Industrial Internship Report on

"Human Resource Management System(HRMS)"

Prepared by

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Bachelor Of Engineering in CSE

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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 topic is Human Resource Management System

This internship gave me a very good opportunity to get exposure to Industrial problems and design/implement solutions for them. It was an overall great experience to have this internship.

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1 Preface

In the fast-paced six-week internship program hosted by Upskill Campus and The IoT Academy in collaboration with **UniConverge Technologies Pvt Ltd (UCT)**, I had the privilege to immerse myself in the dynamic realm of cloud computing.

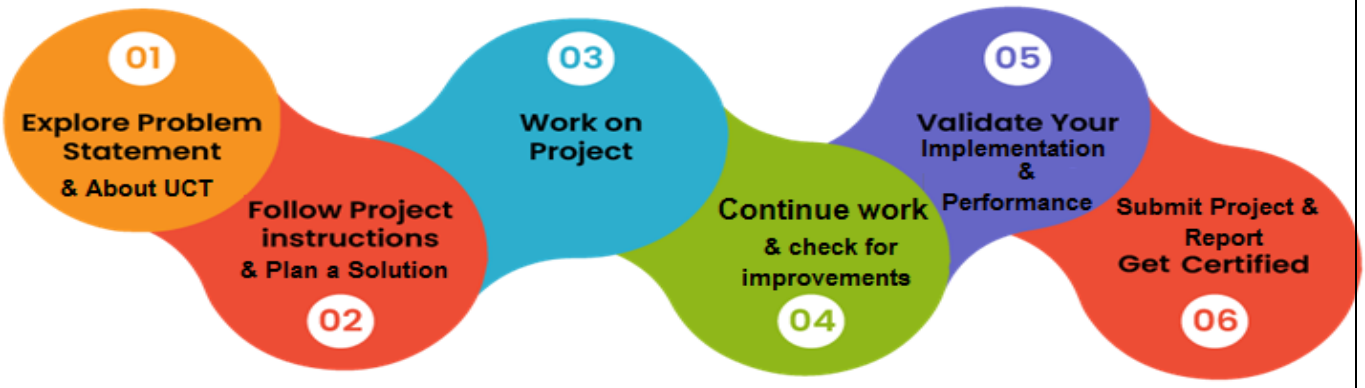
Guided steadily by **Mr. Kaushlendra Singh Sisodia** and **Mr. Nitin Tyagi**, my peers – Priti Kumari, Bhagyashree Saundarkar, and I embarked on a journey to develop a HR management system, harnessing AWS' powerful functionalities to create a serverless application. Our weeks were systematically structured, from understanding UCT's role in the industry to planning, executing, and fine-tuning our project, making every step a learning curve.

This experience reaffirmed the pivotal role that hands-on internships play in career development, allowing young professionals to bridge the gap between theory and practice. It has not only honed my technical skills but also enlightened me on project management and team collaboration.

To my juniors and peers, I pass on the message to seize such opportunities with zeal. The learnings from these experiences are immense, fostering both personal and professional growth.

In closing, I express my profound gratitude to everyone who contributed to this enriching journey, affirming the significance of teamwork, guidance, and collaborative learning.

Thank you.



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.

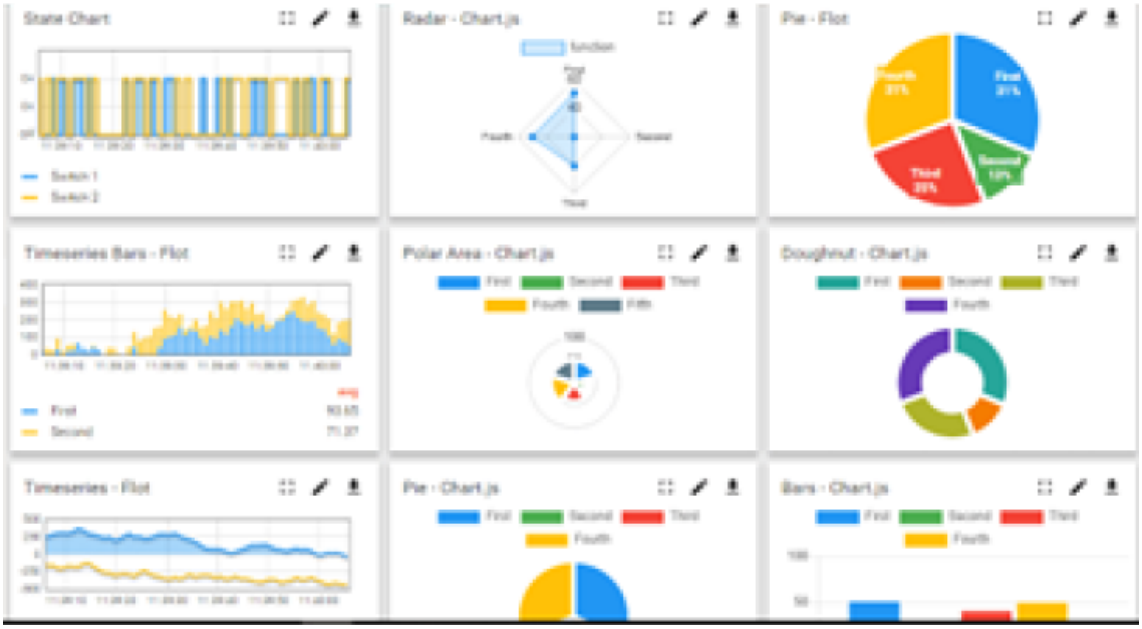
i. UCT IoT Platform(uct Insight)

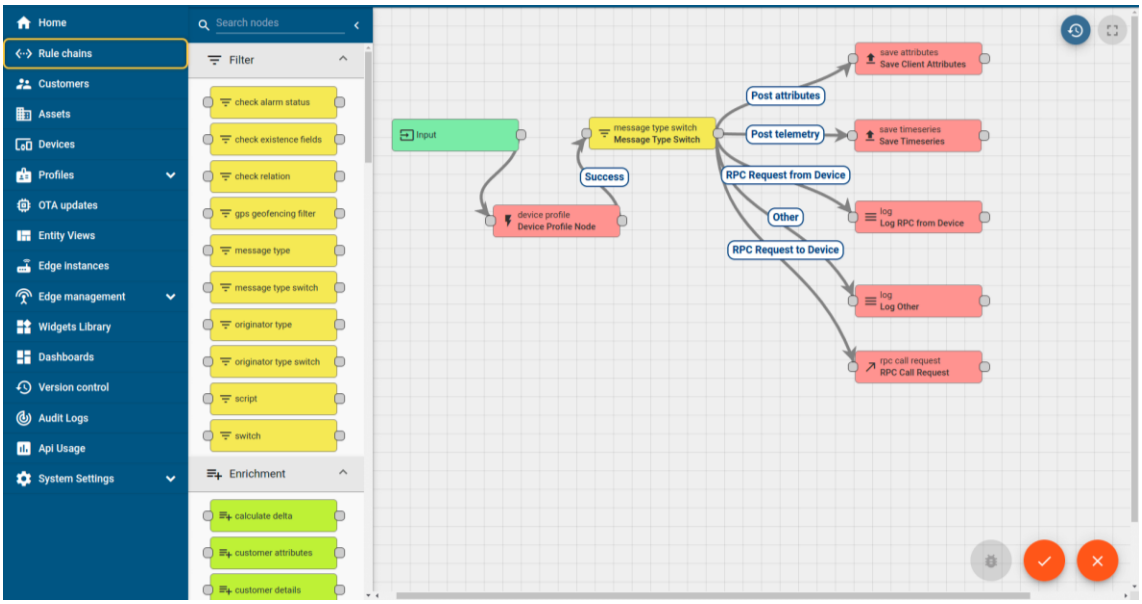
UCT Insight is an IOT platform designed for quick deployment of IOT applications on the same time providing valuable "insight" for your process/business. It has been built in Java for backend and ReactJS for Front end. It has support for MySQL and various NoSQL Databases.

- 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.

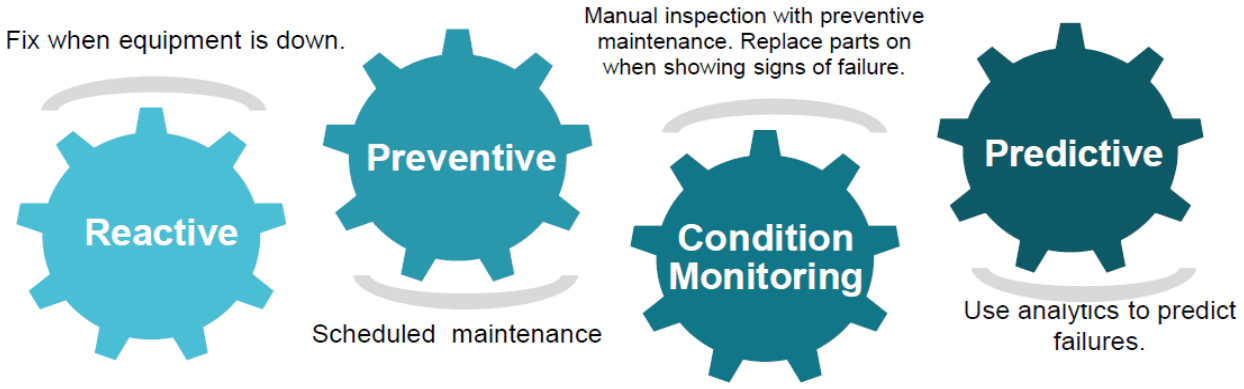
Machine	Operator	Work Order ID	Job ID	Job Performance	Job Progress		Output		Rejection	Time (mins)				Job Status	End Customer
					Start Time	End Time	Planned	Actual		Setup	Pred	Downtime	Idle		
CNC_S7_81	Operator 1	WO0405200001	4168	58%	10:30 AM		55	41	0	80	215	0	45	In Progress	i
CNC_S7_81	Operator 1	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 technology and providing solution in Agri-tech, Smart cities, Industrial Monitoring, Smart Street Light, Smart Water/ Gas/ Electricity metering solutions etc.

iv. Predictive Maintenance

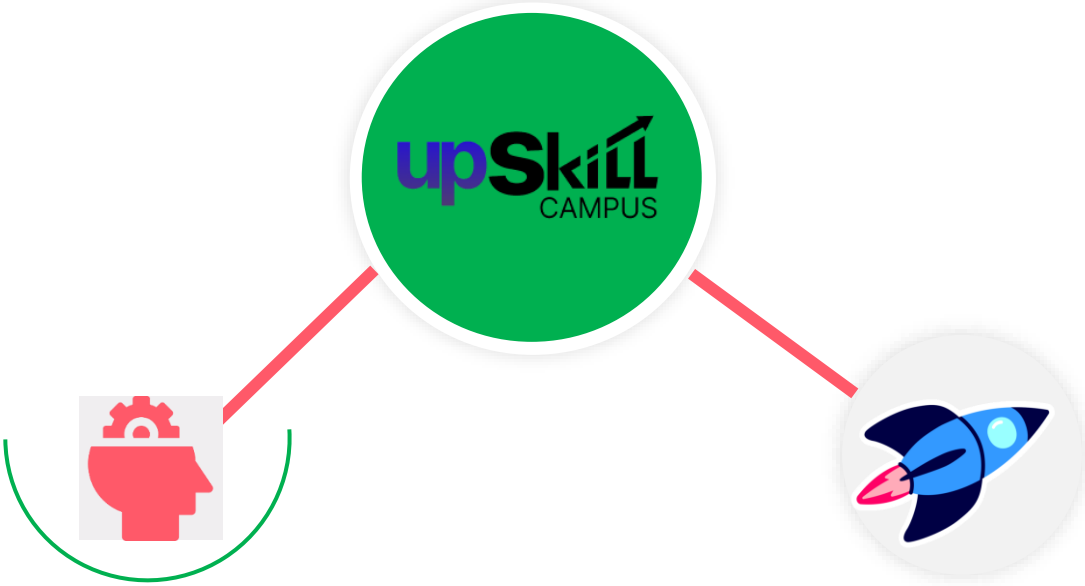
UCT is providing Industrial Machine health monitoring and Predictive maintenance solution leveraging Embedded system, Industrial IoT and Machine Learning Technologies by finding Remaining useful life time of various Machines used in production process.



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.

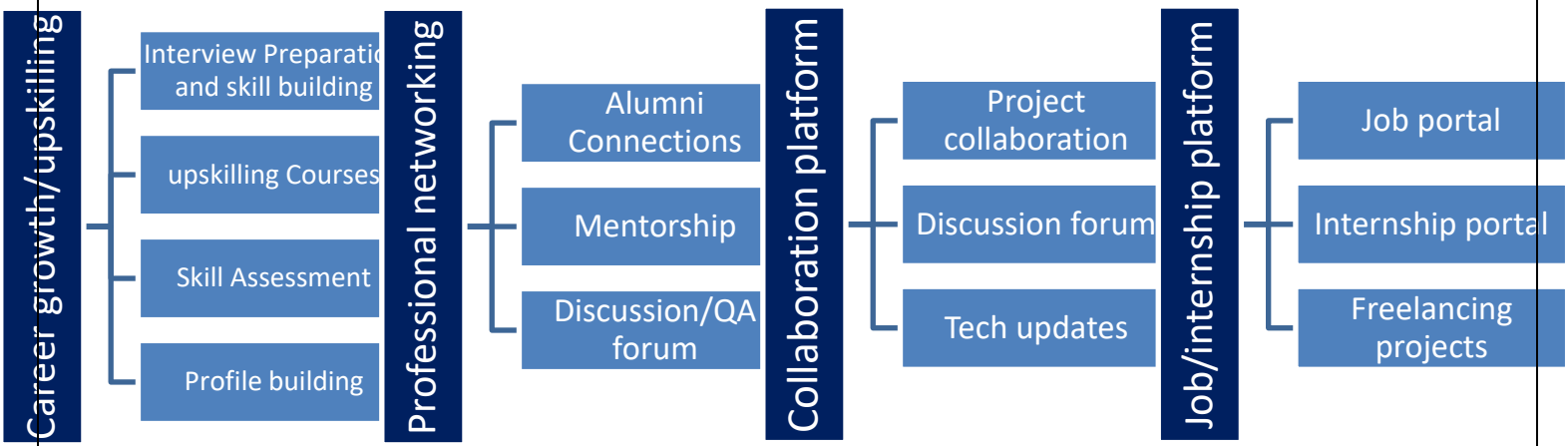
USC is a career development platform that delivers **personalized executive coaching** in a more affordable, scalable and measurable way.



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://code-projects.org/

[2] https://twitter.com/projects_code

[3] https://github.com/YousafKhan1/Employee-Management-System-in-React-Node-MySQL.git

[4] https://github.com/opendevs-org/react-projects/tree/main/employee-management-system

2.6 Glossary

Terms	Acronym
HR Management System	HRMS
Amazon Simple Storage Service	Amazone S3/ S3 bucket
Content Delivery Network	CDN
Employee Management System	EMS

3. Problem Statement

In the evolving corporate landscape, there is a growing necessity for a scalable and user-friendly Human Resource Management System (HRMS) that seamlessly integrates with cloud technologies. During our six-week internship at UniConverge Technologies Pvt Ltd (UCT), we were tasked with the development of a modern HRMS leveraging the serverless functionalities of Amazon Web Services (AWS).

The project aimed to address the prevalent issues in existing HRMS solutions, which are often complex, less customizable, and not fully exploiting the benefits of cloud computing. The goal was to create an intuitive, cost-effective, and adaptable HRMS that would facilitate secure and efficient organizational workflows, aligning with the dynamic needs of contemporary business environments.

Utilizing AWS services, the project was structured to progress from initial research and planning to development and final validation within a six-week timeframe, aiming to deliver a robust HRMS that stands as a benchmark in the industry.

4. Existing and Proposed solution

Provide summary of existing solutions provided by others, what are their limitations?

The current market offers a range of HR management systems, but many are either too complex, lacking in customization, or not fully exploiting the benefits of cloud computing technologies, such as scalability, flexibility, and security. Additionally, with the increasing reliance on remote working environments, there is an urgent need for an HRMS solution that can cater to the evolving dynamics of the corporate sector. The primary challenge, therefore, was to develop a solution that is not only robust and feature-rich but also user-friendly, cost-effective, and easily adaptable to various business environments.

Proposed Solution

To address the identified gaps in the current HR management systems, our proposed solution is a serverless HR management system developed on the Amazon Web Services (AWS) platform. The system integrates a user-friendly frontend developed using HTML, CSS, and JavaScript with a robust backend leveraging AWS services such as S3 bucket, CloudFront, Lambda functions, Amazon REST API, and DynamoDB. This approach not only ensures scalability and cost-effectiveness but also allows for customization to meet specific organizational needs, thereby offering a flexible and adaptive HRMS solution.

Value Additions

Here are the focal points of planned value addition:

User-Centric Enhancements: Improving the user interface and experience to make it more intuitive, facilitating easier navigation and accessibility..

Security Upgrades: Implementing advanced security protocols to safeguard sensitive data, adhering to global data protection standards, and ensuring a secure environment for business operations.

Global Compliance: Developing modules that adhere to various global compliance and regulatory requirements, enabling the system to be adaptable and globally scalable.

Cost-Effectiveness: Ensuring that the system remains cost-effective, providing high value for money and promoting affordability without compromising on quality and features.

4.1 Code submission (Github link):

https://github.com/Nency-Ravaliya/upskillcampus.git

4.2 Report submission (Github link):

https://github.com/Nency-Ravaliya/upskillcampus.git

Website link: https://d2ac622r81rw6d.cloudfront.net

For login: ID: nency

Password: 123

5. Proposed Design/ Model (Agile methodology)

1. **Agile Values and Principles**:

Customer Collaboration: Throughout the design and development phases, we prioritize understanding and meeting user and organizational needs through constant collaboration and feedback gathering by creating a hypothetical customer needs scenario with my peers.

Iterative Development: Our model involves iterative progress, with each phase building upon the previous one, allowing us to adapt and evolve the system as we go.

Responding to Change: Agile encourages adaptability, and our design model ensures that we can respond to changing requirements or feedback from users effectively.

2. **Initialization Phase - Requirement Gathering**:

Agile places a strong emphasis on gathering and prioritizing user requirements, which is a critical step in our initialization phase.

3. **Design Phase - User Interface Design:**

Agile values user-centric design, and our wireframing and UI design efforts ensure that the system is intuitive and responsive, meeting user expectations.

4. **Development Phase - Frontend and Backend Development**:

Agile promotes collaborative development, and our frontend and backend teams work closely together, following Agile practices like daily stand-ups and continuous integration.

5. **Integration Phase - API Integration and Testing:**

Agile encourages frequent integration and testing, and our API integration and testing phases follow this principle by ensuring seamless data flow and regular testing.

6. **Optimization Phase - Performance Tuning and Security Measures**:

Agile prioritizes ongoing improvement, and our optimization phase aligns with this by continuously monitoring and optimizing system performance and security.

7. **Deployment & Monitoring Phase - Deployment and Feedback Loop:**

Agile emphasizes delivering value to users quickly, which our deployment phase achieves. Additionally, our feedback loop ensures that we gather user feedback for iterative improvements.

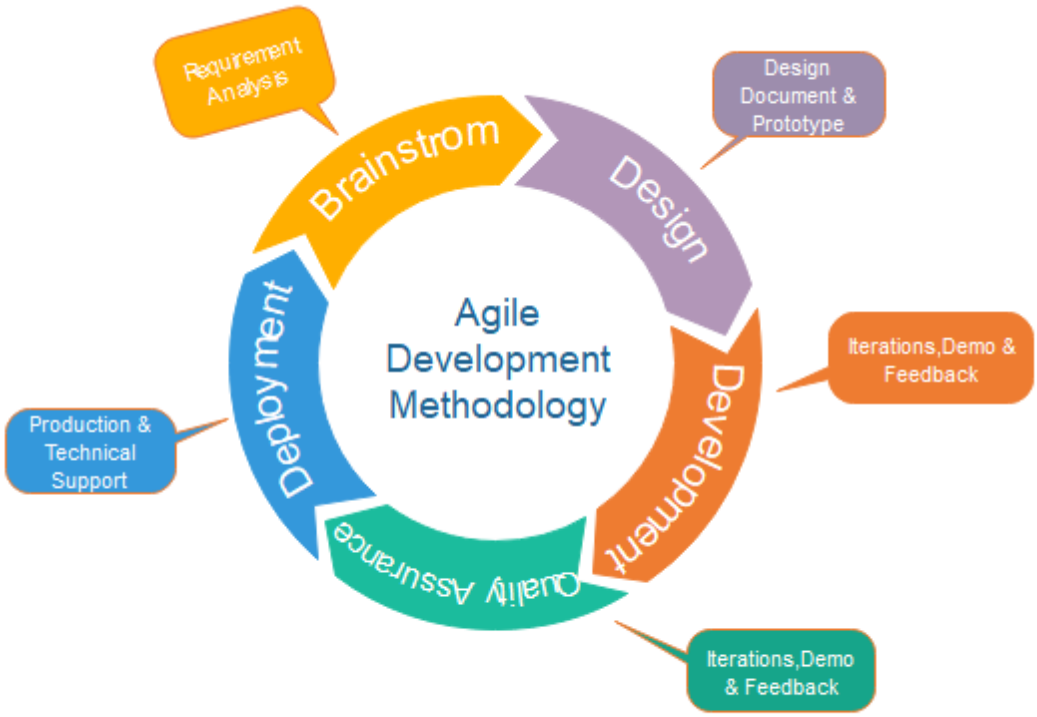


Fig. Agile Model

The proposed design for our serverless HR management system on AWS is a structured process that incorporates a multi-stage model to ensure robustness, scalability, and user-friendliness. Below is crucial phases of the development cycle:

1. Initialization Phase:

Requirement Gathering: Understand and list the fundamental features and functionalities the HRMS should offer based on user and organizational needs.

Platform Selection: Decide on the AWS services to be utilized based on the requirements. Initial selections include S3 bucket for storage, Lambda for serverless operations, DynamoDB for database management, etc.

2. Design Phase:

System Architecture: Design a blueprint of how different AWS services will interact with each other. This will include mapping out data flows, serverless operations, and frontend-backend communications.

User Interface Design: Sketch the frontend of the HRMS using wireframes. Ensure it's intuitive and user-centric. Focus on efficient navigation, aesthetic appeal, and responsiveness across devices.

3. Development Phase:

Frontend Development: Convert wireframes into working interfaces using HTML, CSS, and JavaScript. Integrate any necessary frameworks or libraries to enhance functionality.

Backend Development: Set up the necessary AWS services and create interconnections. Write Lambda functions for operations like adding, deleting, updating employee data, etc.

Database Setup: Configure DynamoDB tables to store employee data. Design schemas in a way that querying is efficient and scalable.

4. Integration Phase:

API Integration: Use Amazon REST API to integrate the frontend with the backend, ensuring seamless data flow between user interfaces and the database.

Testing: After integration, carry out unit testing for individual functionalities and integration testing to check the complete system's cohesiveness.

5. Optimization Phase:

Performance Tuning: Monitor the system to identify bottlenecks or performance lags. Optimize code and database queries to enhance speed.

Security Measures: Implement security protocols to protect data. Ensure encrypted communications, secure data storage, and safeguard against potential threats.

6. Deployment & Monitoring Phase:

Deployment: Launch the HRMS for end-users. Use AWS CloudFront for faster content delivery and optimal user experience.

Monitoring & Feedback Loop: Continuously monitor the system's performance, user interactions, and gather feedback. Use this feedback for iterative improvements.

In summary, our design model transitions from a conceptual phase to concrete development and ends with deployment and feedback. For DS/ML students specifically, once their algorithms are implemented, they can fit it into this model by integrating the algorithm in the Backend Development stage and optimizing it in the Optimization Phase. This multi-stage approach ensures a thorough and systematic development process, leading to a reliable and efficient HRMS.

5.1 High Level Diagram

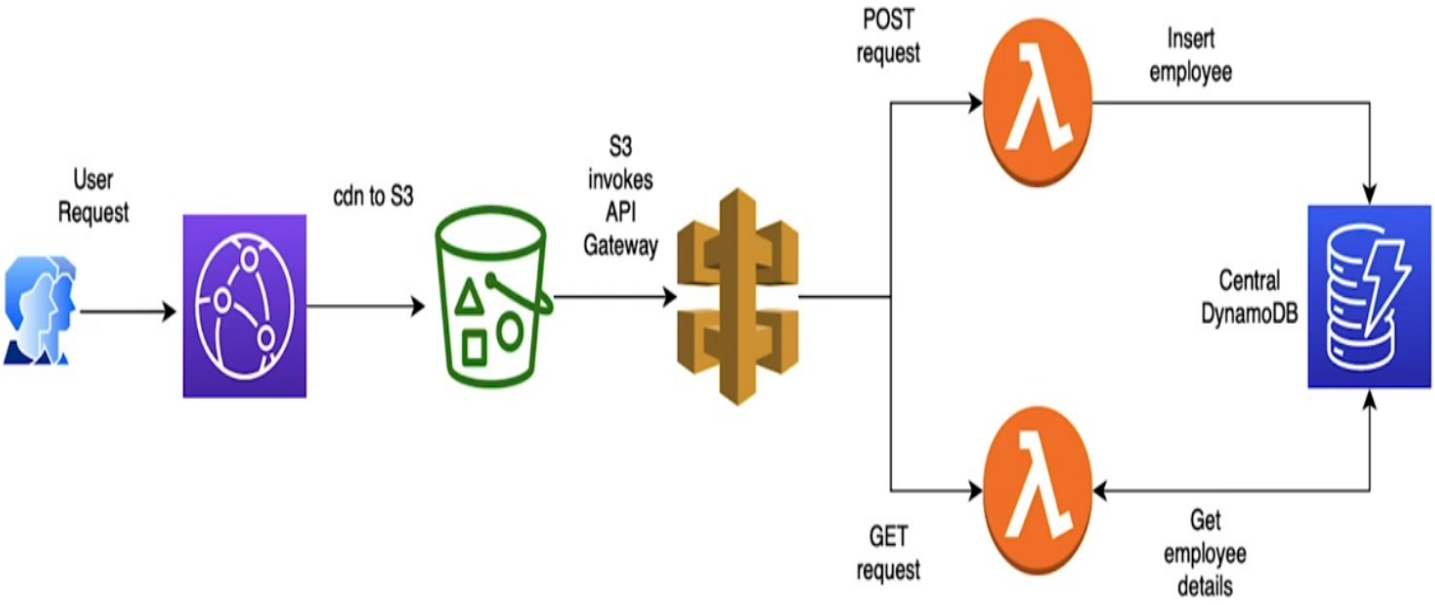
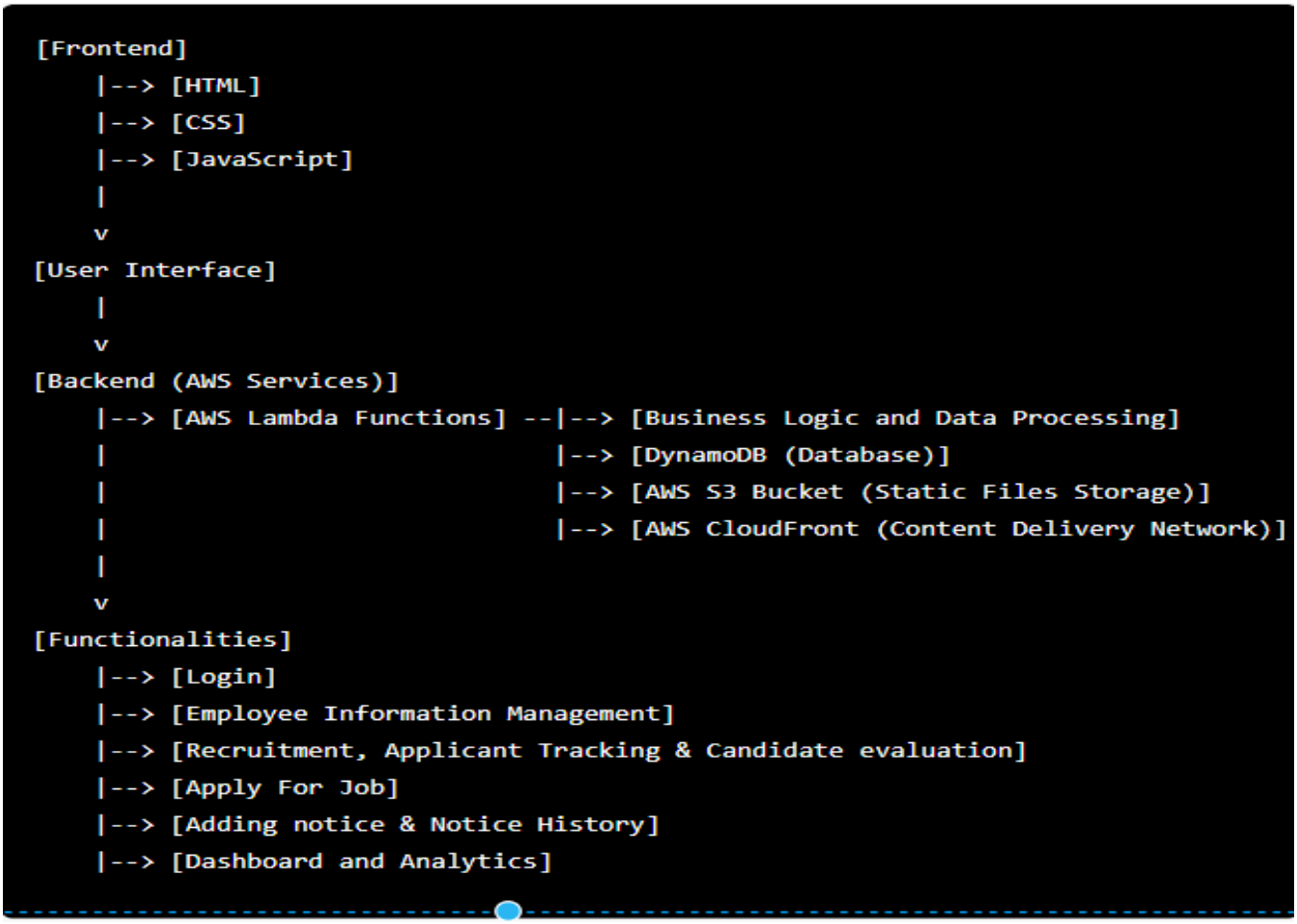


Figure 1: HIGH LEVEL DIAGRAM OF THE SYSTEM

5.2 Low Level Diagram



5.3 Interfaces

Block Diagram:

Frontend: Where the user interacts with the system, built using HTML, CSS, and JavaScript.

AWS Lambda Functions: The backend where business logic and data processing occur.

DynamoDB: The NoSQL database where all HR data is stored.

AWS S3 Bucket: Utilized for storing static files and resources.

AWS CloudFront: A content delivery network service that distributes content globally.

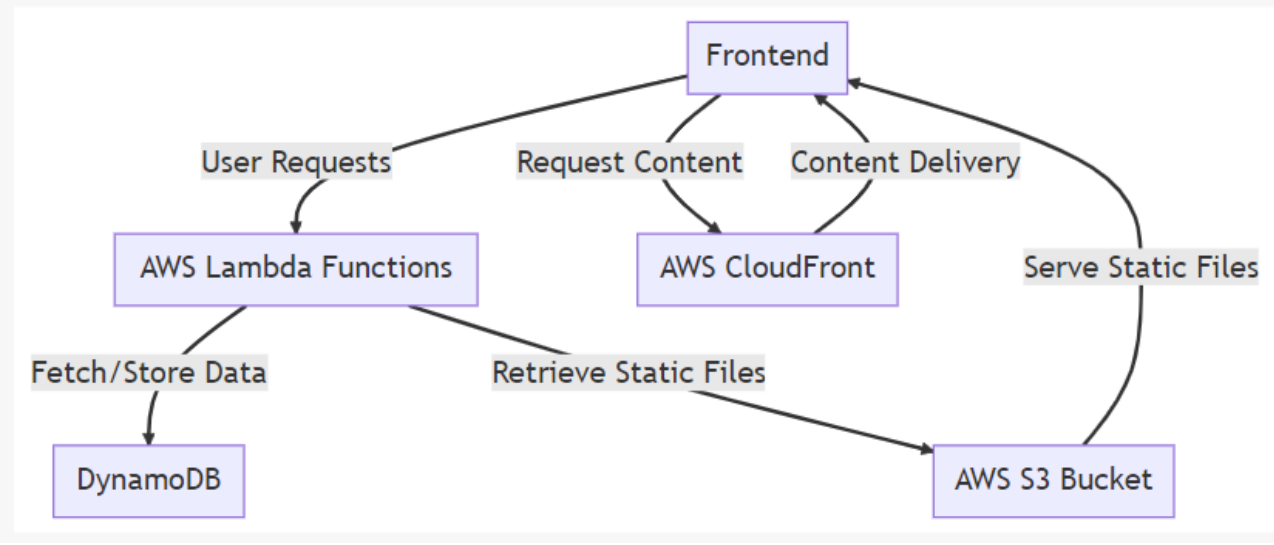
Interactions:

Frontend interacts with AWS Lambda Functions to serve necessary data.

AWS Lambda Functions communicate with DynamoDB to fetch or store data.

AWS S3 Bucket stores static files and resources used by the frontend.

AWS CloudFront distributes content globally with low latency and high transfer speeds.



Protocols

Frontend:

HTML, CSS, JavaScript: Technologies used to build the user interface.

HTTP/HTTPS: Protocols used for secure communication between the frontend and backend.

Backend (AWS Lambda Functions):

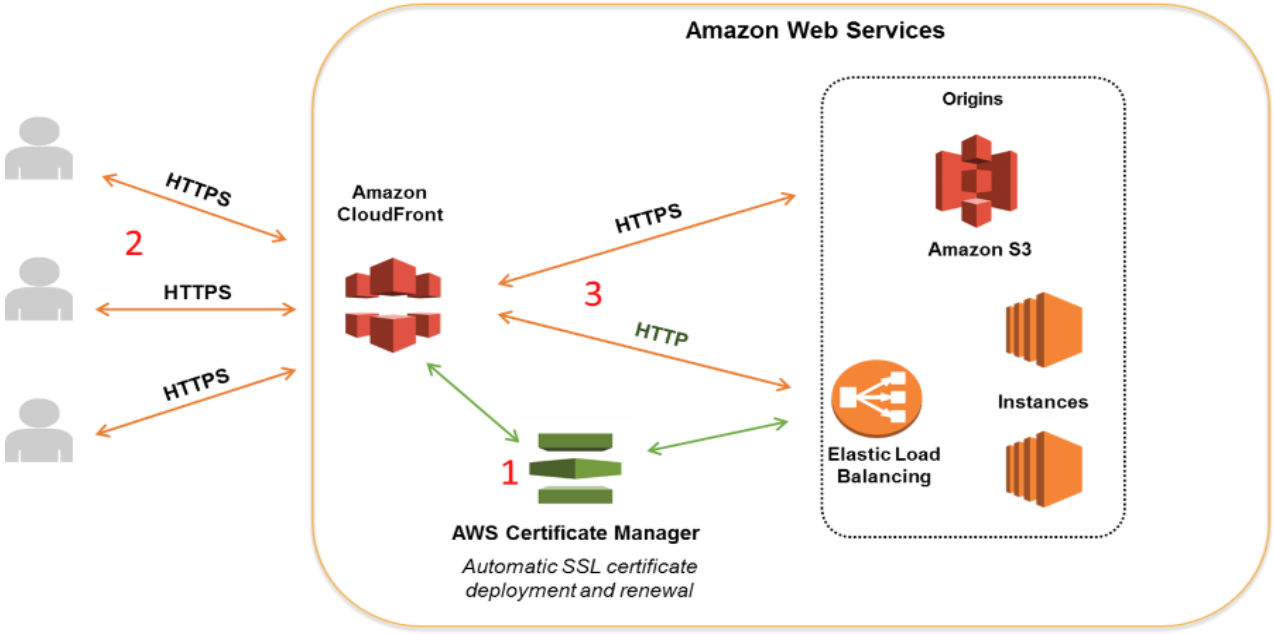
REST API: A set of rules that allow for interactions between the frontend and backend.

JSON: A lightweight data-interchange format used to transmit data between a server and web application.

AWS CloudFront:

CDN: Content Delivery Network used to distribute content globally with low latency and high transfer speeds.

Update with Block Diagrams, Data flow, protocols, FLOW Charts, State Machines, Memory Buffer Management.



Data Flow:

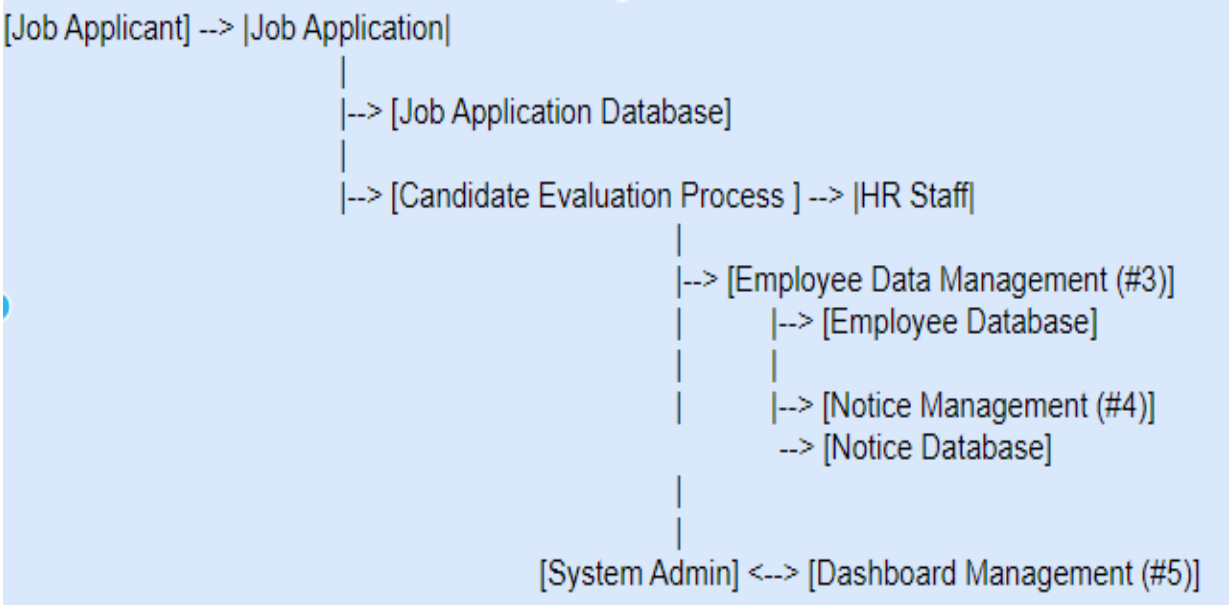
Job applicants submit applications which flow to the Job Application Process.

HR staff evaluates candidates through the Candidate Evaluation Process.

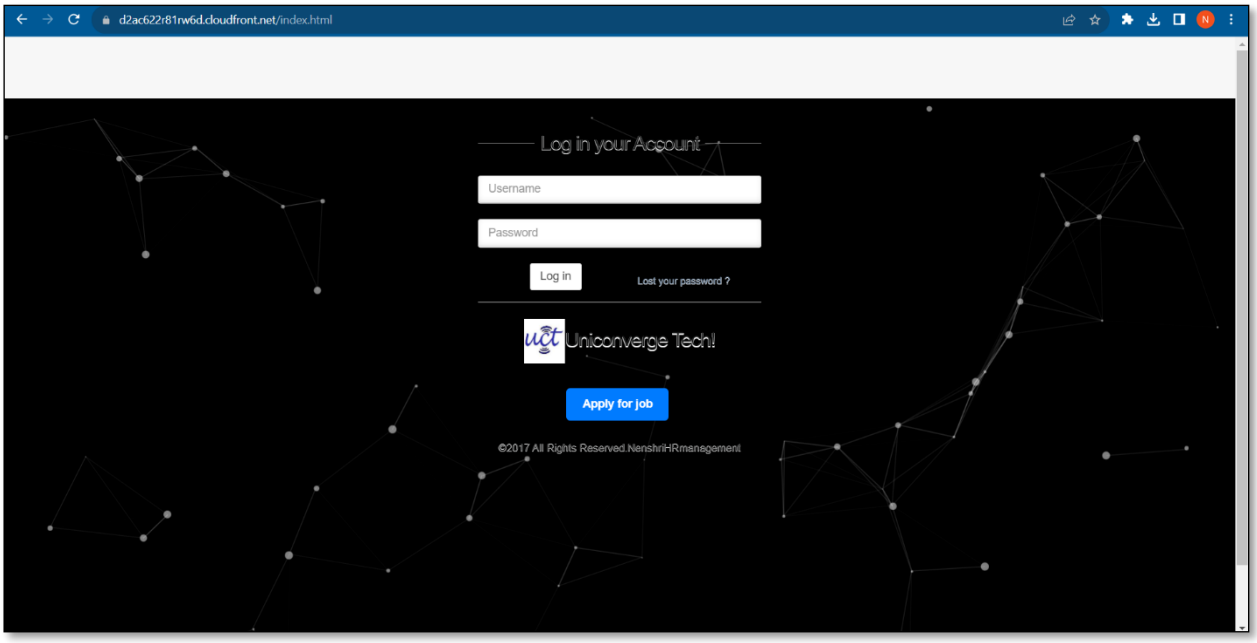
HR staff manages employee data through the Employee Data Management process.

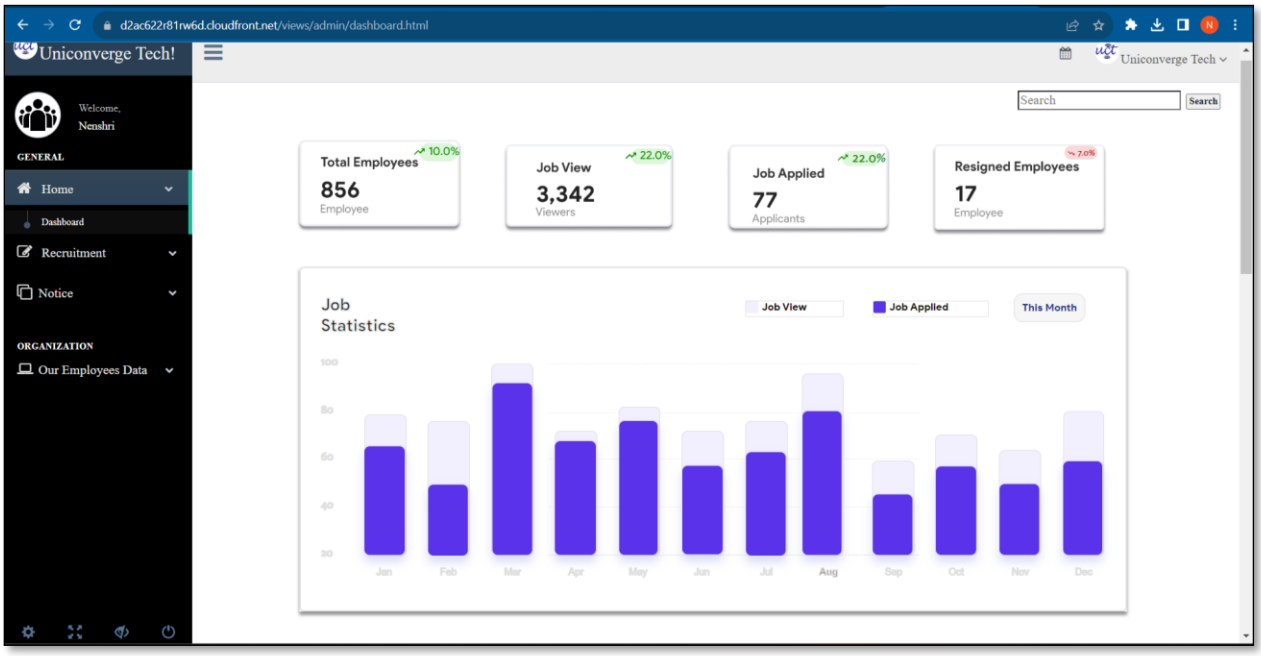
HR staff adds notices through the Notice Management process.

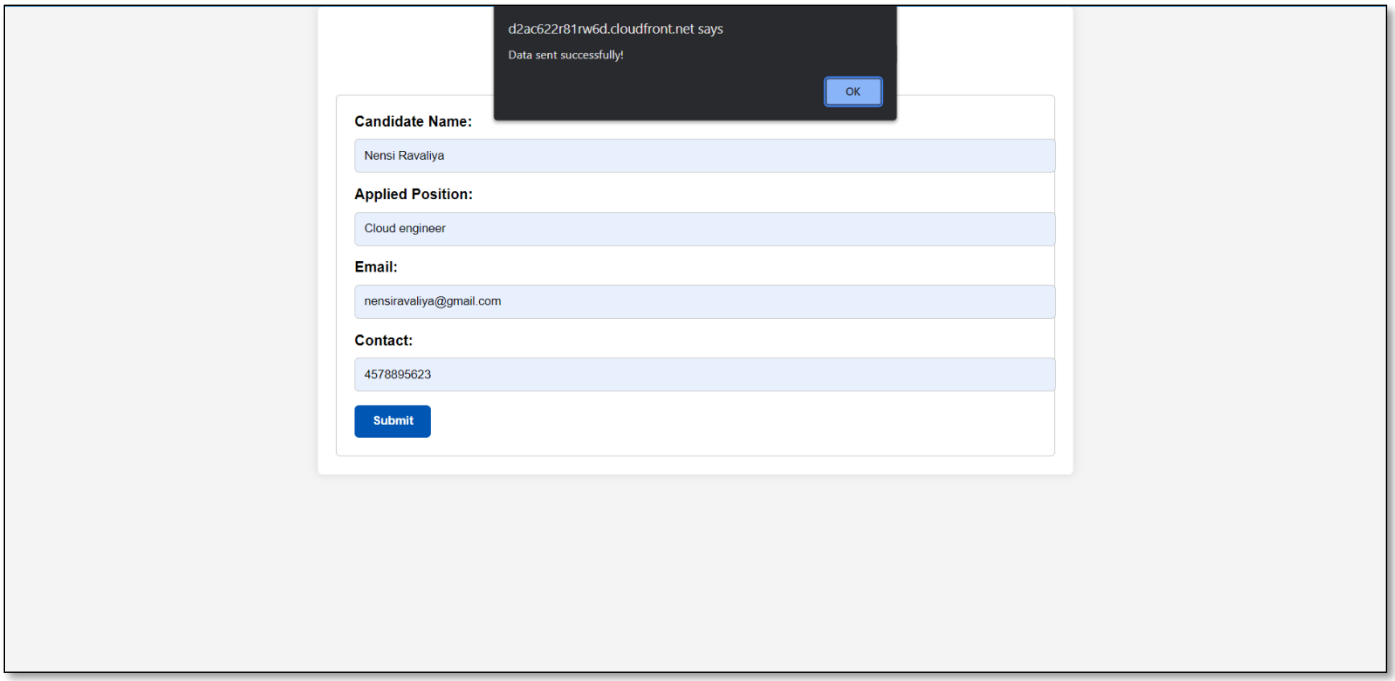
System Admin manages the dashboard through the Dashboard Management process.



Our User Interface (UI):



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Candidate Name:
Nensi Ravaliya
Applied Position:
Cloud engineer
Email:
nensiravaliya@gmail.com
Contact:
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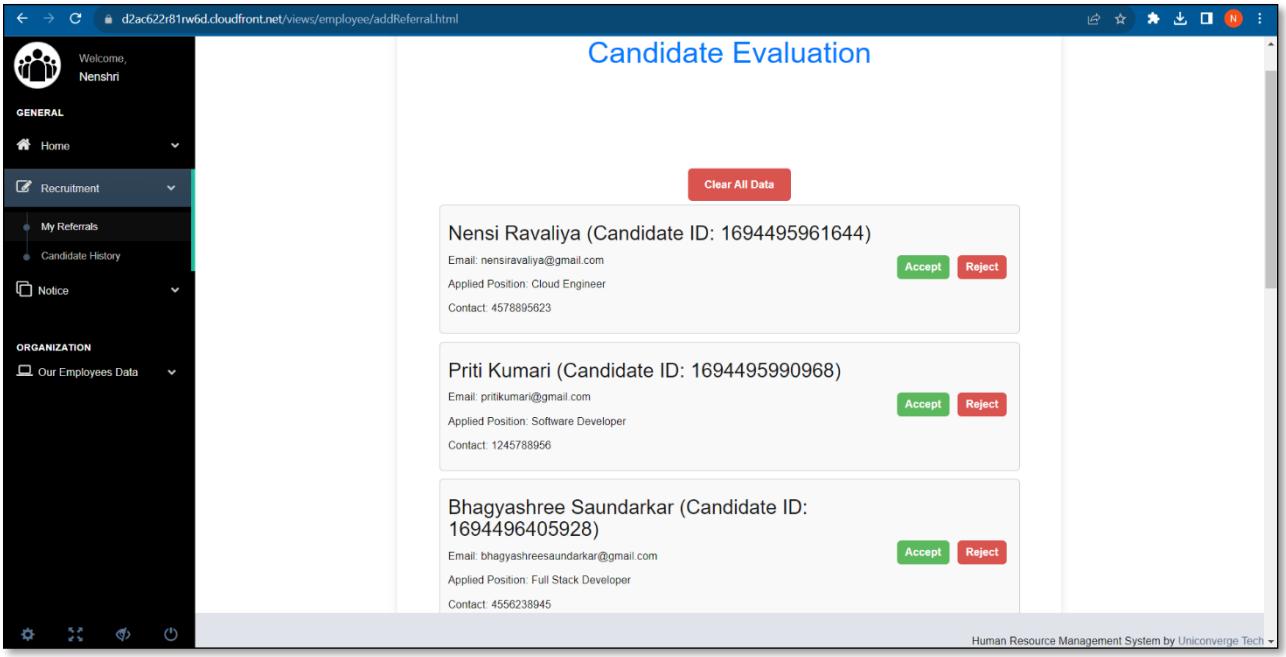
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Welcome,
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Recruitment
My Referrals
Candidate History
Notice
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Our Employees Data
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Clear All Data
Nensi Ravaliya (Candidate ID: 1694495961644)
Email: nensiravaliya@gmail.com
Applied Position: Cloud Engineer
Contact: 4578895623
Accept
Reject
Priti Kumari (Candidate ID: 1694495990968)
Email: pritikumari@gmail.com
Applied Position: Software Developer
Contact: 1245788956
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Bhagyashree Saundarkar (Candidate ID: 1694496405928)
Email: bhagyashreesaundarkar@gmail.com
Applied Position: Full Stack Developer
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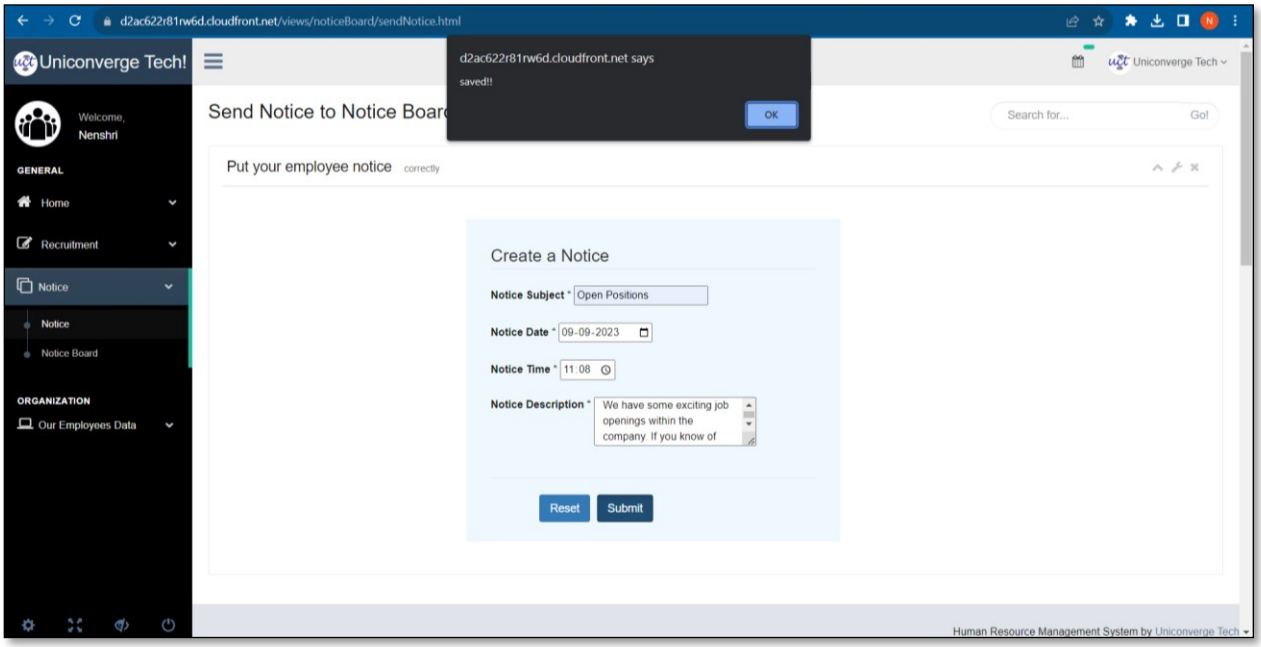
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Send Notice to Notice Board
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Go!
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Notice Subject * Open Positions
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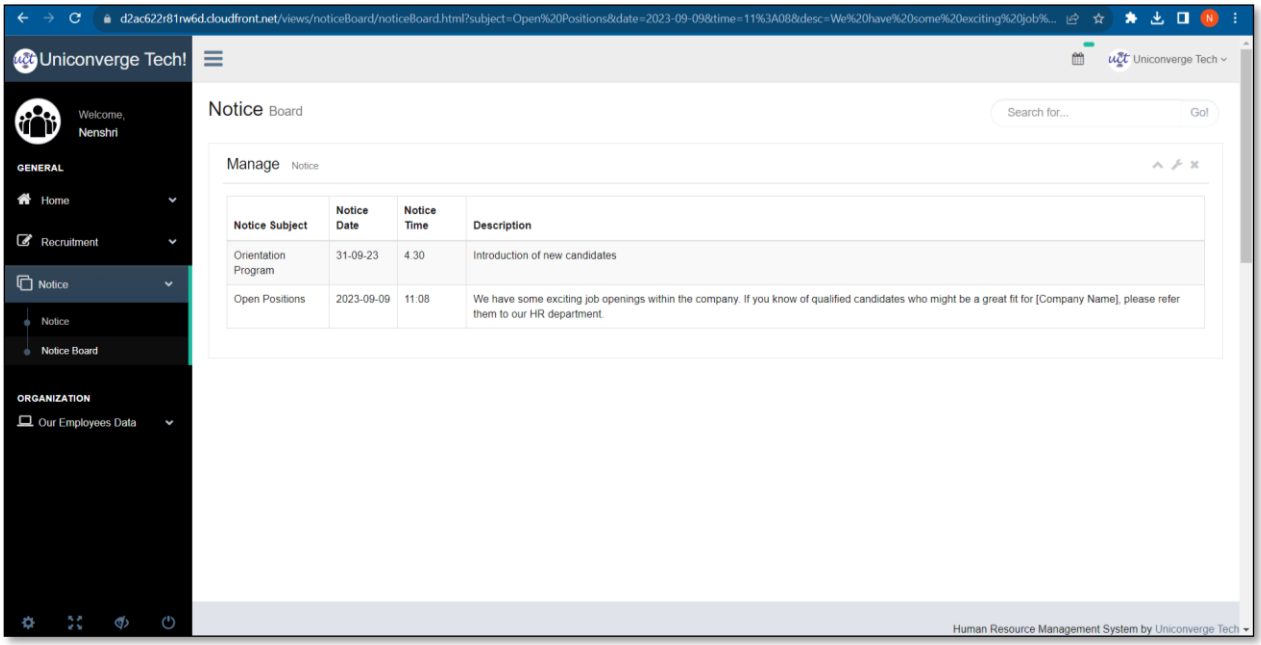
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Description
Orientation Program
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Introduction of new candidates
Open Positions
2023-09-09
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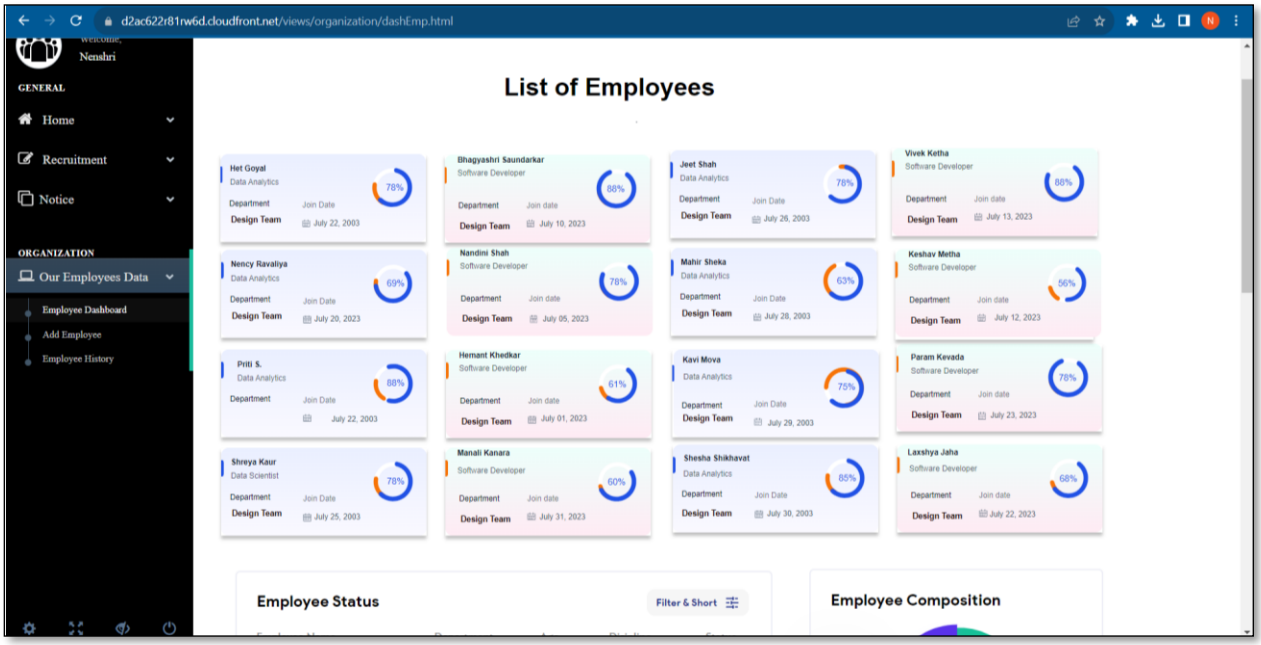
We have some exciting job openings within the company. If you know of qualified candidates who might be a great fit for [Company Name], please refer them to our HR department.
Human Resource Management System by Uniconverge Tech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Design Team
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Mahir Sheka
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Software Developer
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Priti S.
Data Analytics
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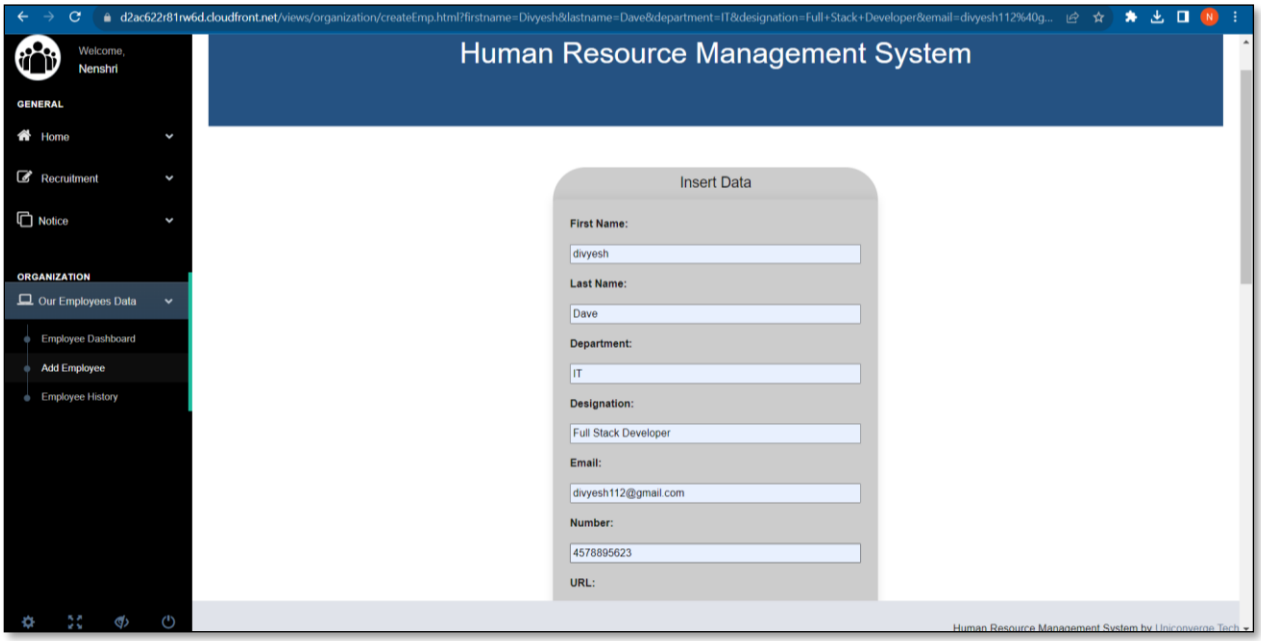
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Add Employee
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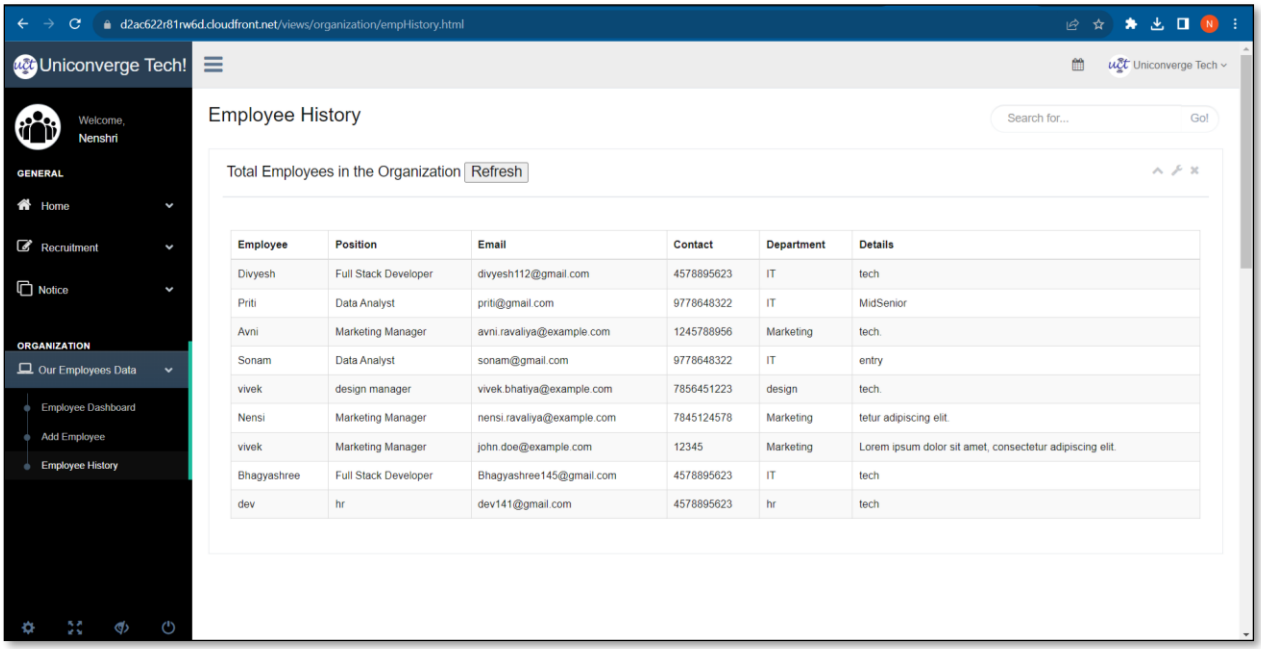
Insert Data
First Name:
divyesh
Last Name:
Dave
Department:
IT
Designation:
Full Stack Developer
Email:
divyesh112@gmail.com
Number:
4578895623
URL:
Human Resource Management System by Uniconverge Tech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Employee | Position | Email | Contact | Department | Details
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6. Performance Test

Performance testing was a pivotal phase in our project, distinguishing it from merely an academic exercise to a potential industry-standard application. We identified critical constraints such as speed, memory usage, and durability to ensure the system is optimized for real-world utilization. Here, we detail how these constraints were addressed, tested, and the results derived from these tests.

6.1 Test Plan/ Test Cases

Memory Usage:

Test Case 1: Monitor memory usage during peak hours to check if the system manages memory efficiently without any leaks.

Test Case 2: Measure the memory consumed by individual modules to identify any potential areas of optimization.

Speed (Operations per Second):

Test Case 3: Measure the response time of various operations performed in the system.

Test Case 4: Load test to check the system's ability to handle a large number of operations simultaneously.

Durability:

Test Case 5: Simulate system failures to check the system’s ability to recover without data loss.

Test Case 6: Perform stress tests to identify the breaking point of the system.

6.2 Test Procedure

Memory Usage

Utilize AWS CloudWatch to monitor the memory usage continuously.

Analyze the data to identify patterns and potential areas for optimization.

Speed:

Conducted tests to measure the response times of various APIs.

Durability

Conducted failure simulation tests to analyze the recovery process.

Execute stress testing to identify the system's breaking point and its ability to maintain data integrity.

6.3 Performance Outcome

Memory Usage:

The system displayed efficient memory management, with no noticeable leaks during peak hours. Optimization opportunities were identified in certain modules, which will be addressed in future iterations.

Speed:

The response time for most operations remained within the acceptable range, ensuring a smooth user experience. The load test results indicated that the system could handle a substantial number of operations simultaneously without significant lag.

Durability:

The system exhibited strong durability characteristics, recovering from simulated failures without data loss. Stress tests indicated that our system could handle a substantial amount of stress before reaching its breaking point, showcasing its readiness for real-world application.

Memory Optimization: Further optimization of memory usage in certain modules to enhance overall system efficiency.

Speed Enhancement: Implementing caching mechanisms to further improve the speed of operations.

Durability Improvements: Enhancing the system's durability by implementing advanced data backup and recovery mechanisms.

7. My learnings

During this immersive six-week internship, I gathered a wealth of knowledge and insights, both technically and professionally. Here's a snapshot of my key learnings:

1. **Technical Proficiency**: I honed my skills in cloud computing, specifically mastering various AWS services like Lambda, S3, DynamoDB, and CloudFront. The practical application of HTML, CSS, and JavaScript in frontend development also significantly elevated my technical prowess.

2. **Project Management**: The phased approach to the project taught me the intricacies of project management. Planning, coordinating, and executing each stage within a set timeframe helped cultivate a strategic mindset and fostered an understanding of how to manage resources efficiently.

3. **Collaborative Working**: Working alongside my peers, Bhagyashri Saundarkar and Nensi Ravaliya, I learned the value of teamwork and collaboration. It instilled a sense of responsibility and accountability, encouraging active participation and idea exchange.

4. **Problem-Solving**: Tackling real-world problems and finding feasible solutions improved my problem-solving capabilities. It encouraged me to think critically and creatively to overcome challenges and innovate within the project scope.

5. **Adaptability and Continuous Learning**: The dynamic nature of the project environment taught me to be adaptable, always ready to modify plans based on the evolving project requirements. This experience ingrained in me the importance of being open to continuous learning and growth.

6. **Industry Insight**: Getting a glimpse into the workings of a company at the forefront of digital transformation, like UCT, was incredibly enlightening. It provided a real-world context to the theories and concepts I had previously studied, offering a more comprehensive view of the industry's landscape.

7. **Professional Networking**: Interacting with industry professionals and mentors, especially Kaushlendra Singh Sisodia and Nitin Tyagi, expanded my professional network. Their guidance and support were invaluable in navigating the project complexities and fostering a growth-oriented mindset.

8. **Self-Reflection and Growth**: This internship served as a mirror, reflecting my strengths and areas where I could improve. It has been a journey of self-discovery, paving the way for personal and professional growth.

Overall, this internship has been a cornerstone in my developmental journey, equipping me with the skills, knowledge, and experiences that form a solid foundation for my future endeavors in the industry.

8. Future work scope

While my internship was a stepping stone into the world of cloud computing and HR system development, the potential for further growth and expansion is immense. The below-mentioned future work scopes reflect the broader vision of future. We look forward to the continuous evolution of this project, possibly ushering in a new era in HR management.

Integration with AI and Machine Learning: Incorporating AI and Machine Learning algorithms to automate and streamline various HR functions like recruitment, employee performance analysis, and predictive analytics for workforce management.

Advanced Analytics Dashboard: Developing a sophisticated analytics dashboard that can provide deep insights into various HR metrics, helping in informed decision-making.

Mobile Application: Designing and developing a mobile application synchronized with the web platform to facilitate remote access and on-the-go HR management.

Cross-Platform Integration: Enabling integration with other popular platforms and tools commonly used in organizations, such as CRM systems, Financial software, etc., to offer a centralized solution.

Blockchain Integration: Exploring the possibilities of incorporating Blockchain technology to enhance security and transparency in transactions and data management within the system.

Enhanced Security Measures: Continuously updating and upgrading the security protocols to safeguard against the evolving landscape of cyber threats.

Customizable Modules: Offering modules that are highly customizable to cater to the diverse and dynamic needs of various organizations, thereby making the system more adaptable.

Global Scalability: Working on optimizing the system further to ensure seamless scalability globally, accommodating the needs of multinational corporations with ease.

User Feedback and Continuous Improvement: Establishing a feedback loop with the users to continuously gather insights and suggestions, which could be utilized for iterative development and improvements.

Training and Support System: Setting up a comprehensive training and support system to assist organizations in efficiently utilizing the system and facilitating a smooth transition from existing systems.