Industrial Internship Report on

”Bikespareparts”

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 **BikeSpareParts Project** a robust **e-commerce platform** designed to simplify the purchase of genuine **automotive spare parts**. It ensures **seamless navigation**, **secure transactions**, and a **user-friendly interface** for both buyers and sellers. With its **scalable architecture** and **modern design**, the platform offers a reliable solution for the growing demand in the **automotive industry**. 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

Over the past **six weeks**, I had the opportunity to work on the **BikeSpareParts E-Commerce Project**, a full-stack web application for buying and managing **automotive spare parts**. This internship was highly relevant to my career development as it allowed me to apply theoretical knowledge from my **B.Tech EEIOT program** to a practical, real-world project, enhancing my skills in **MERN stack development**, database management, and UI/UX design.

The project addressed the **problem of unorganized spare parts sales** by creating a **scalable and user-friendly online platform**, offering features such as **product management, secure transactions, and order tracking**. The internship opportunity provided by **UniconvergeTech (UCT)** gave me exposure to professional workflows, collaborative coding practices, and project management techniques.

The program was **planned systematically**, with clear weekly objectives: requirement gathering, frontend and backend development, integration, testing, and final deployment. Throughout this period, I learned **full-stack development best practices, version control with Git, debugging, and deployment strategies**, while also improving my problem-solving and time management skills.

I would like to extend my sincere gratitude to **[Mentor/Guide Name]** and the **UCT team** for their guidance and support, and to my peers who assisted me during this project.

To my juniors and peers, my message is: **embrace opportunities to work on real-world projects, focus on learning by doing, and never hesitate to seek help and collaborate**, as these experiences are invaluable for your career growth.

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.

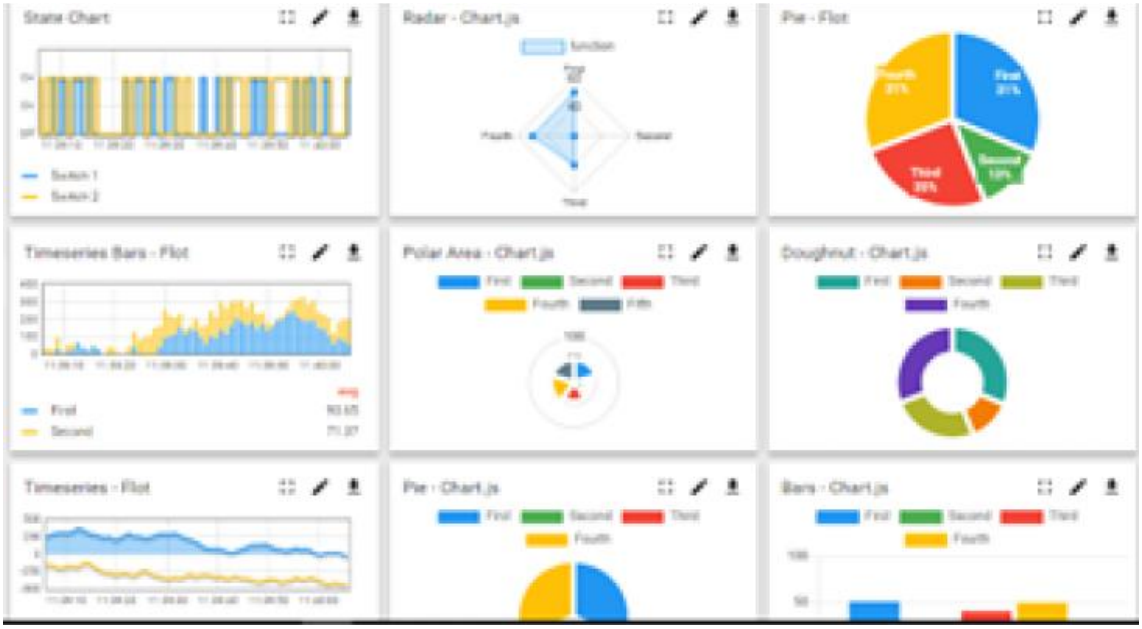
i. UCT IoT Platform (UCT Insight)

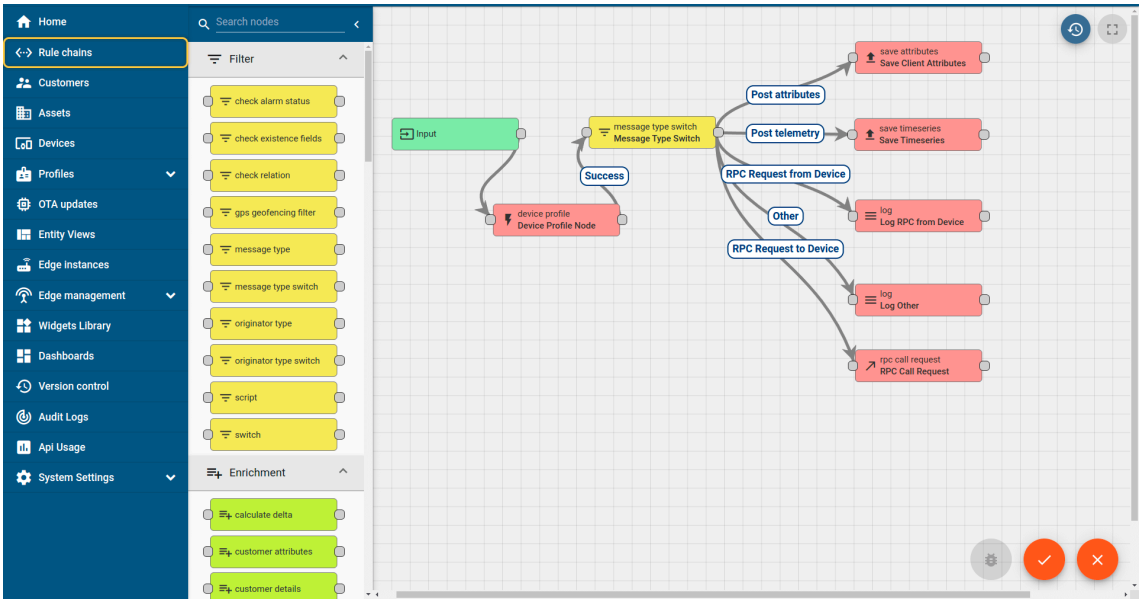
UCT Insight is an IOT platform designed for quick deployment of IOT applications on the same time providing valuable "insight" for your process/business. It has been built in Java for backend and ReactJS for Front end. It has support for MySQL and various NoSql Databases.

- 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.

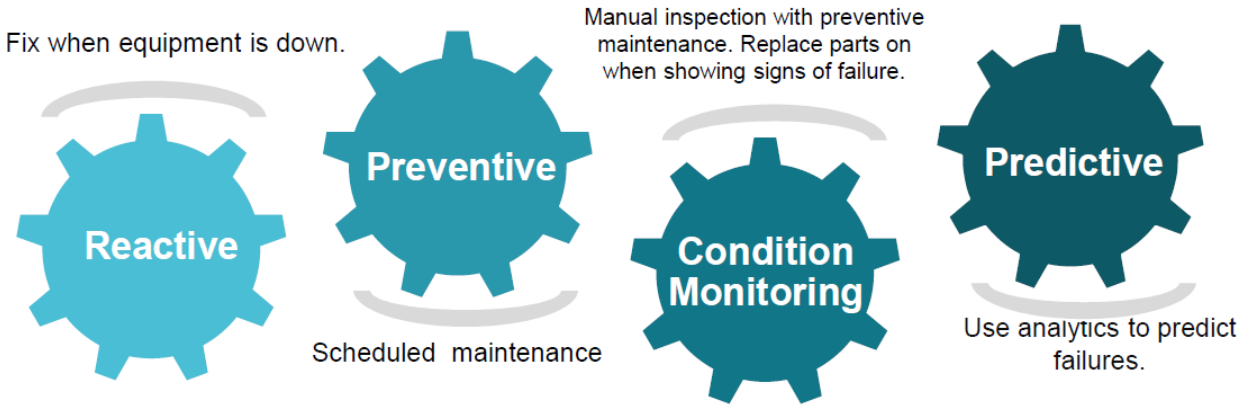
Machine	Operator	Work Order ID	Job ID	Job Performance	Job Progress		Output		Rejection	Time (mins)				Job Status	End Customer
					Start Time	End Time	Planned	Actual		Setup	Pred	Downtime	Idle		
CNC_S7_81	Operator 1	WO0405200001	4168	58%	10:30 AM		55	41	0	80	215	0	45	In Progress	i
CNC_S7_81	Operator 1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

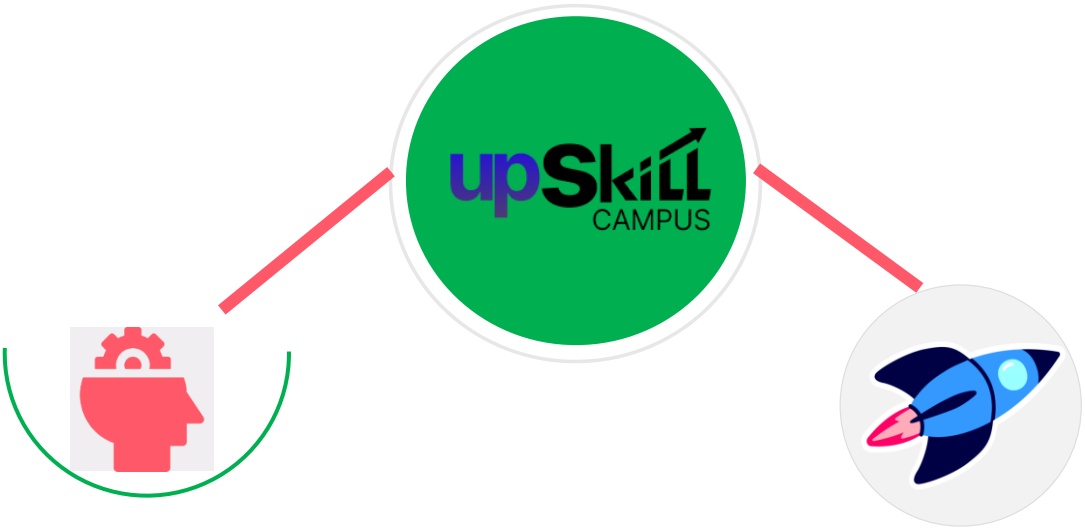
UCT is providing Industrial Machine health monitoring and Predictive maintenance solution leveraging Embedded system, Industrial IoT and Machine Learning Technologies by finding Remaining useful life time of various Machines used in production process.



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.

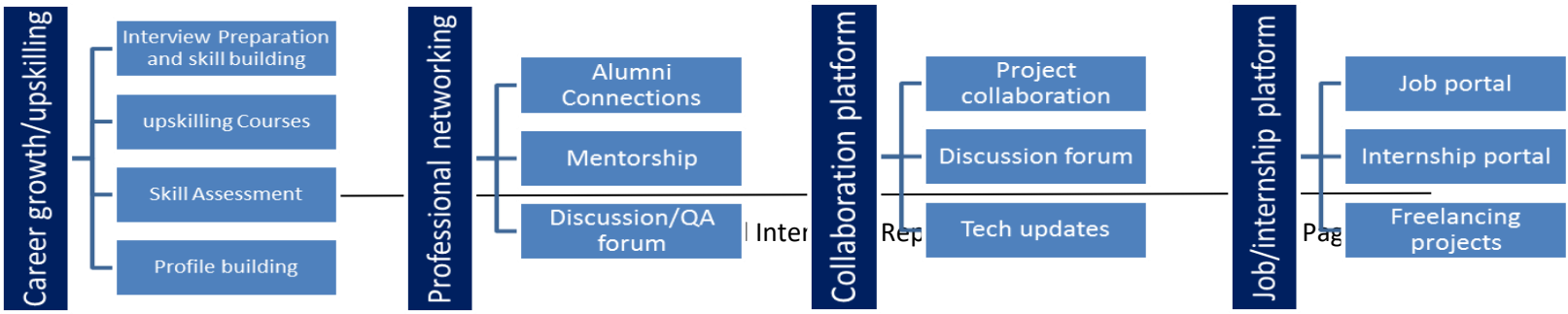
USC is a career development platform that delivers **personalized executive coaching** in a more affordable, scalable and measurable way.



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] https://reactjs.org/docs/getting-started.html

[2] https://nodejs.org/en/docs/

[3] https://docs.mongodb.com/

2.6 Glossary

Terms	Acronym
Term	**Acronym / Meaning**
React	ReactJS – Frontend JavaScript library
Node.js	Node – JavaScript runtime environment
Express	ExpressJS – Web application framework
MongoDB	Mongo – NoSQL database system
Mongoose	ODM – Object Data Modeling library
REST API	Representational State Transfer API
UI/UX	User Interface / User Experience
CRUD	Create, Read, Update, Delete
JWT	JSON Web Token – Authentication standard
HTTP	HyperText Transfer Protocol
CSS	Cascading Style Sheets
HTML	HyperText Markup Language
Git	Version control system
GitHub	Web-based Git repository platform
npm	Node Package Manager

3 Problem Statement

The automotive spare parts market faces several challenges that create inconvenience for customers and retailers alike. This project addresses the need for an **efficient, accessible, and organized e-commerce platform** for spare parts. Key aspects of the problem include:

- **Fragmented Market:** Customers struggle to find the right parts from multiple offline and online sources.
- **Time-Consuming Search:** Locating compatible spare parts for specific vehicles is often tedious.
- **Inventory Management:** Small retailers face challenges in tracking stock and managing orders effectively.
- **Lack of Transparency:** Pricing, availability, and product specifications are often inconsistent.
- **Limited Digital Presence:** Many spare part shops lack a structured online platform to reach potential customers.

Objective: To develop a **full-stack e-commerce application** that provides a **seamless browsing, ordering, and inventory management experience** for both customers and sellers, enhancing efficiency, accessibility, and transparency in the automotive spare parts industry.

4 Existing and Proposed solution

Existing Solutions:

- Various online marketplaces (like Amazon, Flipkart, and local auto-part websites) provide automotive spare parts.
- Most platforms are **generalized**, not specifically focused on automotive spares, leading to **difficulty in finding compatible parts**.
- Limited support for **real-time inventory tracking** and **order management** for small retailers.
- Lack of **user-friendly interfaces** and **detailed product specifications**, which can confuse customers.

Proposed Solution:

- Develop a **dedicated full-stack e-commerce platform** for automotive spare parts.
- Enable **search by vehicle type, brand, and part category**, making it easy for customers to find the right product.
- Implement **real-time inventory management and seller dashboards** for better order tracking.
- Provide **secure payment options, clear product details, and a responsive UI/UX**, enhancing customer satisfaction.

Value Addition:

- Streamlined and **efficient shopping experience** for customers.
- **Empowers small retailers** with an organized digital presence.
- Reduces errors and delays through **automated inventory and order management**.
- Creates a **niche-focused marketplace** that builds trust and reliability in the automotive spare parts industry.

4.1 Code submission : https://github.com/Mahak0204-svg/upskillcampus

4.2 Report submission : https://github.com/Mahak0204-svg/upskillcampus

5 Proposed Design/ Model

The design of the **BikeSpareParts E-commerce Platform** follows a structured flow, ensuring scalability, usability, and efficiency. The solution is divided into multiple stages:

1. **Frontend Design (User Interaction Layer):**
    a. Built using **React.js** to provide a responsive and engaging UI/UX.
    b. Includes features such as **search filters, product catalogs, and cart management**.
    c. Designed to support **mobile-first experience** for wider accessibility.
2. **Backend Development (Business Logic Layer):**
    a. Implemented using **Node.js and Express.js** to handle authentication, product management, and order processing.
    b. Ensures **secure transactions** and smooth communication between users and the database.
3. **Database Model (Storage Layer):**
    a. Uses **MongoDB** to store structured data such as product details, user accounts, orders, and inventory.
    b. Enables **real-time updates** for stock availability and seller dashboards.
4. **Integration & Middleware:**
    a. RESTful APIs ensure smooth data flow between frontend and backend.
    b. Middleware added for **validation, authentication, and error handling**.
5. **Deployment & Final Outcome:**
    a. Application deployed on **GitHub/GitHub Pages (frontend)** and cloud hosting (backend).
    b. Final outcome is a **fully functional e-commerce solution** where customers can easily browse, select, and purchase bike spare parts, while sellers manage products and inventory efficiently.

6 Performance Test

The **performance testing** of the BikeSpareParts E-commerce Platform was conducted to ensure that the system meets real-world industry standards and is not limited to academic implementation. Various **constraints** and parameters were identified and addressed during the testing phase.

6.1.1.1 Identified Constraints

- **Response Time:** Pages and APIs must load within acceptable limits (<2s for major operations).
- **Scalability:** Ability to handle multiple concurrent users without performance degradation.
- **Database Performance:** Efficient retrieval and update of product/inventory data.
- **Security:** Safe handling of user credentials and transactions.
- **Resource Utilization:** Optimize memory and CPU usage on both client and server side.

6.2 Test Plan/ Test Cases

1. Frontend Testing:

- Verified UI responsiveness across devices (desktop, mobile, tablet).
- Tested cart operations (add/remove items, checkout process).

2. Backend Testing:

- Tested API endpoints for product listing, login/signup, order processing.
- Simulated concurrent user requests to check load handling.

3. Database Testing:

- Validated query execution speed under bulk product uploads.
- Checked real-time update of stock levels after purchase.

4. Security Testing:

- Verified **JWT-based authentication** and **password hashing**.
- Checked for unauthorized access attempts.

6.3 Test Procedure

- Deployed the application in a **local environment**.
- Used **Postman** for API testing and **JMeter/Load testing tools** for concurrency.
- Conducted multiple iterations with varying loads (10, 50, 100+ users).
- Monitored database query logs and server performance metrics.

6.4 Performance Outcome

6.5 The platform maintained stable performance up to 100 concurrent users.

6.6 Average API response time was ~1.2 seconds under normal load and ~1.8 seconds under peak load.

6.7 Database queries executed efficiently, with no major delays even during bulk operations.

6.8 UI responsiveness was smooth across devices, maintaining user-friendly navigation.

6.9 Security measures (authentication, role-based access) performed as expected.

Recommendation:

For larger-scale deployment, integration with CDN (Content Delivery Network), caching mechanisms (Redis/Memcached), and cloud-based auto-scaling is suggested to enhance performance, durability, and scalability.

7 My learnings

During this **6-week internship project**, I gained significant exposure to the **end-to-end development of a full-stack e-commerce platform**. I learned how to effectively integrate **frontend technologies (React.js)** with **backend services (Node.js, Express.js)** and manage data using **MongoDB**.

This project enhanced my understanding of **system design, API development, authentication mechanisms, and database modeling**, while also improving my skills

8 Future work scope

While the project achieved its core objectives, there are several areas that can be explored in the future to enhance functionality and usability:

- **Advanced Search & Filtering** – Implement AI-driven search and smart filters for quick product discovery.
- **Recommendation System** – Add personalized product suggestions based on user preferences and purchase history.
- **Payment & Order Tracking Integration** – Include secure payment gateways and real-time shipment tracking.
- **Mobile Application** – Develop a cross-platform mobile app for wider accessibility.
- **Scalability Improvements** – Optimize performance to handle large user traffic and product databases.

These improvements would make the **BikeSpareParts platform** more robust, user-friendly, and industry-ready.