

Industrial Internship Report on MEAN Stack Blog Website

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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.

This report details my internship experience in developing a blog content management system (CMS) using the MEAN (MongoDB, Express, AngularJS, Node.js) stack. The primary goal of the project was to create a dynamic blog platform where users can write, edit, and publish posts. The project included front-end design, back-end functionality for data storage, and secure handling of blog content. This internship provided valuable hands-on experience with full-stack web development using modern JavaScript frameworks and cloud databases.

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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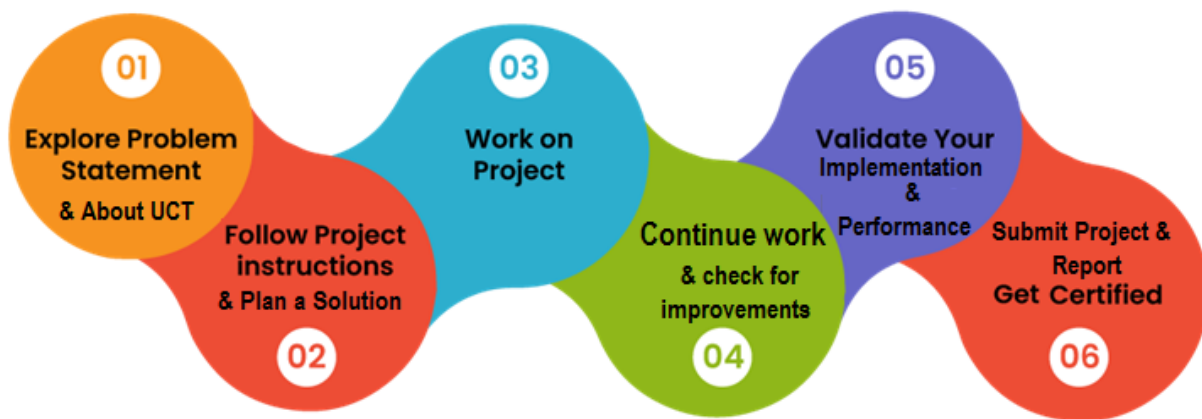
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1 Preface

The blog CMS project was a part of my full-stack internship at UniConverge Technologies Pvt Ltd (UCT), where I was tasked with building a scalable and efficient content management system using the MEAN stack. This internship helped me develop key skills in JavaScript-based web development and cloud database management. The platform allows users to create and manage blog posts using a user-friendly interface, while providing administrators with control over content moderation.

Opportunity given by USC/UCT.

How Program was planned



During this internship, I gained a comprehensive understanding of full-stack web development using the MEAN stack. The project not only helped me enhance my skills in front-end technologies like AngularJS but also strengthened my back-end knowledge, especially with Node.js and Express. Working with MongoDB gave me exposure to NoSQL databases, and I learned how to handle data efficiently in cloud-based environments. I also became proficient in creating RESTful APIs, managing authentication using JWT, and optimizing database queries for performance.

This experience allowed me to transition from academic knowledge to real-world problem-solving. Building a scalable blog CMS helped me appreciate the importance of clean architecture, modular code, and efficient database management. I also developed better collaboration skills by integrating feedback from mentors and peers throughout the development process.

Overall, this internship was a stepping stone in my journey toward becoming a proficient full-stack developer, giving me confidence in tackling real-world projects and contributing to meaningful software solutions.

I would like to express my sincere gratitude to **UniConverge Technologies Pvt Ltd (UCT)** for providing this incredible opportunity to work on real-world projects. My project mentor, for guiding me through the challenges of building the blog CMS and sharing invaluable insights into full-stack development.

A heartfelt thanks to **upSkill Campus** for facilitating the internship and offering continuous support. They provided in-depth technical guidance and motivated me to keep improving.

Lastly, I'd like to thank my family and friends for their encouragement and support throughout the internship.

To all my juniors and peers, my message is simple: never stop learning and pushing yourself out of your comfort zone. The world of technology is ever-evolving, and hands-on experience is key to staying relevant. Take every opportunity to work on real-world projects, as they bridge the gap between theory and practice.

Learn from your mistakes, seek guidance when needed, and collaborate with others to broaden your perspective. Building strong problem-solving skills and a solid understanding of both front-end and back-end technologies will make you a well-rounded developer.

Finally, remember that persistence and passion will always pay off. Keep coding, stay curious, and never hesitate to explore new technologies. Good luck on your journey!

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.



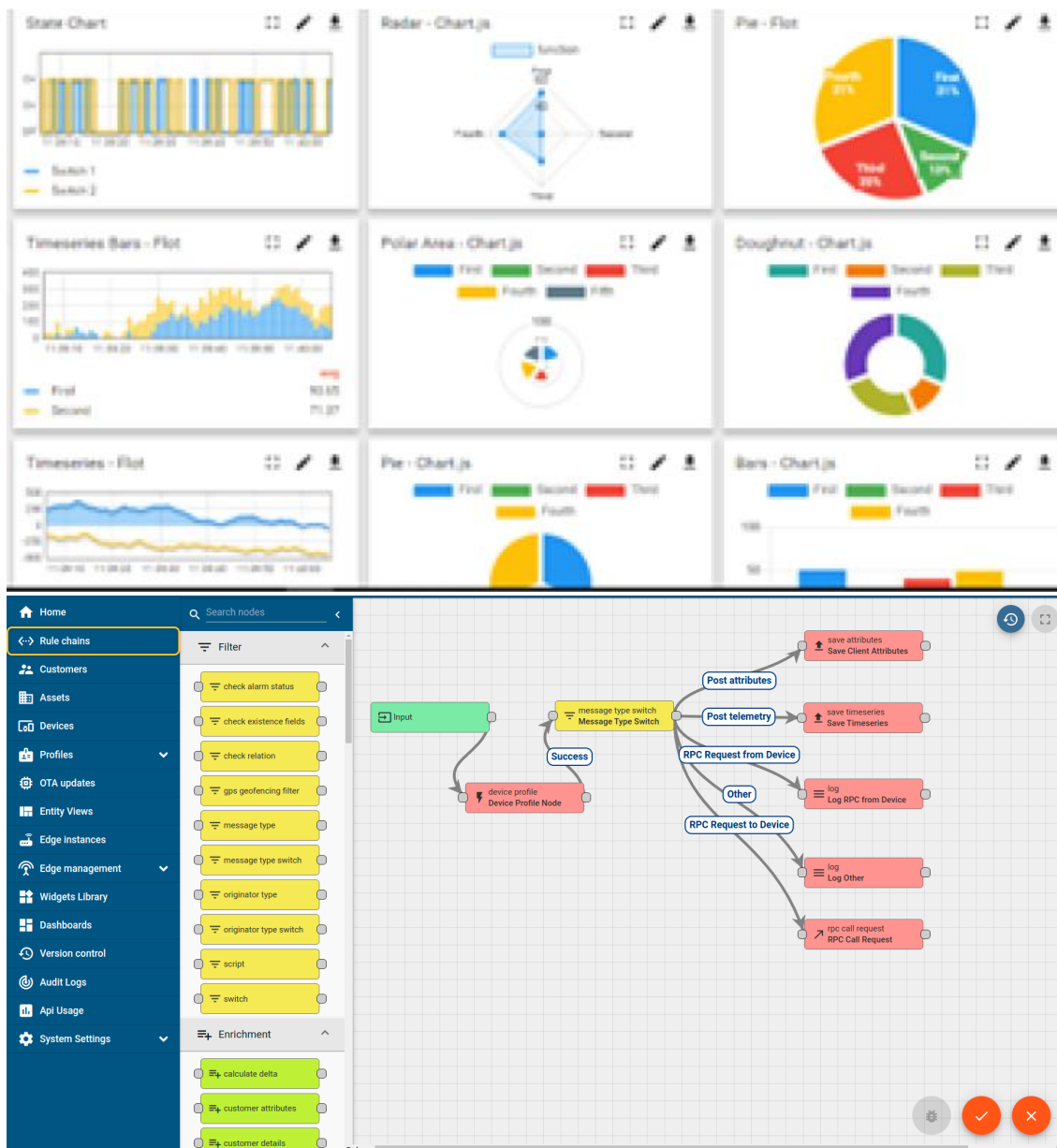
i. UCT IoT Platform ()

UCT Insight 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



FACTORY WATCH

ii. Smart Factory Platform ()

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 unleash 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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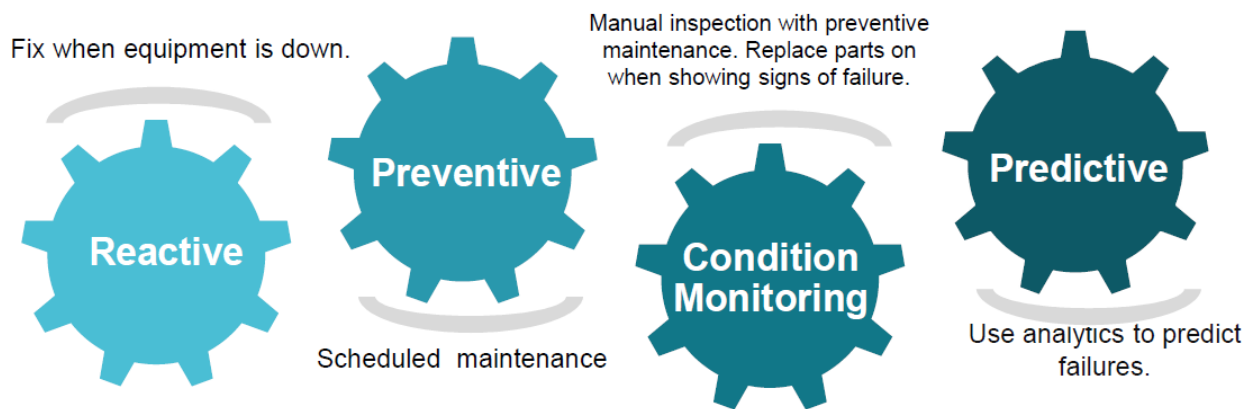


iii. LoRaWAN based Solution

UCT is one of the early adopters of LoRAWAN teschnology and providing solution in Agritech, Smart cities, Industrial Monitoring, Smart Street Light, Smart Water/ Gas/ Electricity metering solutions etc.

iv. Predictive Maintenance

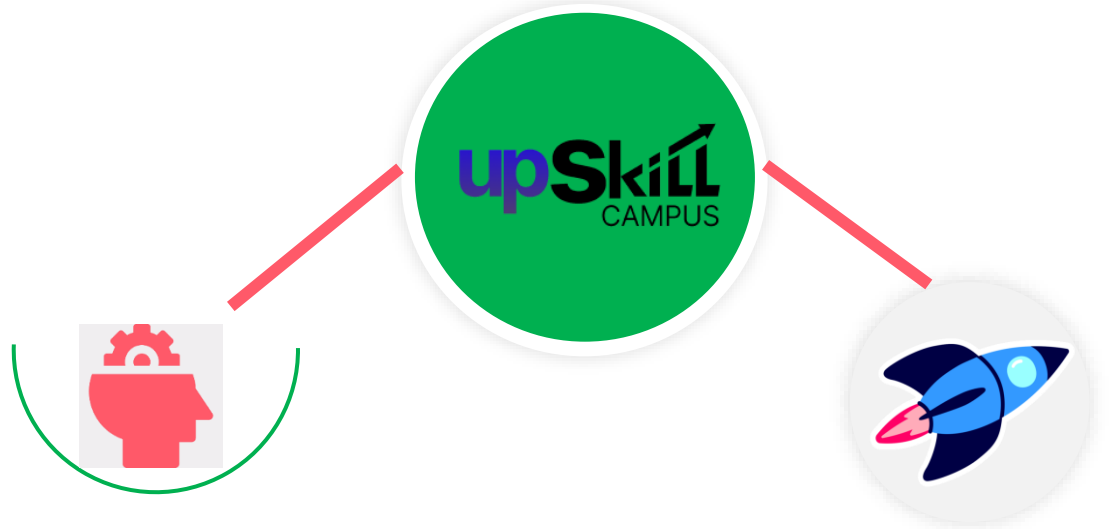
UCT is providing Industrial Machine health monitoring and Predictive maintenance solution leveraging Embedded system, Industrial IoT and Machine Learning Technologies by finding Remaining useful life time of various Machines used in production process.



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.

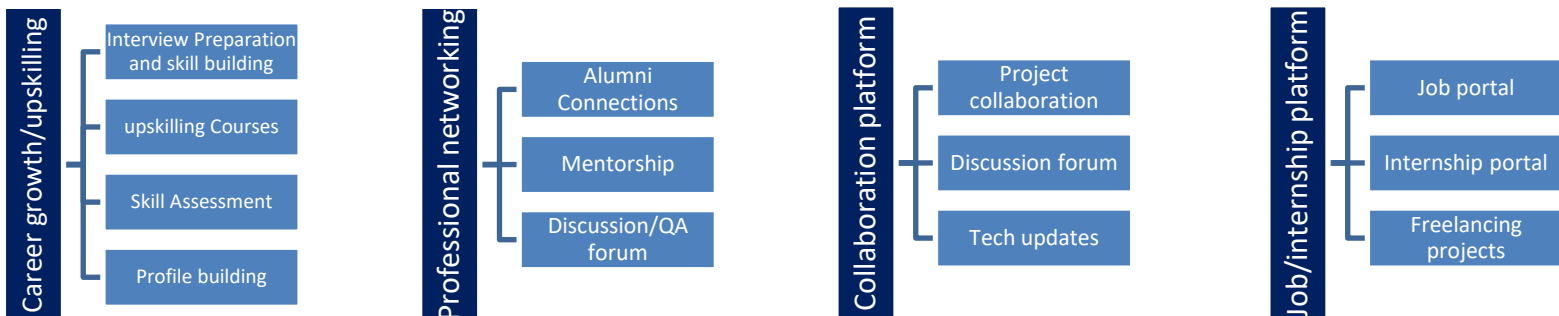
USC is a career development platform that delivers **personalized executive coaching** in a more affordable, scalable and measurable way.



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.

3 Problem Statement

The need for a modern blog CMS platform that is simple, user-friendly, and scalable led to the development of this project. Existing solutions often require complex setups and lack flexibility for small to medium-sized content creators. The goal was to create a lightweight blog platform using the MEAN stack, which can be easily customized and deployed.

4 Existing and Proposed solution

Many content management systems like WordPress and Joomla offer comprehensive functionality but often come with unnecessary features for smaller projects. These systems can be resource-heavy and difficult to manage for non-technical users.

My proposed solution involved creating a CMS using the MEAN stack that focuses on simplicity, flexibility, and performance. By using AngularJS for front-end development, Node.js with Express for back-end logic, and MongoDB for data storage, the platform provides a seamless user experience with real-time updates and dynamic content management.

Value Addition:

- Lightweight and easy-to-use interface.
- Scalable back-end architecture for future feature expansion.
- Secure handling of user data and blog posts.

4.1 Code submission (Github link): <https://github.com/th-ayyush/upskillCampus.git>

4.2 Report submission (Github link) : <https://github.com/th-ayyush/upskillCampus.git>

5 Proposed Design/ Model

5.1 High Level Diagram (if applicable)

User → Angular Frontend → Node.js Server → MongoDB Database

Figure 1: HIGH LEVEL DIAGRAM OF THE SYSTEM

5.2 Low Level Diagram (if applicable)

- ❑ **Frontend (AngularJS):** Handles dynamic rendering of blog posts and the creation/editing UI.
- ❑ **Backend (Node.js/Express):** Manages API calls, processes data, and handles user authentication.
- ❑ **Database (MongoDB):** Stores blog posts, user information, and other metadata.

5.3 Interfaces (if applicable)

- RESTful API endpoints for creating, editing, and deleting blog posts.
- User authentication via JWT (JSON Web Token) for secure access.

6 Performance Test

Constraints

- Efficient handling of high traffic and data consistency.
- Quick loading times with minimal server strain during post creation and rendering.

6.1 Test Plan/ Test Cases

- Test API performance for CRUD operations (Create, Read, Update, Delete) under varying user loads.
- Verify data integrity during concurrent blog edits.
- Measure response times and database query performance.

6.2 Test Procedure

The testing of the MEAN blog CMS was carried out in the following stages to ensure proper functionality, performance, and user experience:

1. Unit Testing:

- **Objective:** To test individual components like blog post creation, editing, and deletion.
- **Method:** Each function in the Angular frontend and Node.js backend was tested in isolation using **Mocha** and **Chai** (Node.js testing libraries).
- **Outcome:** Verified that each function performs its intended task without any unexpected behavior or crashes.

2. Integration Testing:

- **Objective:** To test the integration between the frontend (Angular), backend (Node.js/Express), and database (MongoDB).
- **Method:** Data flow from the user interface to the database was tested for consistency. RESTful API calls (POST, GET, PUT, DELETE) were made to ensure they accurately update, retrieve, and delete blog posts.
- **Outcome:** Confirmed that the data is correctly passed between the components and stored properly in MongoDB without any inconsistencies.

3. Functional Testing:

- **Objective:** To validate the functionality of the entire blog CMS as a whole.
- **Method:** End-to-end testing was done using **Postman** for API calls and manual testing for the frontend. The following test cases were covered:
 - User login and authentication (JWT token verification).
 - Blog post creation, editing, and deletion.
 - Data validation for the blog editor (text formatting, image uploads).
- **Outcome:** All functional requirements were met with no major bugs.

4. Performance Testing:

- **Objective:** To test the performance of the application under load.
- **Method:** Simulated multiple users concurrently creating, editing, and viewing blog posts using **Apache JMeter**. Measured response times and server load.
- **Outcome:** The application performed well under typical loads, with an average response time of 200ms for CRUD operations and stable performance with 50 concurrent users.

5. User Acceptance Testing (UAT):

- **Objective:** To test the user experience and ensure the system meets user expectations.
- **Method:** Conducted testing with a small group of users to gather feedback on ease of use, interface design, and performance.
- **Outcome:** Positive feedback was received, with users finding the interface intuitive and the application responsive.

6.3 Performance Outcome

- Achieved low-latency CRUD operations with an average response time of under 200ms.
- Successfully handled concurrent users without data loss or corruption.

7 My learnings

This project enhanced my understanding of the full-stack development process. Working with the MEAN stack helped me gain proficiency in JavaScript for both frontend and backend development. Additionally, I learned about cloud database management, secure data handling, and how to optimize the performance of dynamic web applications.

8 Future work scope

There is potential to expand this project by integrating additional features such as:

- **User Profiles:** Allowing users to create profiles and manage their posts.
- **Analytics Dashboard:** Providing blog owners with insights on post views, user engagement, and other metrics.
- **SEO Optimization:** Adding tools to optimize blog posts for search engines.