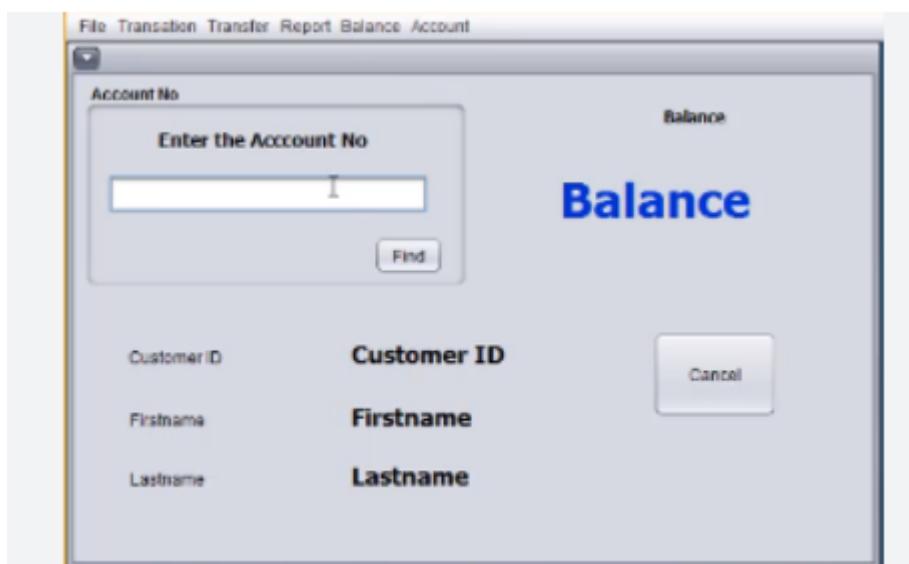


Real time fraud detection: Implement machine learning algorithms that can identify usual transaction patterns and behaviours, triggering alerts or action to prevent potential fraud.

Risk assessment algorithm: design algorithms that excessive risk factor associated with different transactions and customer profiles adding in decision making and risk mitigation.

personalisation engine: develop algorithms that analyse customer data to offer personalised banking experience, product recommendations, and tailored financial advice.

Scalable Architecture Design: Design the algorithm with scalability in mind, leveraging distributed computing, cloud resources, and efficient load balancing.



Algorithm (Music Playback):

Select Song:



- Allow the user to select a song from their library or playlist.

Load Song Metadata:

- Retrieve metadata (title, artist, album, duration) of the selected song.

Audio Buffering:

- Start buffering the audio data to ensure seamless playback.

Audio Playback:

- Play the buffered audio data, providing controls for play, pause, and seeking.

Update Playback Status:

- Update the user interface with the current playback status (playing, paused, time elapsed, etc.).

Handle Playback Controls:

- Monitor user interactions for controls like play, pause, skip, and seek.
- Adjust the playback accordingly and update the user interface.

End of Song:

- When the song reaches its end, trigger the next song in the playlist or queue.

Handle Errors:

- Implement error handling for cases such as audio loading failures or network interruptions.



Algorithm of Human Resource Management System:

Employee Authentication:

- Authenticate the employee to grant access to the system.

Leave Request Submission:

- Allow the employee to submit a leave request through the self-service portal.
- Gather details such as leave type, start date , end date, and reason.

Leave Balance Check:

- Validate the request based on available leave balance and organisational policies.

Manager Approval:

- Notify the employee's manager about the leave request.

- Allow the manager to approve or reject the request through the manager portal.

Notification to Employee:

Inform the employee of the decision (approval or rejection) via email or notification.

Leave Tracking:

- Update the employee's leave balance based on the approved request.
- Record the leave request and approval in the employee's history.

Reporting:

- Generate reports on leave utilisation, approval rates, and trends for HR analysis



6 Performance Test

In every project there is a need for analysis of self evalution.

We can evaluate ourselves through performing any test .

In this industrial internship training three quizzes are organised .

Six week of internship organised every alternate week quiz is organised





6.1 Test Plan/ Test Cases

Every test is organised for a limited time .

At first I completed every topic of my internship and then my quiz was open .

Limited time given so i read properly and then

Click save and next and last I submit then another topic is locked until the result is announced .

6.2 Test Procedure

(i) In this industrial internship program three quiz organised by the internship programer

(ii) Each quiz had a fixed time and question mentioned . In certain time all question has to be

Completed if .we don't know the question's solution then we have skip option also available

(iii) Save and next option also available ,if we done our work or not know then easily move

Or skip that question.

(iv) Limited time given so we have to complete our work in a limited time.

And last submit option also available if we completed then lastly submit and

After some time later we got report of our quiz

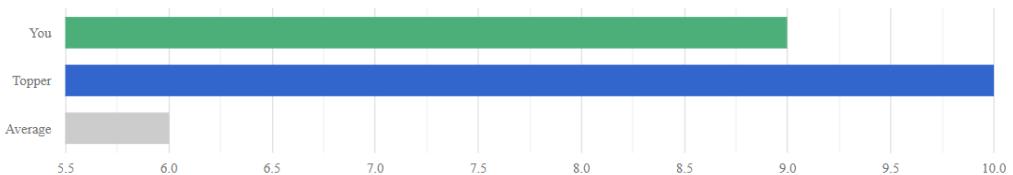
6.3 Performance Outcome

In every performance at the end progress report must be provided to the student.

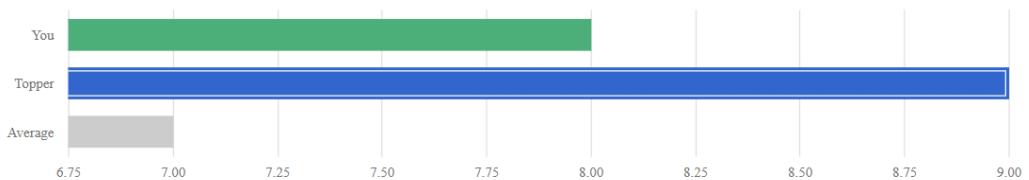
With the help of progress report we can determine in which area is good or in

Which area we have to work on our mistakes .

Comparison between you, average and topper



Comparison between you, average and topper



7 My learnings

Core Java refers to the fundamental components of the Java programming language that serve as building blocks for creating applications . It includes a wide range of concepts and



libraries that facilitate various aspects of programming. Here's a summary of core Java concepts:

Basic Syntax and Structure : Core Java covers the syntax and structure of the language, including data types, variables, operators, and control flow statements like if, switch, and loops (for, while, do-while).

Object-Oriented Programming (OOP): Java is primarily an OOP language. Core Java introduces classes, objects, inheritance, polymorphism, encapsulation, and abstraction. These concepts allow developers to create modular, reusable, and maintainable code.

Packages and Modules: Java classes are organised into packages to manage namespaces and provide a hierarchical structure. Java 9 introduced the concept of modules to enhance encapsulation and modularity.

Exception Handling: Core Java teaches how to handle errors and exceptions using try, catch, throw and finally blocks. This helps in building robust applications that gracefully handle unexpected situations.

Input and Output(I/O): Java offers various classes for input and output operations. Core Java covers basic file handling, reading/writing text or binary data, and using streams.

Collections Framework: Java provides a rich set of classes and interfaces to work with collections of objects, such as lists, sets, and maps. This framework simplifies data manipulation and storage.



8 Future work scope

I also want to work on data science and big data with the help of Java because lots of

Work will seen on data science and big data because every data release in the world wide



Data Science and Big Data: Java is increasingly being used in the field of data science and big data analytics. Libraries like Apache Hadoop, Spark, and Flink offer Java APIs for processing and analysing large datasets.



