Industrial Internship Report on

”URL Shortener”

Prepared by

[Joseph Tandra]

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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Summary of the whole 6 weeks' work.

About need of relevant Internship in career development.

Brief about Your project/problem statement.

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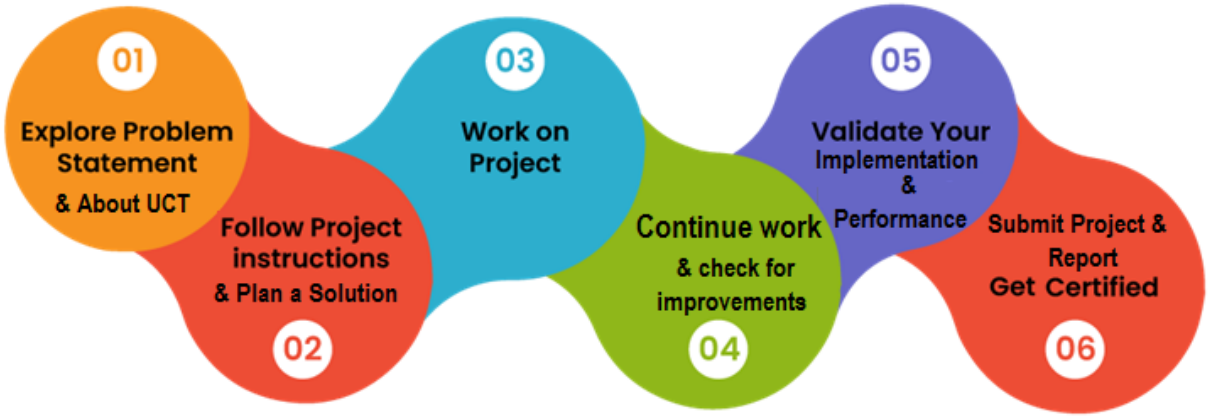


Your Learnings and overall experience.

Thank to all (with names), who have helped you directly or indirectly.

Your message to your juniors and peers.

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.

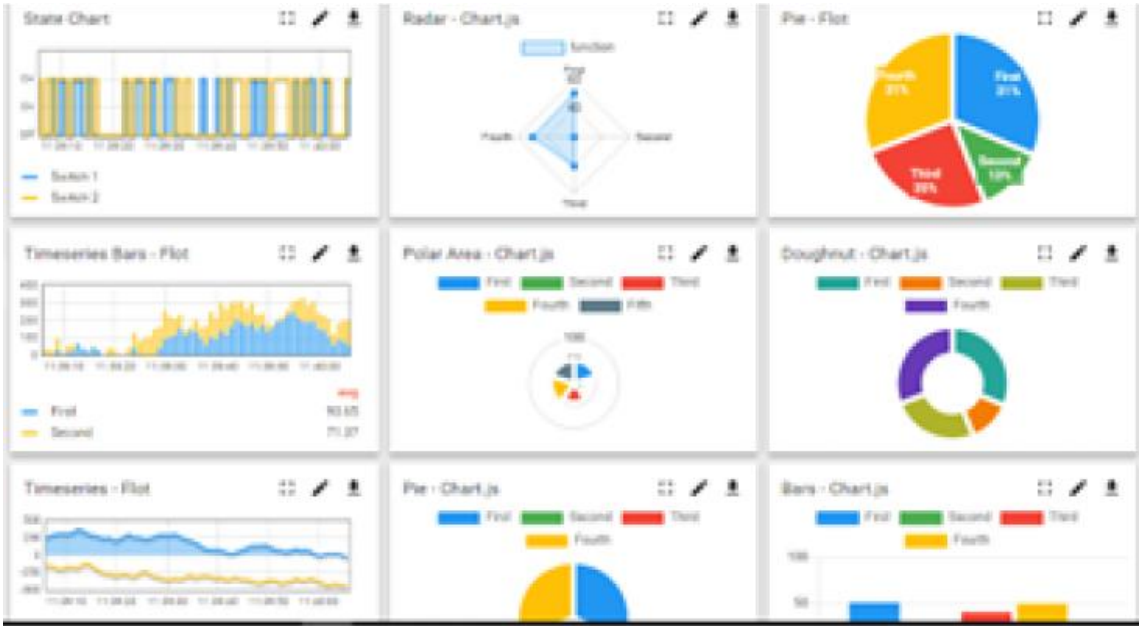
i. UCT IoT Platform (UCT Insight)

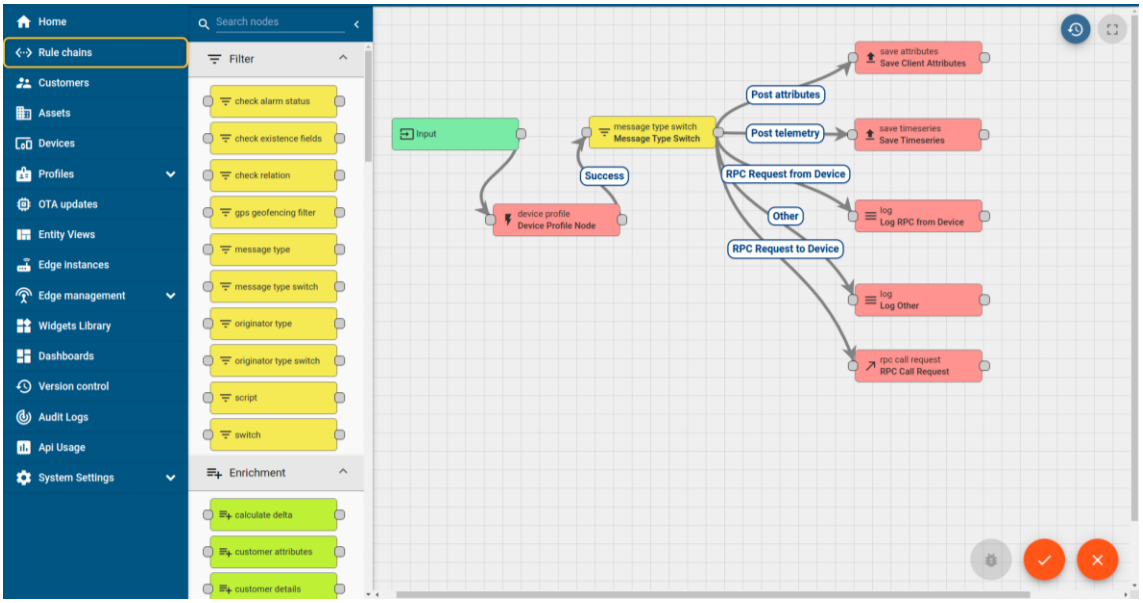
UCT Insight is an IOT platform designed for quick deployment of IOT applications on the same time providing valuable "insight" for your process/business. It has been built in Java for backend and ReactJS for Front end. It has support for MySQL and various NoSql Databases.

- 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





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
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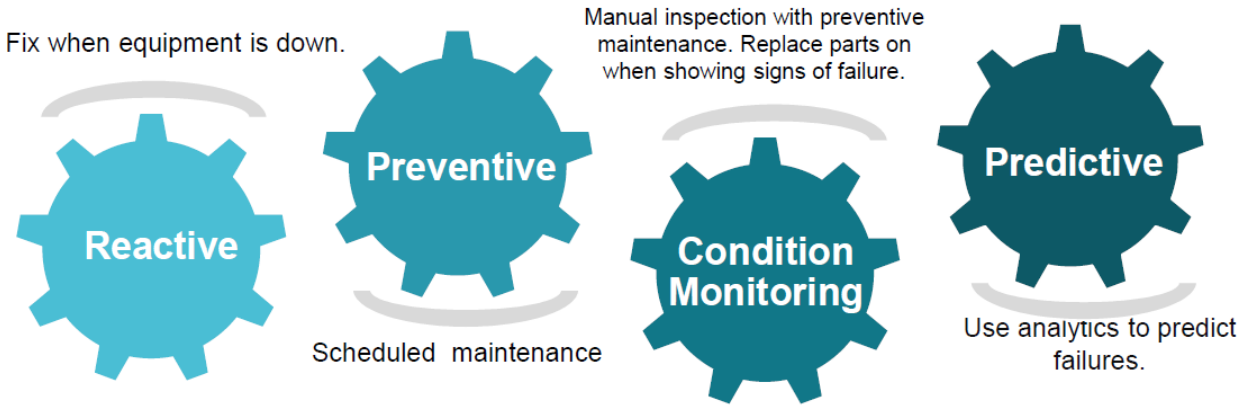
iii. LoRaWAN based Solution

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

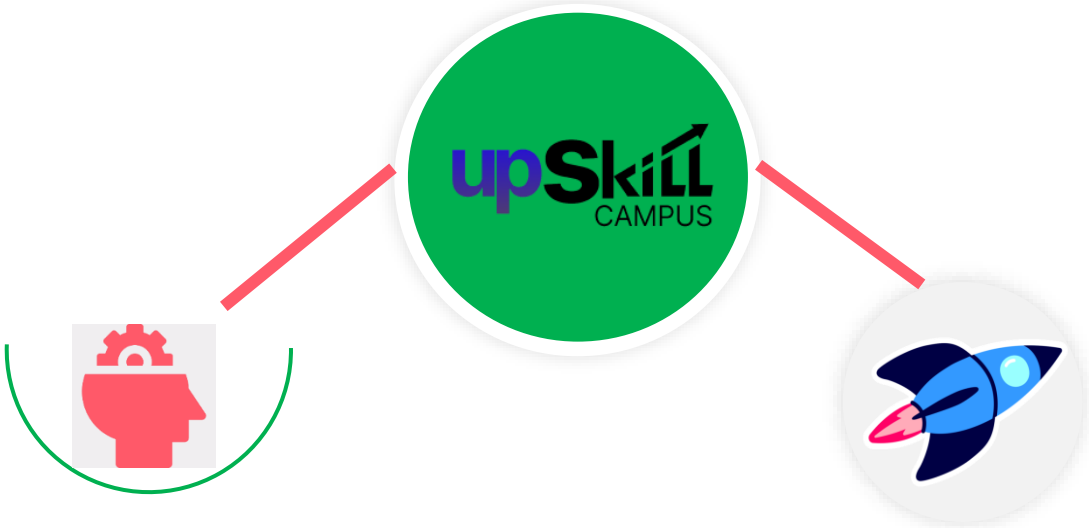
UCT is providing Industrial Machine health monitoring and Predictive maintenance solution leveraging Embedded system, Industrial IoT and Machine Learning Technologies by finding Remaining useful life time of various Machines used in production process.



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.

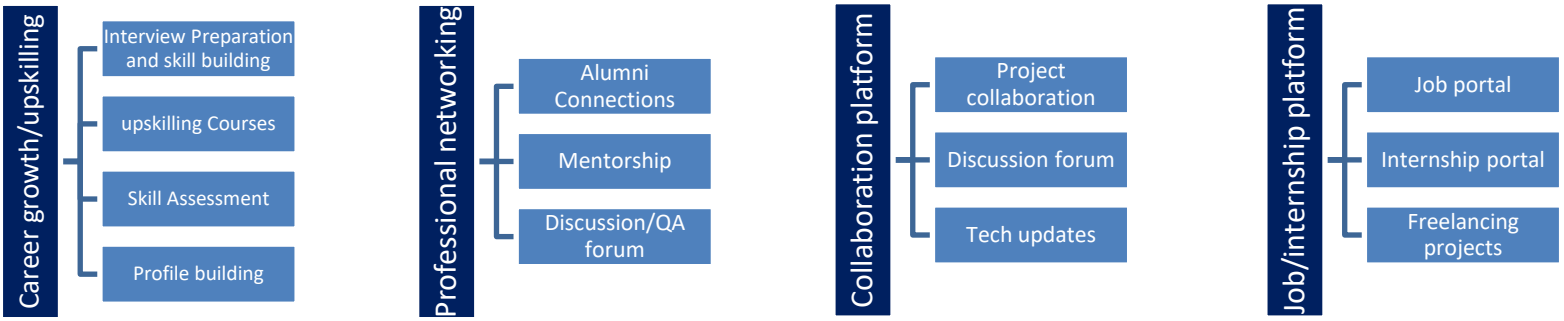
USC is a career development platform that delivers **personalized executive coaching** in a more affordable, scalable and measurable way.



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 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

[2] GeeksforGeeks

[3] StackOverflow

3 Problem Statement

In the digital age, the vast amount of information available on the internet has led to an exponential increase in the length of URLs (Uniform Resource Locators) used to access web resources. Long URLs can be cumbersome to share, difficult to remember, and may even lead to errors in

transcription. To address this issue, URL shortener services have gained popularity by providing a means to create shorter, more manageable aliases for long URLs.

4 Existing and Proposed solution

URL Shortener, while offering convenience, and faced several problems and challengs:

1. **Link Obfuscation:** Shortened URLs hide the actual destination, making it difficult to discern the legitimacy or safety of the link. This can lead to users clicking on malicious or phishing links unknowingly.

2. **Security Risks:** Shortened URLs can be exploited for distributing malware, conducting phishing attacks, or other cybercrimes. Users might unknowingly expose their devices and personal information to risks.

3. **Link Rot**: URL shortening services may shut down, change policies, or experience technical issues, leading to inaccessible or broken links. This can cause frustration for users who encounter dead links.

4. **Limited SEO Value:** Shortened URLs generally do not contribute to SEO efforts, as search engines may not recognize them as relevant content. This can affect the visibility of the linked content in search results.

5. **Geographic Restrictions**: Some countries or regions might have restrictions on accessing certain URL shortening services, limiting the reach of shared links.

6. **Lack of Long-Term Support**: Free URL shortening services might lack long-term support, leading to uncertainty about the longevity of the service and the availability of shortened links.

7. **Brand Identity and Trust**: Shortened URLs may not carry the same level of trust as recognizable domain names, potentially impacting users' willingness to click on them.

LIMITATIONS:

- **Link Longevity and Persistence:** Developers often face the challenge of ensuring that the shortened links remain accessible and functional over time. Changes in infrastructure, database maintenance, or service discontinuation can lead to broken links.

- **Scalability:** As the user base grows, developers need to ensure that the URL shortener service can handle increasing traffic and remain responsive. Scalability challenges may arise in terms of database management, server load, and network bandwidth.

- **Security Concerns:** URL shorteners can be susceptible to abuse, such as spreading malicious links or phishing attacks. Developers must implement robust security measures to prevent abuse, including rate limiting, CAPTCHA integration, and link scanning.

- **Redirection Performance:** The efficiency of redirecting users from the shortened URL to the original destination is crucial for a seamless user experience. Optimizing server response times and minimizing latency can be challenging, especially during peak traffic periods.

- **User Experience and Interface Design:** Designing an intuitive and user-friendly interface is important to attract and retain users. Developers need to balance simplicity with functionality, allowing users to create, manage, and track shortened URLs easily.

What is your proposed solution?

TinyURL is a URL shortening web service, which provides short aliases for redirection of long URLs. The TinyURL homepage includes a form which is used to submit a long URL for shortening. For each URL entered, the server adds a new alias in its hashed database and returns a short URL. Short URL aliases are seen as useful because they are easier to write down, remember or distribute.

What value addition are you planning?

4.1 Code submission (Github link).

https://github.com/jacyturn/URL-Shortener/blob/main/main.py

4.2 Report submission (Github link) :

https://github.com/Josepht2126/Internship-python-report.git

5 Proposed Design/ Model

Longer URLs are truncated by search engines, in web browsers, and many other areas. Users like to see clean, human-readable URLs since it makes them easy to read, remember, and type. URL shortening service that provides a way to convert long URLs into shorter, more manageable links.

The proposed project will provide seamless to the user, and they are automatically taken to the intended webpage. TinyURL performs an HTTP redirect (e.g., 301 Moved Permanently) to the original long URL's destination. Shorten URL offers basic link tracking features that allow users to see the number of clicks on their shortened links.

6 Performance Test

Performance tests on a URL shortener is crucial to ensure that the service can handle various levels of traffic, provide fast response times, and maintain high availability.

- **Define Test Objectives**: Clearly outline the objectives of your performance testing. Identify the key performance metrics you want to measure, such as response time, throughput, and concurrent user capacity.
- **Create Test Scenarios:** Develop a set of test scenarios that simulate different user behaviors. For example, you might have scenarios for creating short URLs, accessing short URLs, and retrieving analytics data.
- **Choose Testing Tools:** Select appropriate performance testing tools such as JMeter, Gatling, Apache Benchmark, or locust.io. These tools allow you to simulate user interactions and generate load on your service.
- **Analyze Results:** Analyze the performance test results to identify bottlenecks, performance degradation points, and areas for improvement. Look for anomalies, spikes, or trends in the performance data.

6.1 Test Plan/ Test Cases

- **Load Testing:** Test the system's performance under different levels of load (low, medium, high). Measure response times, throughput, and server resource utilization.
- **Concurrent Users:** Test how the system performs when multiple users concurrently create and access short URLs.
- **Response Times:** Measure and verify the response time for shortening a URL and accessing a shortened link.

6.2 Test Procedure

- Open the URL shortener interface.
- Input a long URL and verify that a shortened link is generated.
- Test the custom alias functionality by entering a custom alias and ensuring it's used in the shortened link.
- Click on the shortened link and verify that it redirects to the correct original URL.

6.3 Performance Outcome

- **Response Time:** Having data on how quickly the URL shortener responds to user requests under various loads. This includes the time it takes for the system to generate a shortened link and the time it takes for users to be redirected to the original URL after clicking the shortened link.
- **Concurrency Limits:** Performance testing can help to identify the maximum number of concurrent users the system can support before response times start to degrade significantly.
- **Failures and Error Rates:** Performance testing may reveal how the system behaves when it reaches its limits, such as increased error rates or failures. This information is valuable for understanding the system's robustness.
- **Real-World Scenario Simulation:** The outcome of performance testing can provide a realistic view of how the URL shortener will perform in real-world scenarios, helping you make informed decisions about resource allocation and user experience.

7 My learnings

My learnings from this internship, programming language python uses in various domains such as web developer, data science, artificial intelligence, scientific computing, automation, and more. How to write python’s codes if, if else & if elif else statements. How python can help SEO and use in data science. What are the python libraries e.g. NumPy & Pandas. Learned soft skills and the art of communication or art of speaking. What are the campus placements and how to prepare for it, what are the keypoints for interview and how to get the job and how to be at job and climb a success ladder to the corporate world.

8 Future work scope

The future scope of work for a URL shortener involves continuous improvement, innovation, and adapting to evolving technologies and user needs.

- **Dynamic Short URLs:** Explore the creation of dynamic short URLs that can change their destination based on user context or time.
- **Deeper SEO Integration:** Enhance SEO features by providing tools to optimize short URLs for search engines and preserve link value.
- **Mobile App Integration:** Develop a mobile app that allows users to create and manage short links on the go.

- **Privacy-Centric Features:** Implement privacy-focused features such as user opt-in for analytics tracking and improved data protection.

- **Blockchain Integration**: Explore the use of blockchain technology to enhance security, transparency, and data integrity for shortened links.