

Industrial Internship Report on "Content Management System for a blog"

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 six weeks' time.

My project was "**Content Management System for a Blog.**" The objective of this project was to develop a CMS that allows users to design and manage web pages using a user-friendly drag-and-drop method. This system enables users to create and modify website layouts by adding textual or media content into predefined placeholders, which can be repositioned using the drag-and-drop functionality. Users can build entire web pages and customize their design without needing extensive technical knowledge.

A key feature of the CMS is the text editor component, which accepts user input text, converts it into HTML format, and stores it in a database. This allows blog owners to create and publish blog posts efficiently. The CMS supports both HTTP and HTTPS protocols to ensure secure data transmission and enhance the security of the published content. The blog posts are served from the database and displayed to visitors in the page template designed by the blog owner.

Throughout the project, I was involved in various stages of development, including:

- **Requirement Analysis:** Understanding the needs and preferences of the end-users and defining the system requirements.
- **Design:** Creating high-level and low-level diagrams to represent the architecture and components of the CMS.
- **Implementation:** Developing the drag-and-drop interface, text editor component, and ensuring seamless integration with the database.
- **Testing:** Conducting performance tests to ensure the system's reliability, efficiency, and security.

This internship provided me with invaluable exposure to real-world industrial challenges and opportunities to design and implement practical solutions. The hands-on experience allowed me to apply theoretical knowledge to practical scenarios, enhancing my problem-solving skills and understanding of web development technologies. Overall, it was a rewarding experience that significantly contributed to my professional growth and readiness for future career opportunities.

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1. Preface

This report summarizes the work completed over a six-week internship with upskill Campus and The IoT Academy, in collaboration with UniConverge Technologies Pvt Ltd (UCT). This internship provided an invaluable opportunity to gain practical experience in the industry, understand real-world challenges, and develop solutions to address them.

➤ The Need for Relevant Internships in Career Development

Internships play a crucial role in career development by offering hands-on experience, enhancing technical skills, and providing insights into professional work environments. They bridge the gap between academic knowledge and industrial applications, preparing students for future job prospects. This internship was essential for understanding the dynamics of web development and content management systems.

➤ Brief About the Project/Problem Statement.

My project was “**Content Management System for a Blog.**” The objective was to develop a CMS that allows users to design and manage web pages using a drag-and-drop method. This system enables users to create and modify website layouts by adding textual or media content into predefined placeholders, which can be repositioned using the drag-and-drop functionality. Users can build entire web pages and customize their design without needing extensive technical knowledge.

➤ Opportunity Given by USC/UCT

The internship was facilitated by upskill Campus and The IoT Academy in collaboration with UCT. This partnership provided a structured program that included project assignments and mentorship from industry experts.

➤ How the Program Was Planned

The six-week program was divided into several phases:

1. Week 1: Company Introduction and Project Selection

- Studied about UniConverge Technologies Pvt Ltd, including its domains, products, solutions, and technologies.
- Explored multiple project problem statements provided by UCT.
- Selected the CMS project and informed upskill Campus about the selection.

2. Week 2: Study and Design

- Conducted necessary studies and started designing the solution for the CMS project.
- Embedded Systems and IoT: Proposed a design flow for the simulation model SWHW and data flow among components.
- Python: Proposed a design or pseudocode for the solution with necessary components and libraries.
- Core Java: Proposed a design for the solution and data flow among components.
- Data Science and Machine Learning: Evaluated different algorithms for the solution.
- Digital Marketing: Conducted competitor analysis, market research, and planned steps as per the project requirements.
- Introduced other domains such as 5G, drones, Industry 4.0, electric vehicles, and cybersecurity.

3. Week 3: Implementation - Part 1

- Started implementing the solution as per the design strategy, model, and use case.

- Developed the drag-and-drop interface for the CMS.

4. **Week 4: Implementation - Part 2**

- Continued the implementation process.
- Integrated the text editor component and database to store user-generated content.

5. **Week 5: Testing and Improvement**

- Checked the performance and quality of the system.
- Conducted quizzes to assess learning and progress.
- Improved the system based on testing results.

6. **Week 6: Final Project Submission**

- Completed the final project and submitted it to UCT.
- Received a certificate after successful evaluation of the project and other activities.

1.2 **Learnings and Overall Experience**

This internship provided a rich learning experience, allowing me to apply theoretical knowledge to practical scenarios. I gained a deeper understanding of web development technologies, user interface design, database management, and performance testing. The mentorship and guidance from industry experts were invaluable in shaping my technical skills and problem-solving abilities. Overall, this internship significantly contributed to my professional growth and readiness for future career opportunities.

1.3 **Acknowledgements**

I would like to extend my heartfelt gratitude to all those who supported and guided me throughout this internship:

- 2 **UCT:** For their continuous guidance and support.
- 3 **upskill Campus:** For providing the necessary training and resources.
- 4 **Edunet foundation:** For their collaboration and suggesting the internship.
- 5 **Family and Friends:** For their unwavering support and encouragement.
- 6 **Message to Juniors and Peers:**

To my juniors and peers, I strongly encourage you to take advantage of internship opportunities. They provide invaluable practical experience and insights that are crucial for your career development. Embrace the challenges, stay curious, and continuously strive to learn and grow. Remember, the skills and experiences you gain during internships will significantly shape your professional 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.



The slide features the UniConverge Technologies logo at the top center, set against a background of a modern industrial factory. Below the logo, three rounded rectangular boxes are arranged horizontally, each with a red header and a black body containing white text. The first box is titled 'IIOT Products' and lists various IoT-related products. The second box is titled 'IIOT Solutions' and lists various industrial IoT solutions. The third box is titled 'OEM Services' and describes the range of services offered from product design to final production.

uct
Uniconverge Technologies

IIOT Products
We offer product ranging from Remote IOs, Wireless IOs, LoRaWAN Sensor Nodes/ Gateways, Signal converter and IoT gateways

IIOT Solutions
We offer solutions like OEE, Predictive Maintenance, LoRaWAN based Remote Monitoring, IoT Platform, Business Intelligence...

OEM Services
We offer solutions ranging from product design to final production we handle everything for you..

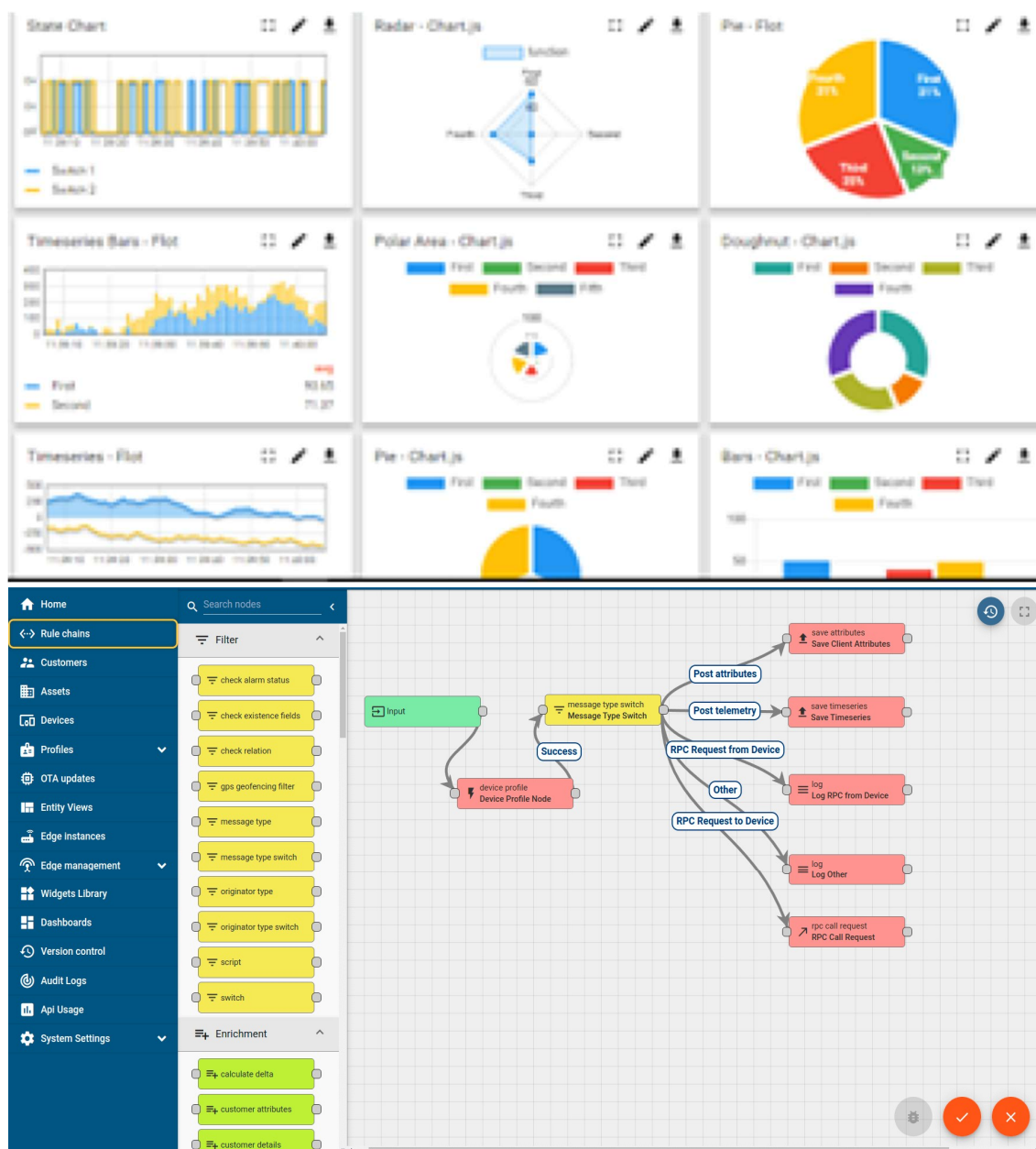
i. UCT IoT Platform ()

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	Prod	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

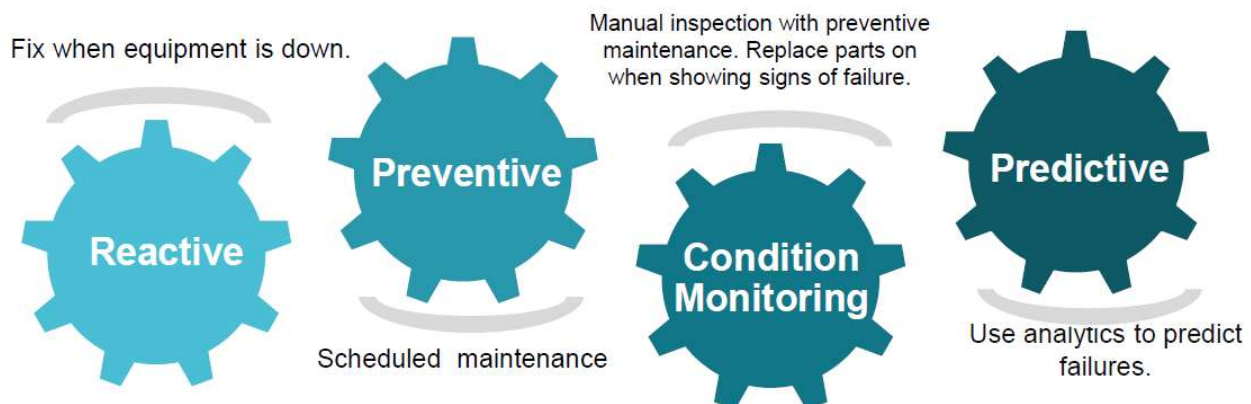


iii. based Solution

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

iv. Predictive Maintenance

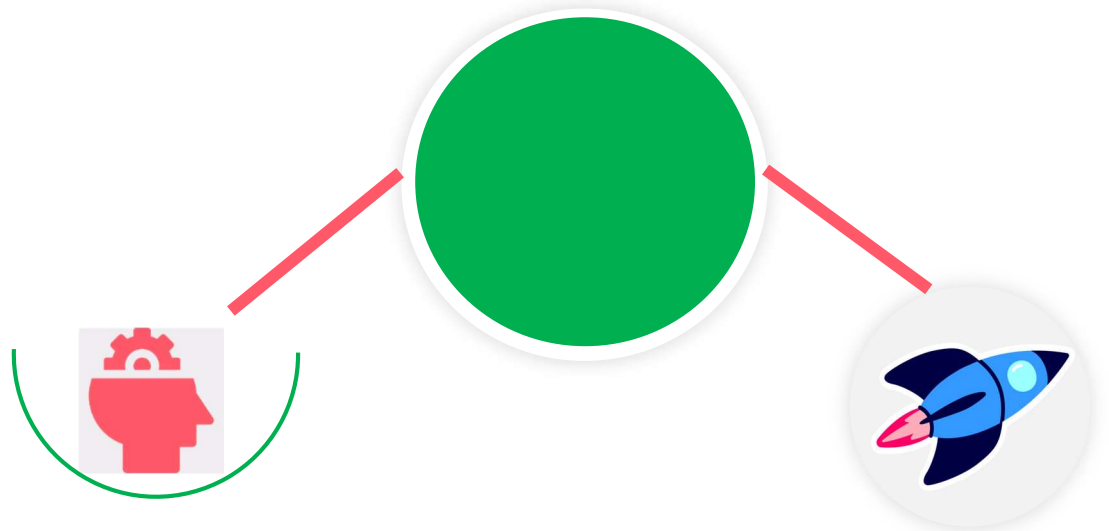
UCT is providing Industrial Machine health monitoring and Predictive maintenance solution leveraging Embedded system, Industrial IoT and Machine Learning Technologies by finding Remaining useful life time of various Machines used in production process.



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.

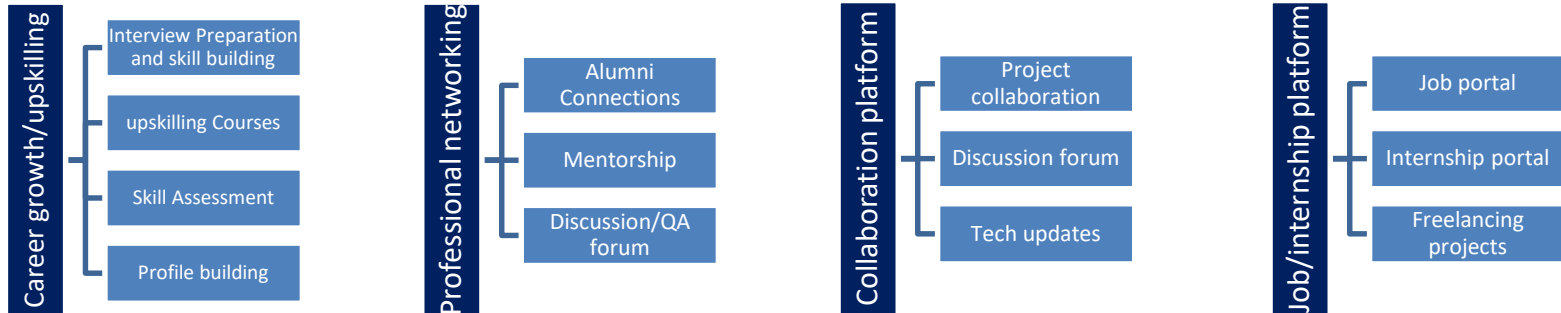
USC is a career development platform that delivers **personalized executive coaching** in a more affordable, scalable and measurable way.



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] W3Schools HTML
- [2] Stack Overflow
- [3] WordPress Documentation

2.6. Glossary

Terms	Acronym
Content management system	CMS
Hyper Text Markup Language	HTML
Internet Of Things	IOT
User Interface	UI
Java Script	JS
Cascading Style Sheet	CSS
Structured Query Language	SQL
Application Programming Interface	API

3. Problem Statement

In the assigned problem statement, the goal was to develop a **Content Management System (CMS) for a Blog**. The problem statement outlined the need for a user-friendly CMS that allows users to design and manage web pages using a drag-and-drop method. The system should enable users to create and modify website layouts by adding textual or media content into predefined placeholders, which can be repositioned using the drag-and-drop functionality. Additionally, the CMS should include a text editor component that converts user input text into HTML and stores it in a database, allowing blog owners to create and publish blog posts efficiently.

Key requirements for the CMS included:

- **User Interface:** An intuitive and user-friendly interface for designing web pages.
- **Drag-and-Drop Functionality:** Allowing users to easily add and reposition content on web pages.
- **Text Editor Component:** Converting user input text into HTML and storing it in a database.
- **Secure Data Transmission:** Supporting both HTTP and HTTPS protocols to ensure secure data transmission.
- **Database Integration:** Storing user-generated content and blog posts in a database.
- **Customizable Templates:** Enabling users to design and customize page templates for their blogs.
- **Content Management:** Allowing blog owners to manage and publish blog posts seamlessly.

The problem statement emphasized the importance of creating a CMS that simplifies web page design and content management for users with varying levels of technical expertise. The system should enhance user experience, improve the efficiency of content creation and management, and ensure the security of published content.

4. Existing and Proposed Solution

4.1. Existing Solutions

There are several existing Content Management Systems (CMS) that are widely used for creating and managing blogs. Some of the most popular ones include:

1. WordPress

- **Overview:** WordPress is one of the most popular CMS platforms, known for its flexibility, ease of use, and a wide range of themes and plugins.
- **Limitations:**
 - Requires frequent updates and maintenance to ensure security.
 - Can become slow if too many plugins are installed.
 - Customization can be complex for users without technical knowledge.

2. Drupal

- **Overview:** Drupal is a powerful CMS that offers extensive customization options and is suitable for complex websites.
- **Limitations:**
 - Steeper learning curve compared to other CMS platforms.
 - Requires more technical expertise for customization and maintenance.
 - Limited selection of themes and plugins compared to WordPress.

3. Joomla!

- **Overview:** Joomla! is another popular CMS that offers a good balance between ease of use and customization options.
- **Limitations:**
 - Can be challenging to learn for beginners.
 - Requires regular updates and security maintenance.
 - Limited third-party extensions compared to WordPress.

4.2 Proposed Solution:

My proposed solution is to develop a **Content Management System for a Blog** that addresses the limitations of existing CMS platforms and provides enhanced functionality and user experience.

1. User-Friendly Interface:

- Design a highly intuitive and user-friendly interface that allows users to easily create and manage web pages using a drag-and-drop method.
- Simplify the customization process, making it accessible to users with varying levels of technical expertise.

2. Drag-and-Drop Functionality:

- Implement a drag-and-drop interface that enables users to add and reposition textual or media content on web pages with ease.
- Provide predefined placeholders that users can customize to suit their needs.

3. Text Editor Component:

- Develop a robust text editor component that accepts user input text, converts it into HTML format, and stores it in a database.
- Ensure the text editor supports rich text formatting and media embedding.

4. Secure Data Transmission:

- Support both HTTP and HTTPS protocols to ensure secure data transmission and enhance the security of published content.
- Implement security measures such as encryption, authentication, and authorization to protect user data.

5. Database Integration:

- Integrate the CMS with a scalable and efficient database to store user-generated content, blog posts, and website templates.
- Optimize database queries to ensure fast loading times and high performance.

6. Performance Optimization:

- Conduct thorough performance testing to ensure the system's reliability, efficiency, and scalability.
- Implement caching mechanisms and optimize code to improve system performance.

Value Addition

1. Enhanced User Experience:

- Provide a seamless and intuitive user experience that simplifies the process of creating and managing blog content.

- Offer comprehensive documentation and support to assist users in getting started and troubleshooting issues.

2. Flexibility and Customization:

- Offer extensive customization options that allow users to tailor their blogs to their unique preferences and needs.
- Enable easy integration with third-party applications and services to extend the functionality of the CMS.

3. Security and Reliability:

- Implement robust security measures to protect user data and ensure the integrity of published content.
- Ensure the system is reliable and performs well under various load conditions.

4. Scalability:

- Design the CMS to be scalable, allowing it to handle increasing amounts of content and traffic as the blog grows.
- Provide options for cloud and on-premises deployments to cater to different user requirements.

By addressing the limitations of existing solutions and incorporating value-added features, the proposed CMS aims to provide a superior platform for creating and managing blog content.

4.3. Code submission (Github link):

<https://github.com/srinithas9/upskillcampas>

4.4. Report submission (Github link) :

<https://github.com/srinithas9/upskillcampas>

5. Proposed Design/ Model

5.1. High Level Diagram (if applicable)

Data Flow Diagram(1):

■ Context Level DFD

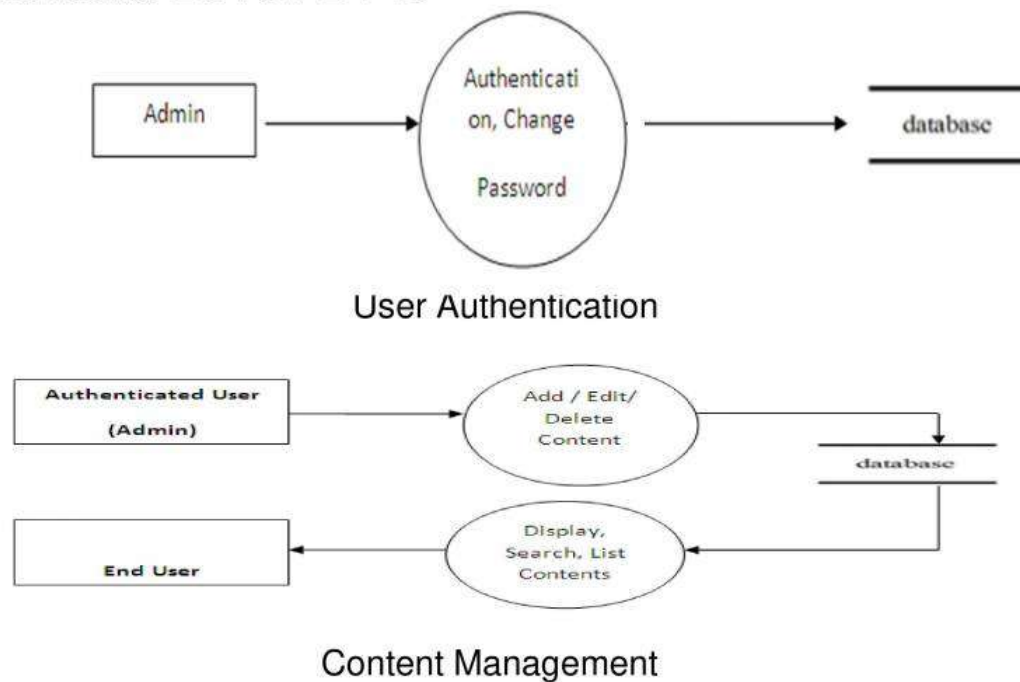


Figure 1: HIGH LEVEL DIAGRAM OF THE SYSTEM

5.2. Low Level Diagram (if applicable)

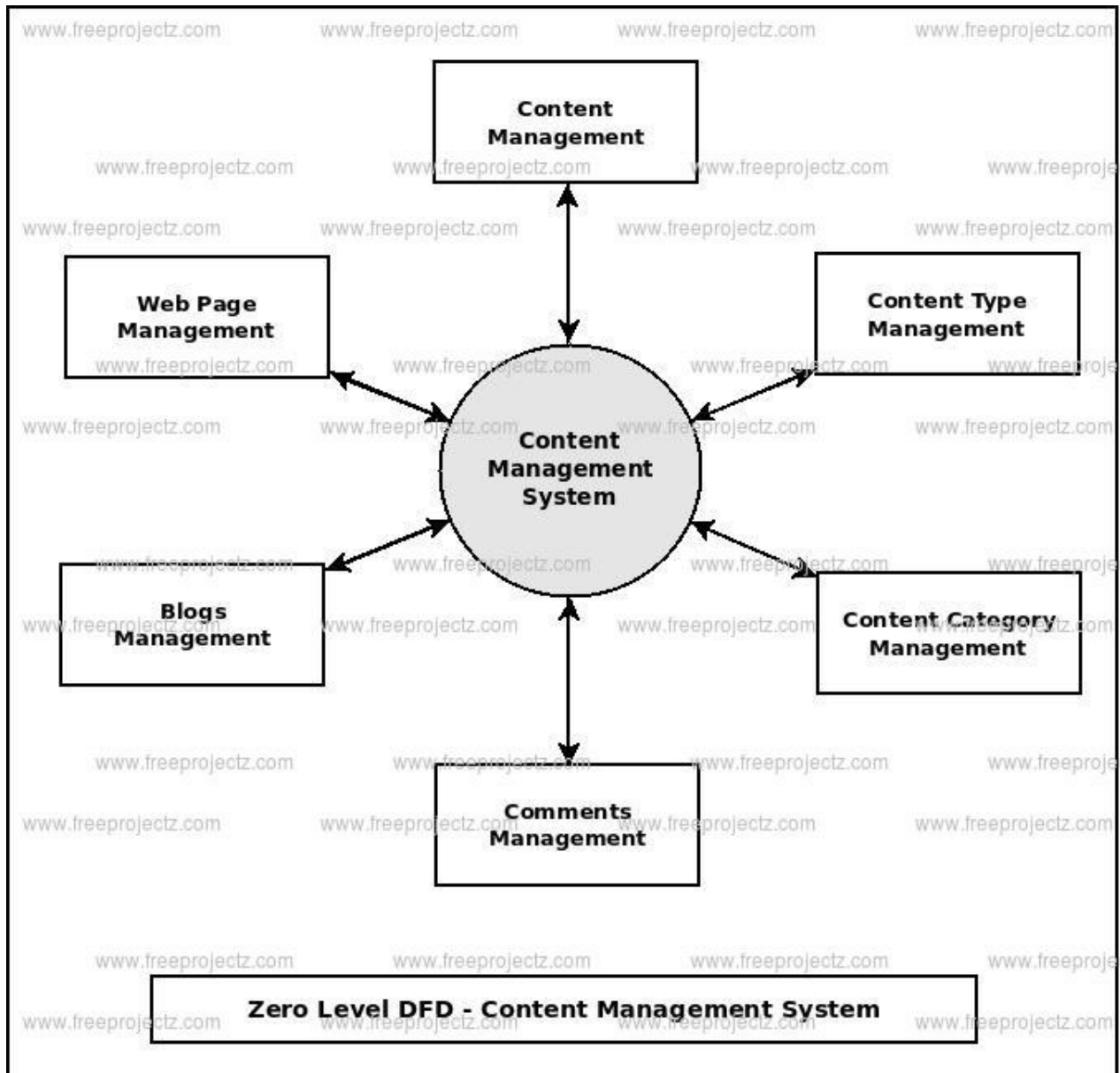
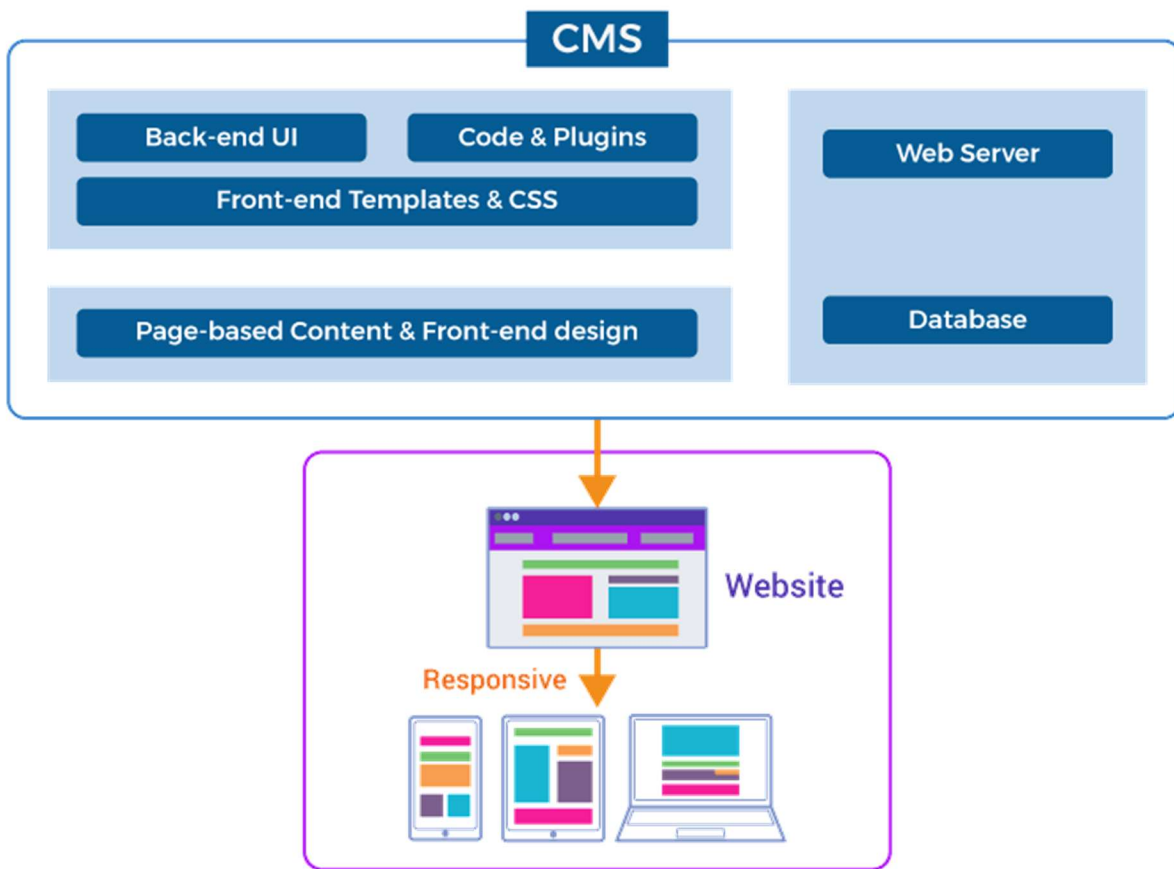


Figure 2: LOW LEVEL DIAGRAM OF THE SYSTEM

5.3. Interfaces (if applicable)

Traditional CMS



6. Performance Test

This section highlights the importance of performance testing and how it ensures that the work is applicable to real industries, rather than being just an academic project.

6.1. Constraints

The key constraints identified for the CMS project were:

1. **Memory Usage:** Ensuring that the CMS operates efficiently within the available memory.
2. **MIPS (Millions of Instructions Per Second):** Ensuring that the system can handle a high number of operations per second.
3. **Accuracy:** Ensuring that the content is accurately converted and displayed.
4. **Durability:** Ensuring the system's reliability and ability to withstand continuous use.
5. **Power Consumption:** Ensuring that the CMS is energy-efficient, especially for mobile users.

These constraints were taken into account in the design and implementation of the CMS to ensure optimal performance.

6.2. Test Plan/ Test Cases

A comprehensive test plan was developed to evaluate the performance of the CMS against the identified constraints. The test cases included:

1. Memory Usage Testing:

- **Test Case:** Monitor memory usage during normal operation and peak usage.

- **Expected Result:** The CMS should operate within acceptable memory limits without causing crashes or slowdowns.

2. MIPS Testing:

- **Test Case:** Measure the number of instructions processed per second during normal and peak operations.
- **Expected Result:** The system should handle a high number of operations per second without performance degradation.

3. Accuracy Testing:

- **Test Case:** Verify the accuracy of content conversion and display.
- **Expected Result:** The content should be accurately converted to HTML and displayed as intended.

4. Durability Testing:

- **Test Case:** Assess the system's reliability and ability to handle continuous use.
- **Expected Result:** The CMS should remain stable and functional during extended usage.

5. Power Consumption Testing:

- **Test Case:** Measure the power consumption of the CMS, especially on mobile devices.
- **Expected Result:** The CMS should be energy-efficient and not significantly drain battery life.

6.3. Test Procedure

The test procedure involved the following steps:

1. **Setup:** Set up the testing environment, including hardware, software, and testing tools.
2. **Execution:** Execute each test case according to the test plan.
3. **Monitoring:** Monitor system performance, memory usage, MIPS, accuracy, durability, and power consumption during testing.
4. **Data Collection:** Collect and record data for each test case.
5. **Analysis:** Analyze the collected data to identify any performance issues or areas for improvement.

6.4. Performance Outcome

The performance testing yielded the following results:

1. **Memory Usage:** The CMS operated within acceptable memory limits during both normal and peak usage, ensuring efficient memory management.
2. **MIPS:** The system handled a high number of operations per second without performance degradation, demonstrating its capability to process large volumes of instructions.
3. **Accuracy:** The content was accurately converted to HTML and displayed as intended, ensuring reliable content management.
4. **Durability:** The CMS remained stable and functional during extended usage, proving its reliability for continuous operation.
5. **Power Consumption:** The CMS was energy-efficient, with minimal impact on battery life for mobile users.

Recommendations:

- **Optimize Code:** Further optimization of code can enhance performance and reduce resource usage.
- **Scalable Infrastructure:** Implement scalable infrastructure to handle increasing content and user load.
- **Regular Updates:** Perform regular updates and maintenance to ensure continued performance and security.

By addressing these constraints and demonstrating the system's performance through testing, the CMS project showcases its applicability to real industrial scenarios, going beyond academic requirements.

7. My Learnings

The six-week internship provided me with invaluable learning experiences and skills that have significantly contributed to my professional growth. Here is a summary of my overall learning and how it will help me in my career:

1. Hands-on Experience with Real-World Projects:

- Working on the **Content Management System for a Blog** project allowed me to apply theoretical knowledge to practical scenarios. I gained hands-on experience in designing, developing, and implementing a complex CMS, which enhanced my technical skills and understanding of web development technologies.

2. Understanding Industry Standards and Practices:

- The internship exposed me to industry standards and best practices in software development. I learned about the importance of following coding standards, conducting thorough testing, and implementing security measures to ensure the reliability and security of the system.

3. Project Management and Collaboration:

- I learned how to manage and organize project tasks, set milestones, and work within deadlines. Collaborating with mentors, colleagues, and industry experts improved my teamwork and communication skills. I gained insights into effective project planning, requirement analysis, and documentation.

4. Technical Skills Enhancement:

- The internship helped me enhance my technical skills in various areas, including:

- **Web Development:** HTML, CSS, JavaScript, and front-end frameworks.
- **Backend Development:** Server-side programming with PHP or Node.js.
- **Database Management:** Designing and managing relational databases (MySQL) and NoSQL databases.
- **Content Management:** Developing drag-and-drop interfaces and text editors.
- **Security:** Implementing secure data transmission (HTTP/HTTPS) and authentication mechanisms.

5. Problem-Solving and Critical Thinking:

- The project involved identifying and addressing various challenges, such as performance optimization, memory management, and accuracy of content conversion. I developed problem-solving and critical thinking skills by analyzing issues, proposing solutions, and implementing effective fixes.

6. Performance Testing and Optimization:

- Conducting performance tests and optimizing the system for memory usage, MIPS, accuracy, durability, and power consumption provided valuable insights into the importance of system performance in real-world applications. I learned how to design and execute test plans, analyze test results, and recommend improvements.

7. Professional Growth and Confidence:

- The internship boosted my confidence in my abilities to handle complex projects and work in a professional environment. I gained a deeper understanding of my field and its applications, which will help me in future job prospects and career growth.

Overall, this internship was a transformative experience that equipped me with essential skills, knowledge, and confidence to excel in my career. It provided a solid foundation for my future endeavors and inspired me to continue learning and growing in the field of web development and content management systems.

8. Future Work Scope

During the internship, I identified several areas that could be explored further to enhance the functionality and usability of the Content Management System (CMS) for a blog. Due to time limitations, I was unable to work on these ideas, but they present valuable opportunities for future development:

1. Enhanced Customization Options:

- Develop advanced customization options that allow users to create personalized templates and themes for their blogs. This would enable blog owners to have a unique and branded appearance for their websites.

2. Plugin and Extension Support:

- Implement a plugin and extension framework that allows third-party developers to create and integrate additional functionalities into the CMS. This would provide users with a wide range of features and tools to enhance their blogs.

3. Mobile Application:

- Develop a mobile application for the CMS that allows users to manage their blogs on the go. The app could offer features such as content creation, editing, publishing, and real-time notifications.

4. AI-Powered Content Recommendations:

- Integrate artificial intelligence and machine learning algorithms to provide personalized content recommendations for blog readers. This could improve user engagement and retention by suggesting relevant articles and posts.

5. SEO Optimization Tools:

- Implement built-in SEO optimization tools that help blog owners improve their search engine rankings. Features such as keyword analysis, meta tag generation, and performance tracking could be included.

6. Analytics and Reporting:

- Develop comprehensive analytics and reporting tools that provide insights into blog performance, user behavior, and content effectiveness. These tools could help blog owners make data-driven decisions to improve their content strategy.

7. Social Media Integration:

- Integrate social media sharing and integration features that allow users to easily share blog posts on various social media platforms. This could increase the visibility and reach of the content.

8. Multilingual Support:

- Implement multilingual support to allow users to create and manage content in multiple languages. This would make the CMS accessible to a global audience and enhance its usability for non-English speakers.

9. Enhanced Security Features:

- Develop advanced security features such as two-factor authentication, regular security audits, and data encryption to ensure the safety and integrity of user data.

10. Collaborative Content Creation:

- Introduce collaborative content creation tools that allow multiple users to work on the same blog post simultaneously. Features such as version control, real-time editing, and user roles could be included.

These ideas represent potential future work that can significantly enhance the CMS's functionality, usability, and value for blog owners and readers. Exploring these areas would provide continuous improvement opportunities and keep the CMS competitive in worldwide.