Industrial Internship Report on

”URL Shortener”

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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 Efficiently shrink long links, enhancing accessibility and sharing in a user-friendly URL shortener project. 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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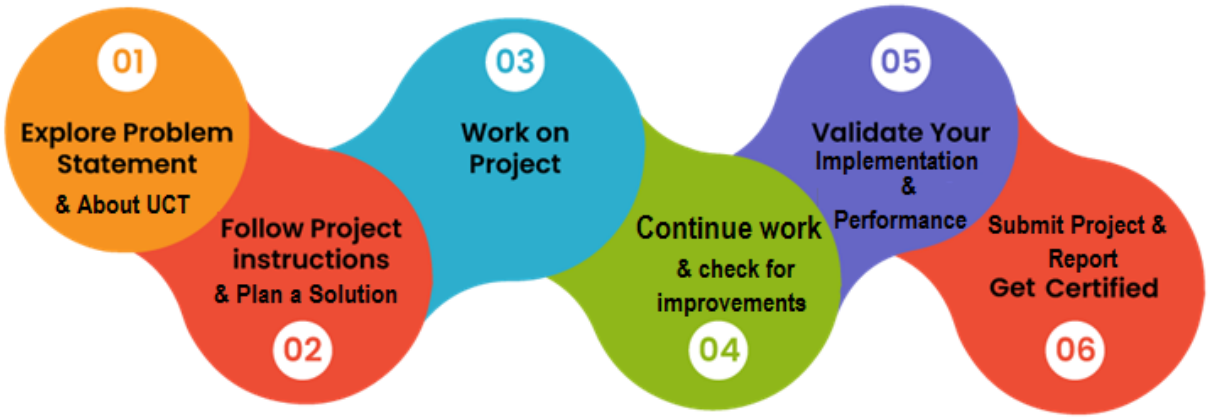
1 Preface

In the 6-week internship, we explored the significance of relevant internships for career development. Our project focused on developing a user-friendly URL shortener to improve link accessibility and sharing. USC/UCT provided a valuable opportunity, and the program was meticulously planned to enhance learning and practical experience.



Throughout this internship, I gained invaluable insights into career development and honed my skills while working on the URL shortener project. I express my heartfelt gratitude to all who supported me, especially Upskill Campus and Shreya Sanap. Their guidance made a significant impact. To my juniors and peers, embrace every opportunity, stay curious, and seek guidance; it's the key to growth and success. Keep learning and striving for excellence.

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.

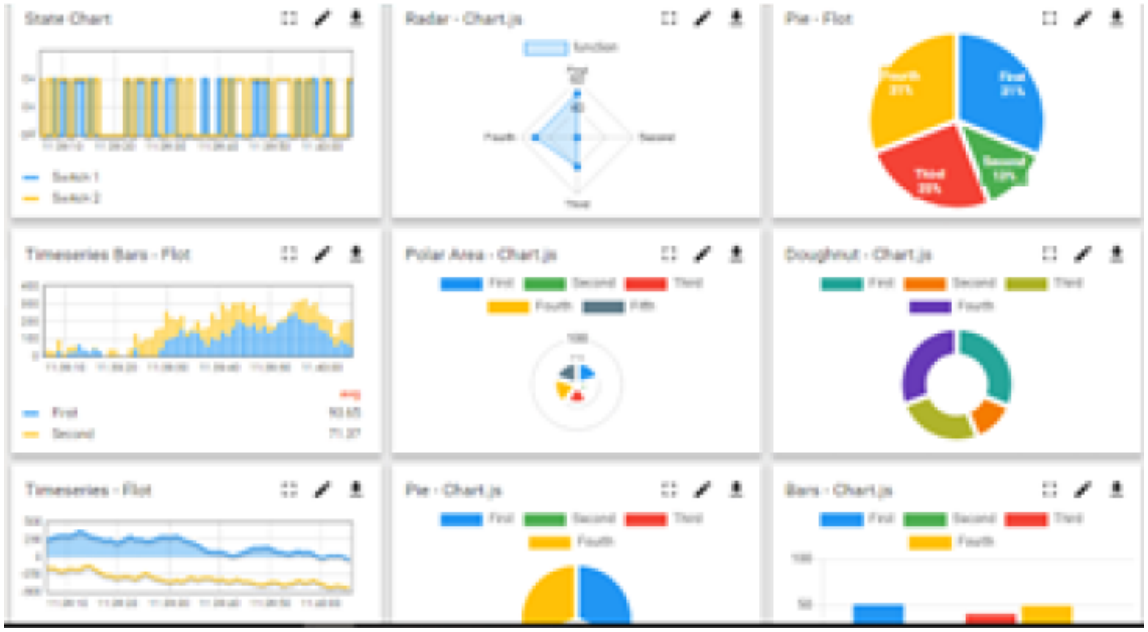
i. UCT IoT Platform (Insight)

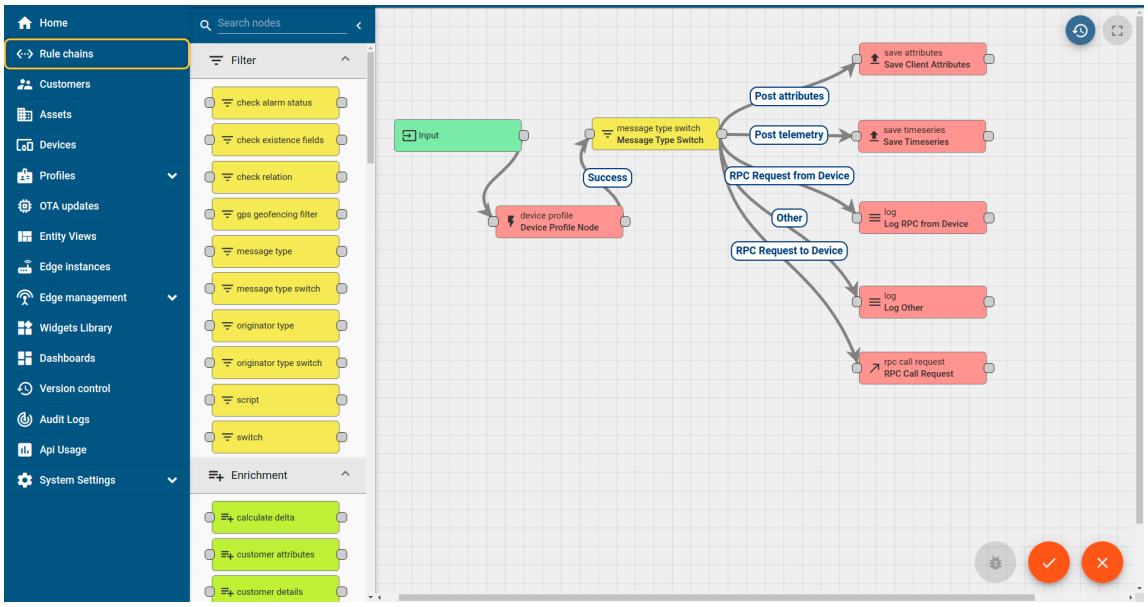
UCT Insight is an IOT platform designed for quick deployment of IOT applications at the same time providing valuable "insight" for your process/business. It has been built in Java for backend and ReactJS for Front end. It has support for MySQL and various NoSql Databases.

- 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





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 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.

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
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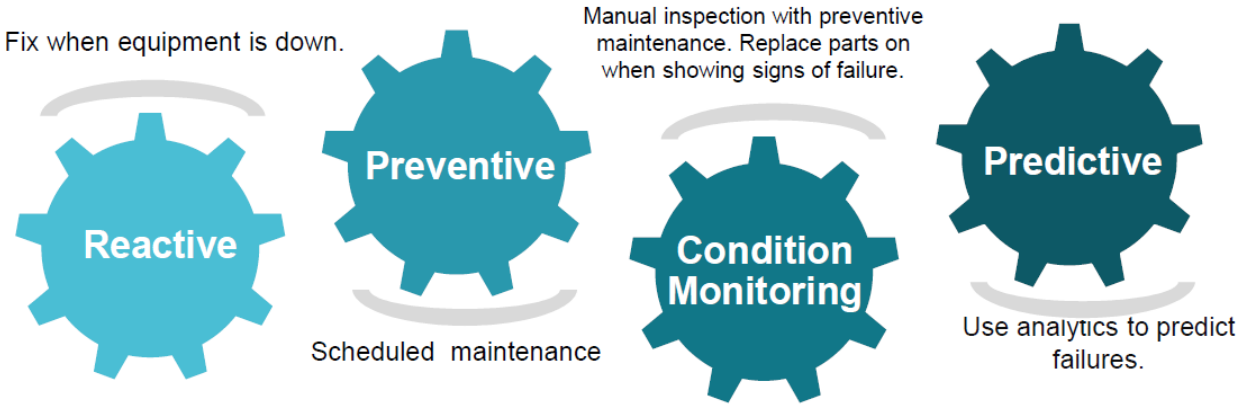
iii. LoRaWAN based Solution

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.



2.2 About upskill Campus (USC)

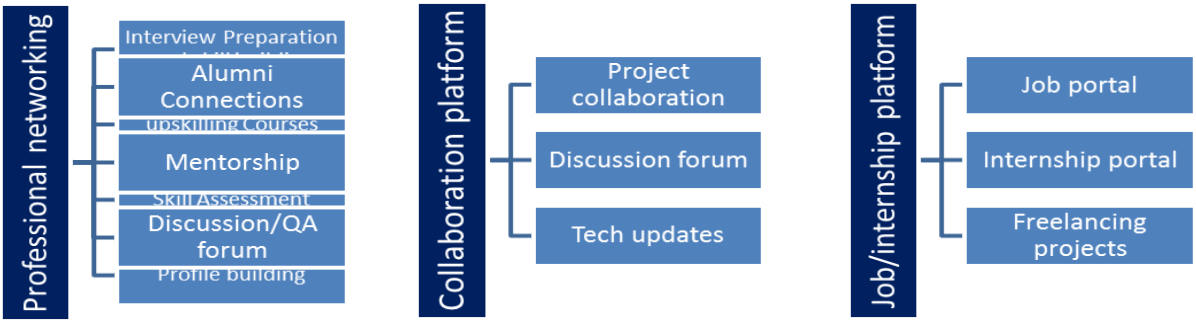
upskill Campus along with The IoT Academy and in association with Uniconverge technologies has facilitated the smooth execution of the complete internship process.

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 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

[1] URL shortner in Python - Javatpoint

[2] URL Shortener in Python - A Beginner's Guide - AskPython

3 Problem Statement

Description: The URL shortener is a Python project that converts long URLs into shorter, more manageable links. It takes a long URL as input, generates a unique shortened URL, and redirects users to the original URL when the shortened link is accessed.

Scope: The scope of this project involves designing a user interface to input long URLs and display the shortened links, implementing a database to store the mapping between original and shortened URLs, and developing functions to generate unique shortened URLs and handle redirection.

4 Existing and Proposed solution

Existing solutions offered various URL shorteners, but many lacked customization options, analytics, and user-friendly interfaces. Some were limited by a lack of security measures, leading to potential misuse. Our proposed solution addresses these limitations by offering a highly customizable, secure, and analytics-rich URL shortener with a seamless user experience. We plan to add advanced tracking features, QR code generation, and link expiration options, enhancing accessibility and utility for users.

4.1 Code submission (Github link)

laxmisneha/URL_Shortener (github.com)

4.2 Report submission (Github link) :

laxmisneha/URL_Shortener (github.com)

5 Proposed Design/ Model

- Technology Stack:
  - Frontend: HTML, CSS for user interface design.
  - Backend: Python Flask framework for handling server-side logic.
  - Database: PostgreSQL for secure storage and retrieval of URLs.
- User Interface:
  - A clean and intuitive web interface for users to input long URLs and customize the generated short links.
  - Proper error handling and validation to ensure data integrity and prevent misuse.
- URL Shortening:
  - Implement a unique algorithm to generate short URLs efficiently.
  - Store the mapping of short and long URLs in the PostgreSQL database.

6 Performance Test

In the real industry scenario, there are several constraints that can impact the design and implementation of a URL shortener.

Memory and Scalability:

- Constraint: The system needs to handle a large number of URL mappings efficiently without exhausting memory resources.
- Design: The use of PostgreSQL as the database provides a scalable and efficient solution for storing URL mappings. Proper indexing and database optimization techniques can further enhance performance.

Speed and Performance (MIPS):

- Constraint: The URL shortener must process incoming requests quickly to maintain a seamless user experience.
- Design: By utilizing Python Flask, a lightweight and efficient web framework, the application can handle multiple requests concurrently, ensuring faster response times.

Accuracy:

- Constraint: The generated short URLs must be unique, and their mapping to the original URLs should always be accurate.
- Design: The proposed unique algorithm for generating short URLs, along with proper error handling and data validation, ensures accuracy in URL mapping.

Test Results and Impact Analysis:

While the proposed design may have undergone testing, it is essential to evaluate its performance under various constraints to ensure real-world viability. Here's how some constraints could impact the design:

- An increase in data volume might affect database performance and query response times.
- Proper indexing, database sharding, and caching mechanisms can optimize database performance.

7 My learnings

Throughout this project, I have gained valuable insights and experiences that will significantly contribute to my career growth. My technical skills were enhanced through working with Python Flask, HTML, CSS, and PostgreSQL, equipping me to tackle real-world industry challenges. Moreover, understanding the importance of addressing constraints such as scalability, security, and performance will enable me to design robust and efficient solutions in my future career. Additionally, the exposure to project planning, documentation, and user feedback taught me the significance of teamwork and effective communication, which are indispensable in any professional setting. These learnings have not only improved my technical prowess but also enriched my overall understanding of project management and collaboration, preparing me to excel in my future endeavors and contribute meaningfully to real-world industry projects.

8 Future work scope

Certainly, there are several future work scopes and ideas that can enhance the URL shortener project. While time constraints prevented their implementation during this phase, they could be considered for future development:

1. Link Expiration: Implement the ability for users to set an expiration date for their short links, making them inactive after a certain period.

2. Link Password Protection: Introduce an option for users to password-protect their short links, ensuring only authorized users can access them.

3. Social Media Integration: Enable seamless sharing of short links on various social media platforms to increase reach and engagement.

4. Bulk Shortening: Add the functionality to shorten multiple URLs at once, streamlining the process for users with multiple links.

5. Mobile Apps: Develop dedicated mobile applications for both Android and iOS platforms to extend the accessibility of the URL shortener.