Industrial Internship Report on

”Healthcare Data Management”

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

Cloud-Based Solution for Managing Patient Data, Medical Records, and Imaging

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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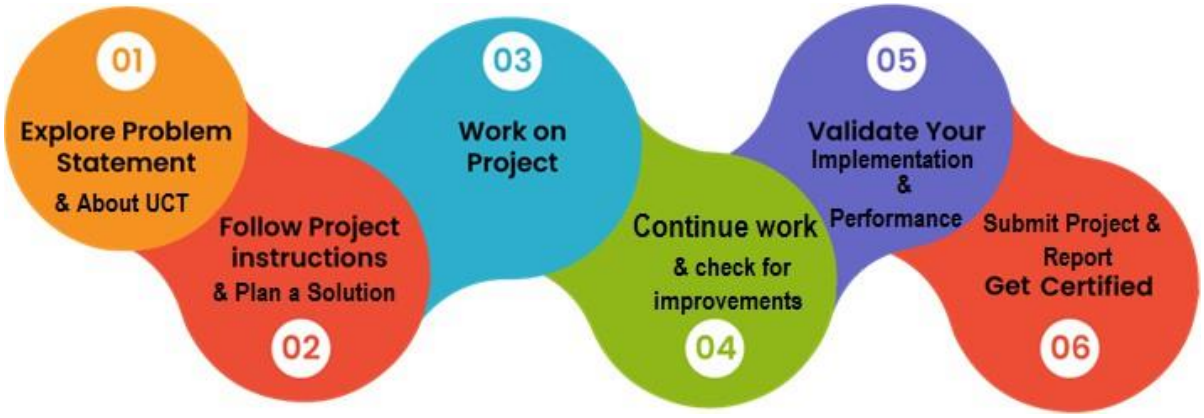
1 Preface

In this 6 week internship I learn more about cloud computing, how actually it work for real time.

My project is about Cloud-Based Solution for Managing Patient Data, Medical Records, and Imaging

Thank yo so much USC/UCT to give me this Opportunity to showcase my ability.



My overall experience is good but I am disappointment that when I asked for query I did not get any response from your side.

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)

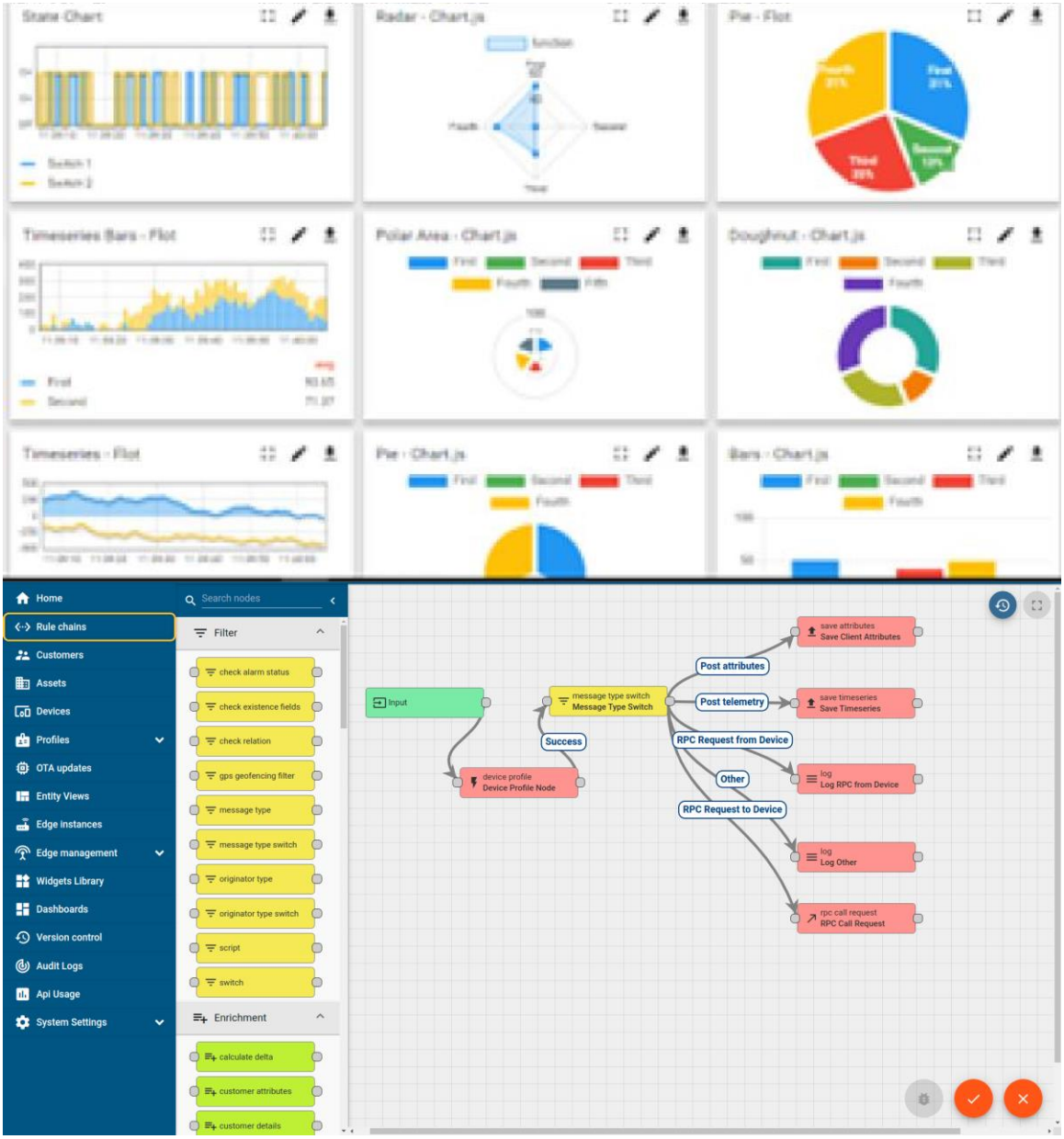
UCT Insight is an IOT platform designed for quick deployment of IOT applications on the same time providing valuable "insight" for your process/business. It has been built in Java for backend and ReactJS for Front end. It has support for MySQL and various NoSql Databases.

- 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


State Chart
Radar - Chart.js
Pie - Plot
Timeseries Bars - Plot
Polar Area - Chart.js
Doughnut - Chart.js
Timeseries - Plot
Pie - Chart.js
Bars - Chart.js
Home
Rule chains
Customers
Assets
Devices
Profiles
OTA updates
Entity Views
Edge instances
Edge management
Widgets Library
Dashboards
Version control
Audit Logs
Api Usage
System Settings
Search nodes
Filter
check alarm status
check existence fields
check relation
gps geofencing filter
message type
message type switch
originator type
originator type switch
script
switch
Enrichment
calculate delta
customer attributes
customer details
Input
message type switch
Message Type Switch
Success
device profile
Device Profile Node
Post attributes
Post telemetry
RPC Request from Device
Other
RPC Request to Device
save attributes
Save Client Attributes
save timeseries
Save Timeseries
log
Log RPC from Device
log
Log Other
rpc call request
RPC Call Request

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.

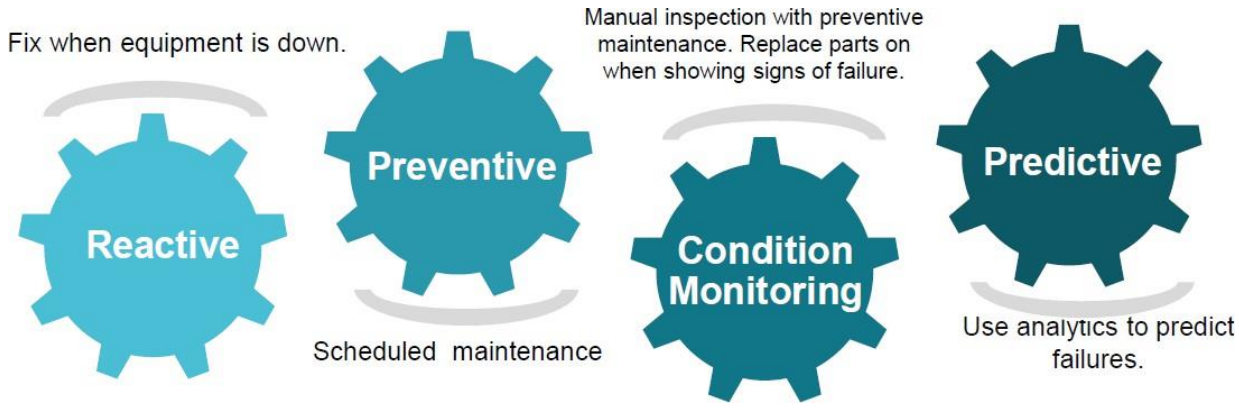
Machine	Operator	Work Order ID	Job ID	Job Performance	Job Progress		Output		Rejection	Time (mins)				Job Status	End Customer
					Start Time	End Time	Planned	Actual		Setup	Pred	Downtime	Idle		
CNC_S7_81	Operator 1	WO0405200001	4168	58%	10:30 AM		55	41	0	80	215	0	45	In Progress	i
CNC_S7_81	Operator 1	WO0405200001	4168	58%	10:30 AM		55	41	0	80	215	0	45	In Progress	i

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

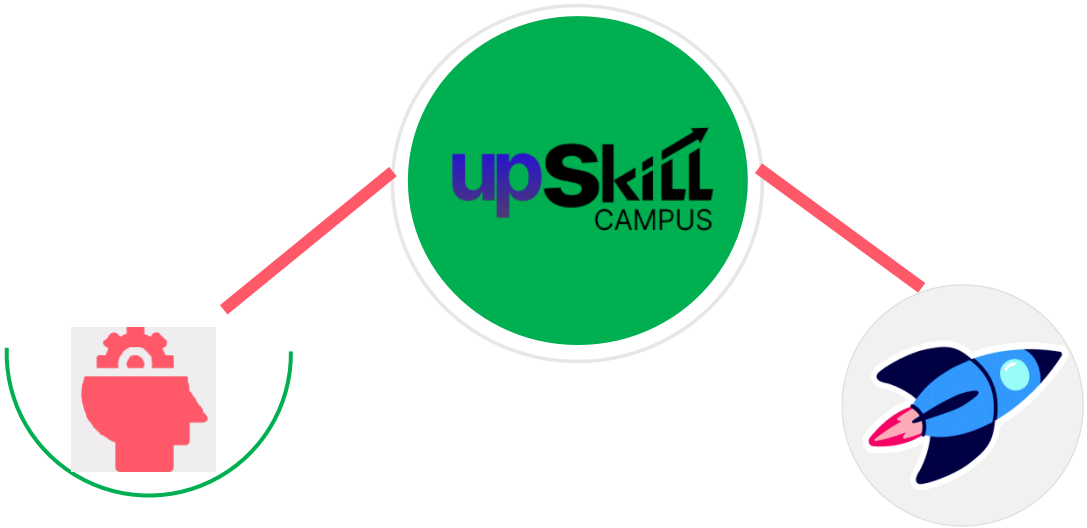
UCT isproviding Industrial Machine health monitoring and Predictive maintenance solution leveraging Embedded system, Industrial IoT and Machine Learning Technologies by finding Remaining useful life time of various Machines used in production process.



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.

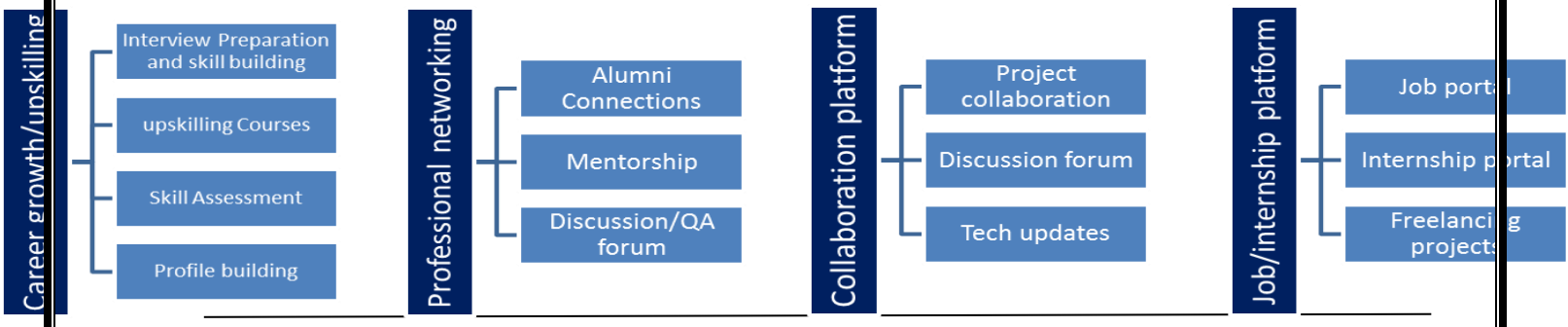
USC is a career development platform that delivers **personalized executive coaching** in a more affordable, scalable and measurable way.



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] Youtube Video

[2] Github

[3] Aws documentation

2.6 Glossary

3 Problem Statement

In the assigned problem statement

A cloud-based solution for managing patient data, medical records, and imaging that can help healthcare organizations to store, access, and share critical information securely and efficiently. This project can be built using platforms AWS .

4 Existing and Proposed solution

Base on my research I show that most of people do for particular one dieses using dataset and perform analysis etc.

4.1 Code submission (Github link):

https://github.com/KUSHPATEL0024/upskillcampus

4.2 **Report submission (Github link) :** first make placeholder, copy the link.

https://github.com/KUSHPATEL0024/upskillcampus/blob/main/test.text

https://github.com/KUSHPATEL0024/upskillcampus/blob/main/HealthCareDataManagement_Kush_USC_UCT. pdf

5 Proposed Design/ Model

Web Application

|

API Gateway

|

Lambda Function

|

S3

(Patient Data, Medical Records)

|

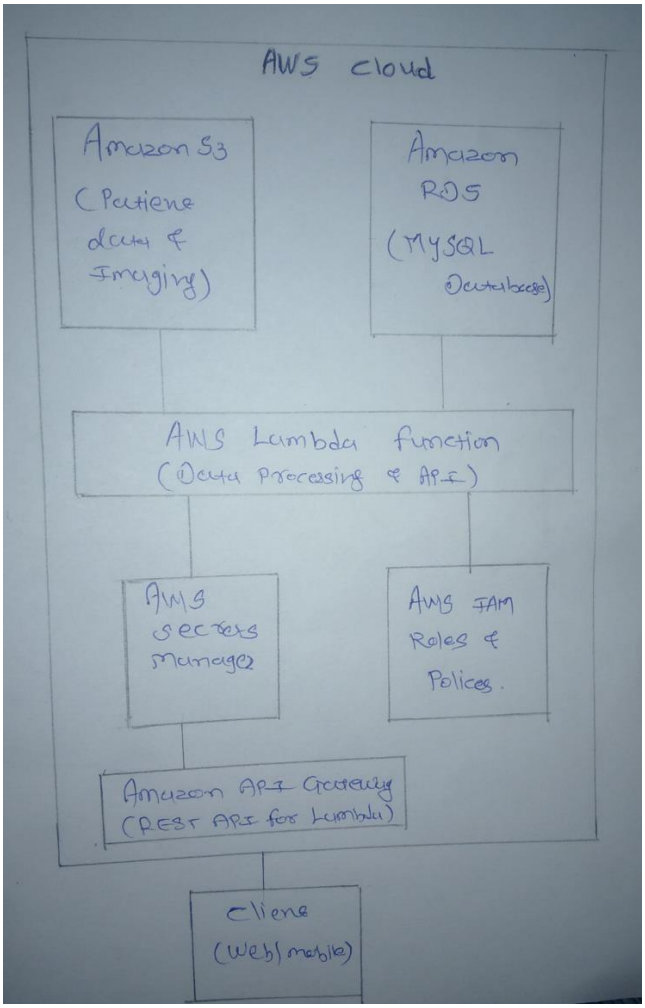
RDS

(MySQL Database)

5.1 High Level Diagram (if applicable)

Figure 1: HIGH LEVEL DIAGRAM OF THE SYSTEM

5.2 Low Level Diagram (if applicable)



5.3 Interfaces (if applicable)

Update with Block Diagrams, Data flow, protocols, FLOW Charts, State Machines, Memory Buffer Management.

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

6.1.1.1 Test Environment:

- Web browser for accessing the web application
- tool for sending API requests
- AWS Management Console for monitoring AWS services

6.1.1.2 Test Cases:

1. **Storing Patient Data**:
2. **Retrieving Patient Data**:
3. **Security and Access Control**:
4. **Data Integrity**:
5. **Performance**:
6. **Error Handling**:

6.2 Test Procedure

7. **Storing Patient Data**:
    - **Test Case 1**: Verify that the store_patient Lambda function stores patient data in the RDS database.
    - **Test Steps**:
        1. Send a POST request to the /store_patient endpoint with valid patient data.
        2. Verify that the patient data is inserted into the RDS database.
8. **Retrieving Patient Data**:
    - **Test Case 2**: Verify that the get_patient Lambda function retrieves patient data from the RDS database.
    - **Test Steps**:
        1. Send a GET request to the /get_patient/{patient_id} endpoint with a valid patient_id.
        2. Verify that the patient data is retrieved correctly.
9. **Security and Access Control**:
    - **Test Case 3**: Verify that unauthorized users cannot access patient data.
    - **Test Steps**:
        1. Attempt to access patient data without proper authentication.
        2. Verify that access is denied.
10. **Data Integrity**:
    - **Test Case 4**: Verify that patient data is stored securely in S3.
    - **Test Steps**:
        1. Upload a file containing patient data to S3.
        2. Verify that the file is stored securely and can be accessed only with proper authorization.
11. **Performance**:
    - **Test Case 5**: Verify that the system can handle a large number of concurrent requests.
    - **Test Steps**:
        1. Simulate a large number of concurrent requests to store and retrieve patient data.
        2. Verify that the system remains responsive and does not experience any performance degradation.
12. **Error Handling**:
    - **Test Case 6**: Verify that the system handles errors gracefully.
    - **Test Steps**:
        1. Send a request with invalid data or parameters.
        2. Verify that the system returns an appropriate error message.

6.3 Performance Outcome

To evaluate the performance of the healthcare data management system, I tried multiple testing but I found error every time. I give too much time to resolve it but unfortunately I could not solve the error. Error like connection problem , secret id problem etc. I solve problem another generated.

7 My learnings

You should provide summary of your overall learning and how it would help you in your career growth.

8 Future work scope

You can put some ideas that you could not work due to time limitation but can be taken in future.