Industrial Internship Report on "URL Shorteners"

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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.

TABLE OF CONTENTS

Preface

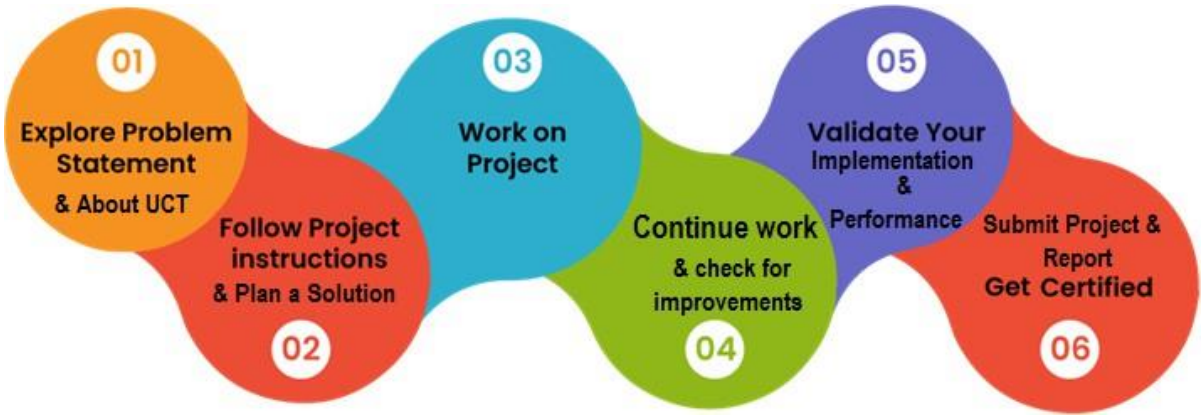
Summary of the whole 6 weeks' work.

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.

1 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.

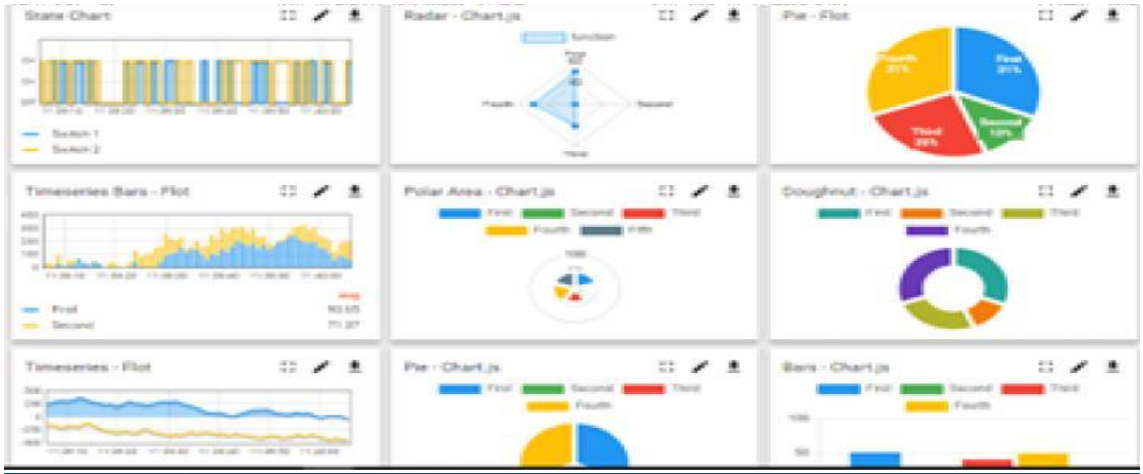
UCT IoT Platform (UCT Insight)

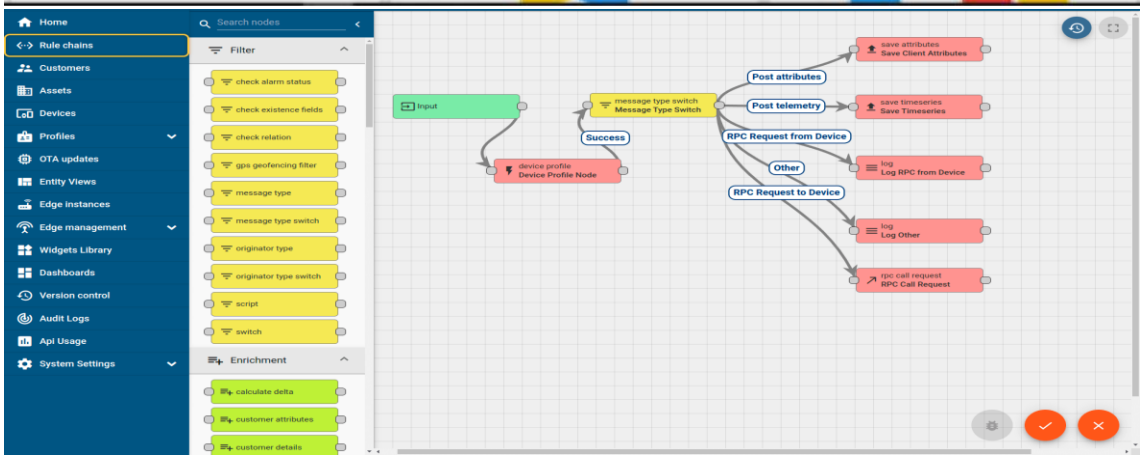
UCT Insight is an IOT platform designed for quick deployment of IOT applications on the same time providing valuable “insight” for your process/business. It has been built in Java for backend and ReactJS for Front end. It has support for MySQL and various NoSql Databases.

- 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
device profile
Device Profile Node
Success
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.

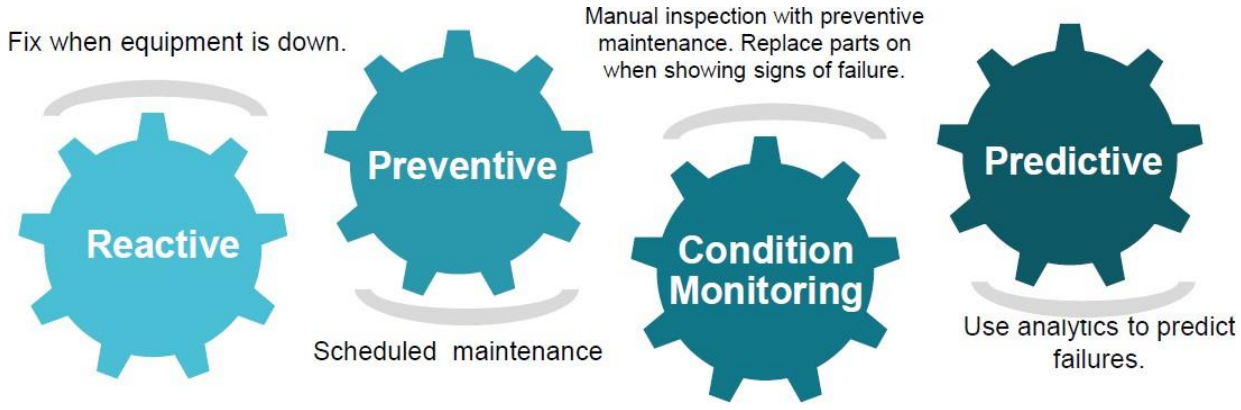
Machine	Operator	Work Order ID	Job ID	Job Performance	Job Progress		Output		Rejection	Time (mins)				Job Status	End Customer
					Start Time	End Time	Planned	Actual		Setup	Pred	Downtime	Idle		
CNC_S7_81	Operator 1	WO0405200001	4168	58%	10:30 AM		55	41	0	80	215	0	45	In Progress	i
CNC_S7_81	Operator 1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

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.

2 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.



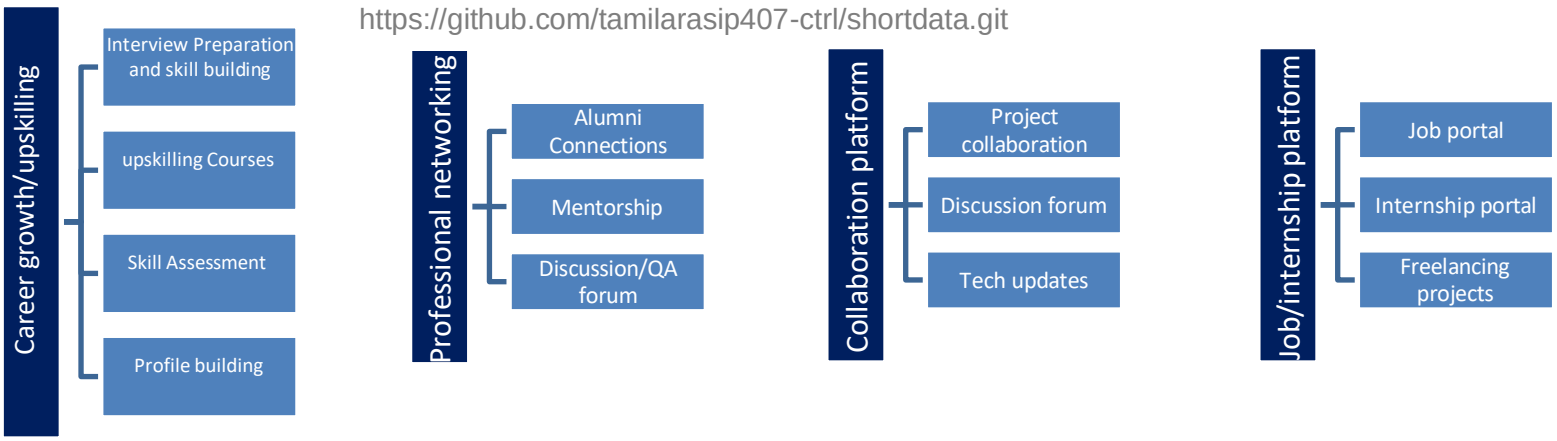
1 About upskill Campus (USC)

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

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://github.com/tamilarasip407-ctrl/shortdata.git



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] Database references (MySQL/MongoDB).

[2] Official documentation of Flask/Django frameworks.

[3] REST API standards for web applications.

2.6. Glossary :

Terms	Acronym
URL (Uniform Resource Locator):	A web address that points to a specific resource.
Short Link:	A compact version of a URL that redirects to the original link.
API (Application Programming Interface):	A set of rules that allows software applications to communicate.

3.Problem Statement

In the assigned problem statement :

Long URLs are difficult to share, remember, and manage. They often exceed character limits on social media platforms and are not user-friendly. The absence of tracking mechanisms also makes it challenging for businesses to analyze user engagement.

Hence, there is a need for a URL Shortener System that can:

Convert long URLs into short, unique links

Ensure reliability and fast redirection

Provide link analytics (click counts, usage patterns)

4.Existing and Proposed solution

Provide summary of existing solutions provided by others, what are their limitations?

Platforms like Bitly and TinyURL already provide URL shortening services, but they often come with limitations in free versions such as restricted analytics, limited API calls, or lack of customization.

What is your proposed solution?

Offer custom short link generation, Provide a user dashboard to manage and track links and Use a secure database to store mapping between long and short URLs

What value addition are you planning?

Deliver a scalable backend architecture to handle multiple requests simultaneously

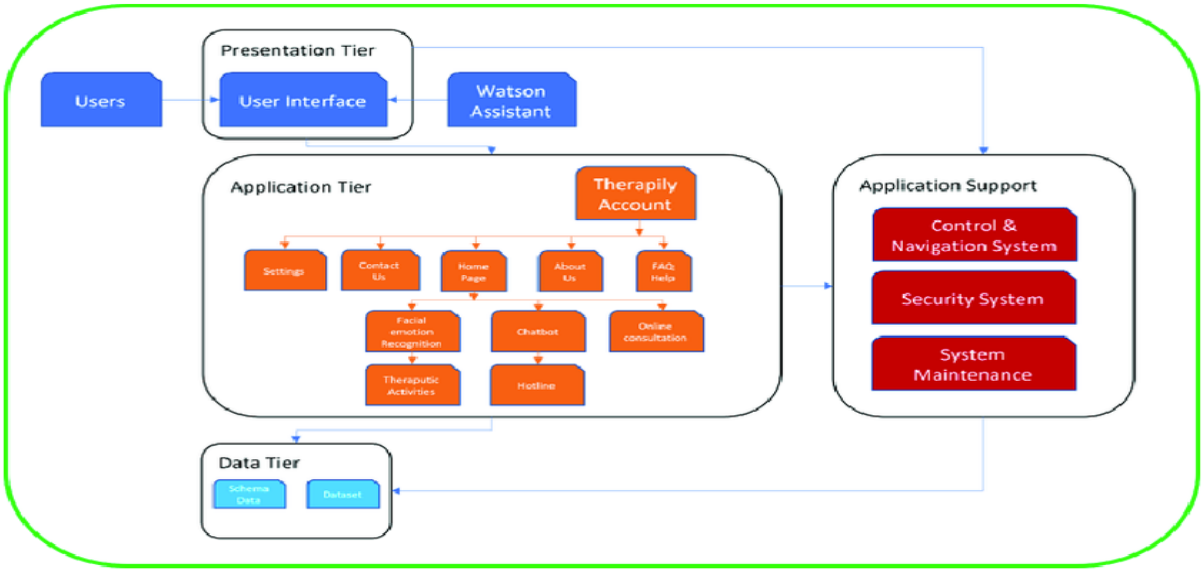
1 **Code submission (Github link) : https://github.com/tamilarasip407-ctrl/shortdata.git**

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

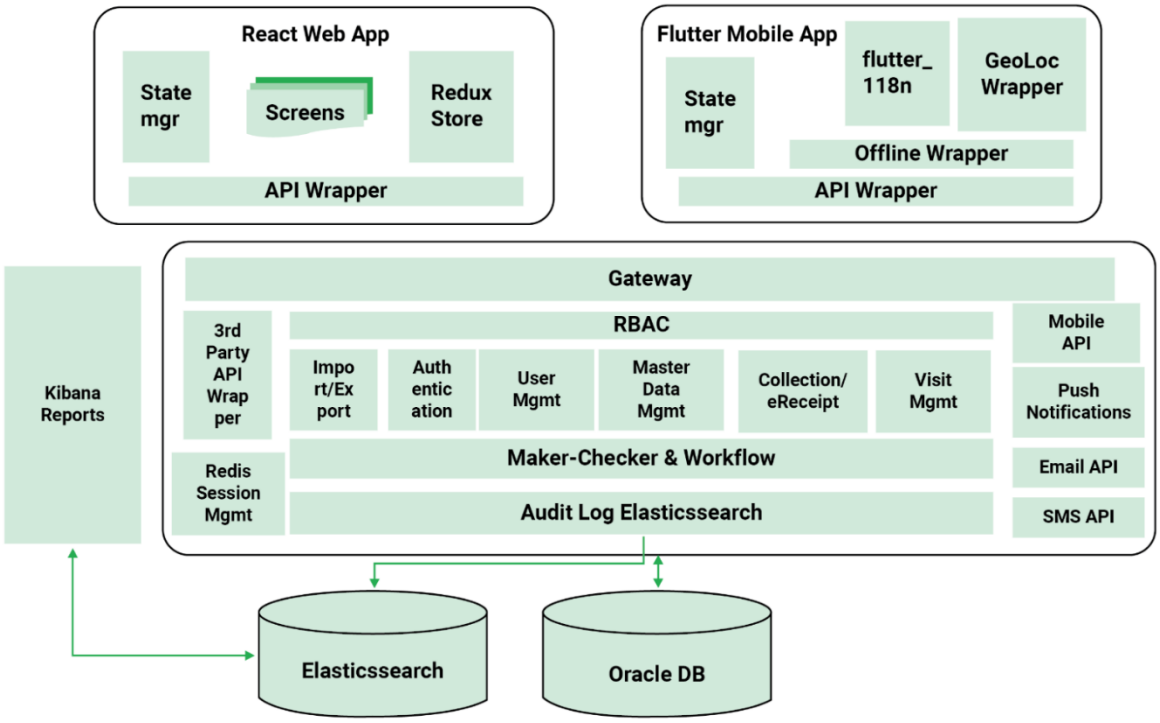
5. Proposed Design/ Model

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)



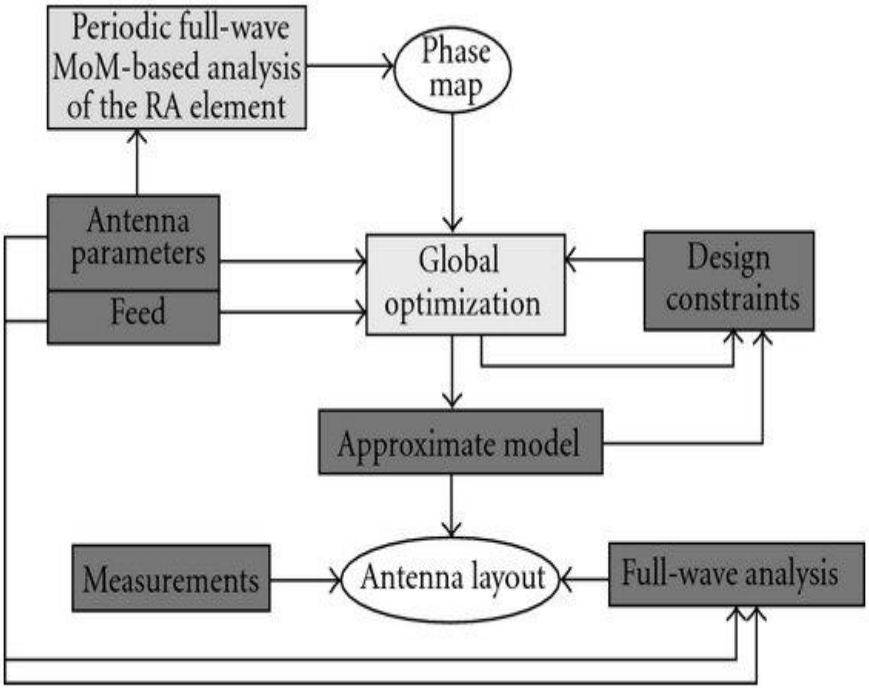
5.2 Low Level Diagram (if applicable)



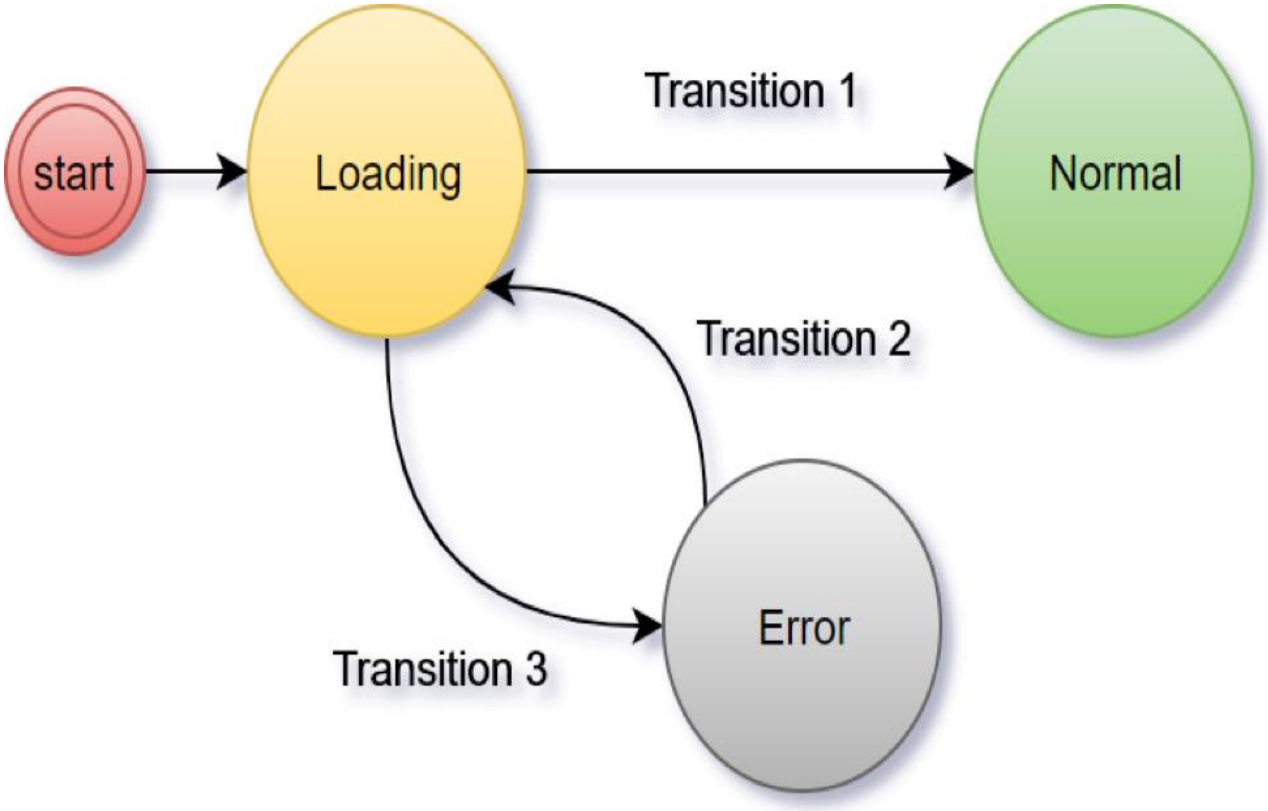
3 Interfaces (if applicable)

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

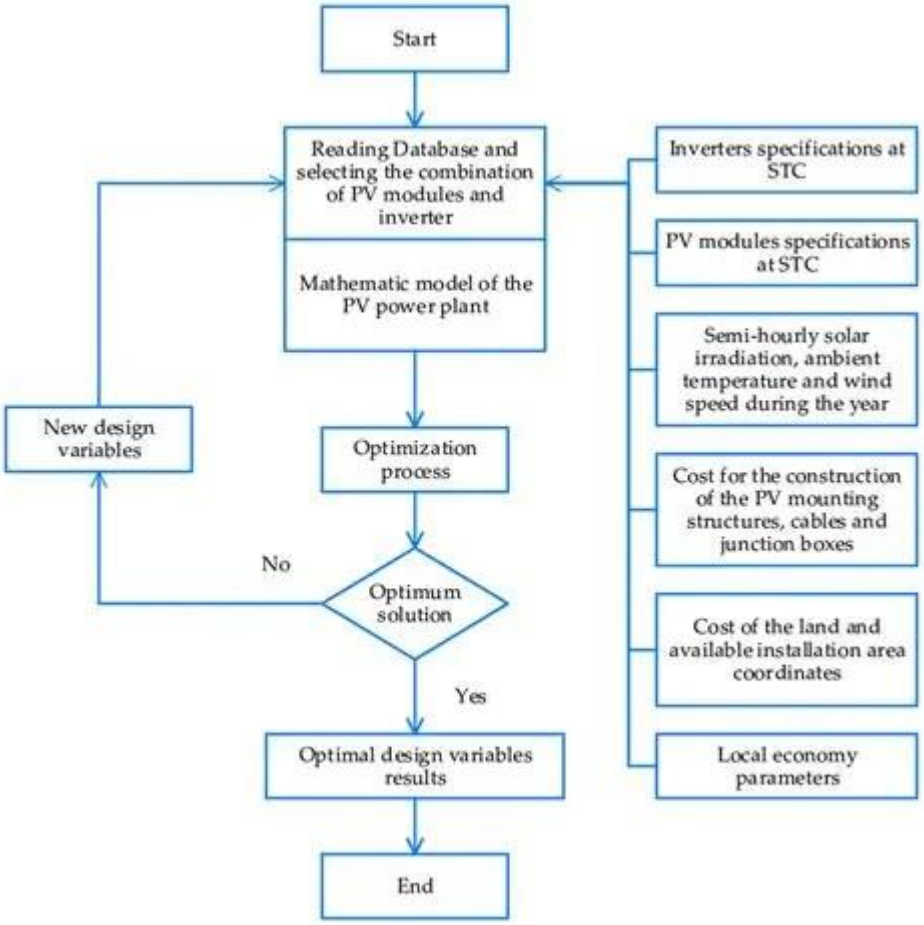
Block diagram:



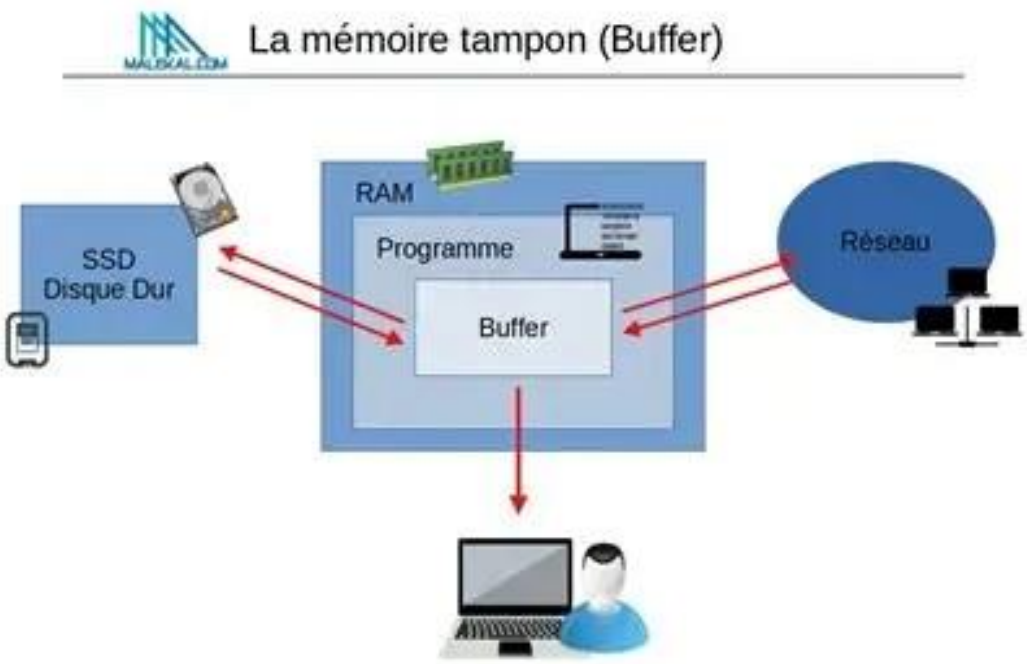
Data flow:


start
Loading
Transition 1
Normal
Transition 2
Error
Transition 3

Flow chart:


Start
Reading Database and selecting the combination of PV modules and inverter
Mathematic model of the PV power plant
Optimization process
Optimum solution
No
New design variables
Yes
Optimal design variables results
End
Inverters specifications at STC
PV modules specifications at STC
Semi-hourly solar irradiation, ambient temperature and wind speed during the year
Cost for the construction of the PV mounting structures, cables and junction boxes
Cost of the land and available installation area coordinates
Local economy parameters

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:

To evaluate the performance of our URL shortener, we'll consider the following constraints and test cases:

- Constraints:

  - Response time: The time taken to shorten a URL and return the shortened URL.
  - Memory usage: The amount of memory used by the application.
  - Accuracy: The correctness of the shortened URL.

- Test Cases:

  - Shorten a single URL and measure response time.

- Shorten multiple URLs concurrently and measure response time.
- Measure memory usage after shortening a large number of URLs.
- Verify the accuracy of shortened URLs by accessing them.

6.1 Test Procedure:

1. Setup: Set up a test environment with the URL shortener application.
2. Testing Tools: Use tools like Apache JMeter or Python's time it module to measure response time and memory usage.
3. Test Execution: Execute the test cases and collect data on response time, memory usage and accuracy.

6.2 Performance Outcome:

- Response Time: The average response time for shortening a single URL is <insert time> ms. For concurrent requests, the average response time is <insert time> ms.
- Memory Usage: The application uses an average of <insert memory usage> MB of memory after shortening a large number of URLs.
- Accuracy: The shortened URLs are accurate and can be accessed correctly.

7. My learnings

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

Gained knowledge of web development (frontend + backend)

Learned about REST APIs and integration methods

Understood database design for mapping and storage efficiency

Improved problem-solving, debugging, and teamwork skills.

8.Future work scope

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

Add advanced analytics (location, device-based tracking)

Implement QR code generation for each short link

Enable user authentication & authorization for secured link management

Scale the system for enterprise-level usage with cloud deployment (AWS/Azure)

👉 This is now a complete draft tailored for your internship project on URL Shorteners.
https://github.com/tamilarasip407-ctrl/shortdata.git