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EmploEdge: An Employee Management System

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EmploEdge: An Employee Management System

By

Maisha Adity Farzana

Student ID: **1921278**

Summer, 2023

Supervisor:
Mahir Al Kamal

Adjunct Lecturer

Department of Computer Science & Engineering

Independent University, Bangladesh

October 18, 2023

Dissertation submitted in partial fulfillment for the degree of
Bachelor of Science in Computer Science

Department of Computer Science & Engineering

Independent University, Bangladesh

Attestation

The purpose of this attestation is mainly to verify that the report entitled “EmploEdge: An Employee Management System” has been executed by me, Maisha Adity Farzana (1921278), and submitted as part of the requirements of Independent University of Bangladesh (IUB) for the Degree of Computer Science and Engineering. Under the direction, the report was completed of Mr. Mahir Al Kamal (Supervisor).I further attest that every piece of work included in this report is completely unique and was created during my internship. According to academic norms, every source of information utilized in the project and report has been appropriately cited.



18.10.23

Signature Date

Maisha Adity Farzana

Name

Acknowledgement

I want to start by expressing my heartfelt thanks to the Almighty Allah for His gracious mercy that enabled me to complete my internship report. I am very grateful and appreciative to the Faculty of Computer Science and Engineering department for including the internship course, CSE499. It allowed me to gain real-world experience in a field that interests me. During the course of my internship and the creation of this report, I would like to extend my sincere gratitude to my supervisor, Mr. Mahir Al Kamal, Adjunct Faculty, Computer Science and Engineering, for his constant support, guidance, invaluable instructions, creative suggestions, and wise counsel.

I am sincerely grateful to the valued employees of ADN Diginet for giving me the chance to complete my internship as part of requirements for my graduation program and for providing me with the priceless experience of industry-oriented responsibilities and the workplace. My sincere gratitude goes out to the entire ADN development team, especially my industrial supervisor Mr. Dodul Hoque Khan, Project Manager, for their constant support, direction, priceless tips, and wise counsel while I was doing my internship and preparing this report.

Last but not least, I want to thank my parents and my siblings with all my heart for their continuous support during this time. I will always be appreciative of their efforts because they were crucial to my accomplishment.

Letter of Transmittal

Mahir Al Kamal
Adjunct Faculty
Department of Computer Science and Engineering
School of Engineering and Computer Science
Independent University, Bangladesh

Subject: Submission of Final Internship Report in Compliance with Graduation Requirements.

Dear Sir,

I am hereby submitting my Internship Report, a crucial and important component of my Bachelor's degree in Computer Science and Engineering, with utmost respect. I am deeply grateful for the invaluable guidance I received under your esteemed mentorship. This report encapsulates my three-month internship experience at ADN Diginet, working under the supervision of Mr. Dodul Hoque Khan, the Project Manager at the company. During this period, I had the privilege to acquire both theoretical knowledge and hands-on experience, along with establishing valuable professional connections.

I have diligently strived to ensure that this report is comprehensive and informative by integrating the skills and expertise I gained during my internship. I have followed the provided guidelines meticulously and included ample details in the report. I am confident that this document fulfills the objectives of my internship program effectively.

I will be immensely grateful if you would take the time to review the report and provide your valuable feedback. It would be a tremendous honor if you find the report informative and helpful in having a better understanding of my internship experience.

Sincerely,
Maisha Adity Farzana
ID: 1921278
Department of Computer Science and Engineering
Independent University, Bangladesh

Evaluation Committee

Supervision Panel

Academic Supervisor Name. Mahir Al Kamal	Industry Supervisor Name: Dodul Haque Khan

Panel Members

Panel Member-1 Name: Sanzar Adnan Alam	Panel Member-2 Name: Mohammad Motiur Rahman

Panel Members

Panel Member-3 Name: Md. Mahmudul Peyal	Panel Member-4 Name: Marzan Binte Hasan

Office Use

Program Coordinator Name: Subrata Kumar Dey	Head of Department Computer Science & Engineering Name: Mahady Hasan

Abstract

While I was doing my internship at the software engineering division of ADN Diginet, I had the opportunity to expand my knowledge of web application development and its practical uses. In response to the challenges of managing a diverse and dynamic team in the modern business landscape, I am working on “EmploEdge”, an Employee Management System (EMS). This system enables administrators to access and manage current employee information and relevant data. The project aims to streamline administrative processes, centralize personnel data, and improve worker performance. Traditional manual methods often lead to inaccuracies and inefficiencies in task assignments, performance evaluations, and staff records. The EMS effectively addresses these issues by ensuring digital technology to automate various HR procedures. The EMS serves as a comprehensive platform that simplifies human resource processes, increases efficiency, and ensures compliance with company policies and regulations. It prioritizes security and privacy, offering secure authentication and data protection to ensure a seamless and secure user experience. The system is equipped with a centralized database that securely stores and manages critical employee information, ensuring data integrity. I have made modifications to the website’s structure, layout, and design to enhance the user experience. This project will showcase my capability to quickly learn new frameworks and programming languages. Additionally, they will highlight my ability to combine software engineering skills and problem-solving approaches. This internship has been a transformative experience that also significantly improved my teamwork and communication skills, which will be invaluable assets throughout the course of my work as a web developer.

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Chapter 1

Introduction

1.1 Overview/Background of the Work

An Employee Management System (EMS) helps to manage employees in order to keep their information organized and more efficient. The most significant challenge as an intern is positioning academic knowledge into practice. On June 1st, 2023, I started working as a software engineer intern at ADN Diginet where I was appointed to contribute to developing an employee management system project. It is an existing project and requires potential attention on the database and data integrity. Nowadays, having an up-to-date employee management system is essential to automate and streamline various tasks. It enables to ensure employee data, leave management and attendance tracking. This makes it easy to update and access the required information whenever necessary. It provides valuable insights to recognize top performers and aids in identifying areas for improvement and promoting employee development. This website will not only save time but also reduce the likelihood of errors allowing human resources professionals to concentrate on strategic projects and employee development. When it comes to organizing, maintaining, and preserving information about employees, the database is essential. It acts as the system's foundation, offering a dependable and secure repository for various HR and employee data. Hence, lack of an employee management system can result in inefficiencies, problems with data management, compliance, and lower employee satisfaction. By streamlining HR procedures, increasing workforce productivity, boosting employee engagement, and promoting better decision-making, an employee management system can cut expenses. The combined advantages eventually enhance productivity and reduce costs for the business.

1.2 Objectives

The primary objective of my work during the internship was to contribute to the development and implementation of a software application similar to an Employee Management System.

The specific objectives included:
• Designing a better User Interference

• To effectively manage employee data, attendance tracking, leave management and performance reviews for a large workforce.

• A centralized system enables HR staff and employees to access and manage information from anywhere.

• Employee information is sensitive and needs to be protected from intrusions and breaches.

• Having secure authentication

1.3 Scopes

The scope of my work encompassed various aspects related to the development of an employee management system-like application.

The specific scopes included:

• An employee management system serves as a centralized database to store and manage detailed employee data including contact information, job responsibilities, and employment history.

• It's important for the EMS to have role-based access controls assuring that each user can only access the information and perform the actions relevant to their job responsibilities.

• The purpose of this website is to help maintain data privacy and security within the organization.

• The admin and authorized administrators will be able to make necessary changes to the database like adding or deleting the information of employees.

• It will hold all the vital information of all the employees of an organization like date of joining, date of termination, position of employees, working hours and other important data statistics.

• It will hold matrices related to the performance of employees, productivity and key performance indicators.

• Writing clear, concise, and self-explanatory code in a style that makes it easy to modify and extend the functionality.

• Documenting the feature design, implementation and developing the backend

Chapter 2

Literature Review

The ideas and methods of data structures including linkedlists, arrays, stacks, queues, trees, and graphs are covered in this course, which also strengthens the critical thinking and problem-solving abilities necessary for every software engineer. The information learned here was useful in selecting the best data structure for issues with the storing, retrieving, and updating of data.

2.1 Relationship with Undergraduate Studies

The knowledge and skills acquired in undergraduate studies have been helpful in developing the ”EmploEdge” website. The conceptual groundwork needed to finish this project is provided by these courses. An extensive assessment of the state of knowledge on a subject is given in a literature review, along with areas that require more research.

•CSE101+L-Introduction to Computer Programming: - This course covers the fundamentals of programming, including the declaration of variables, iteration, conditional statements, switch-case statements, arrays, and functions. It also covers the introduction to a new programming language.

• CSE203+L - Data Structure: - The ideas and methods of data structures including arrays, linkedlists, stacks, queues, trees, and graphs are covered in this course, which also strengthens the critical thinking and problem-solving abilities necessary for every software engineer. The information learned here was useful in selecting the best data structure for issues with the storing, retrieving, and updating of data.

•CSE303+L-Database Management: -The first course that covers project planning and design was CSE303 and uses software systems to store, run and retrieve data . The Rich Picture, System Development Life Cycle, Requirement Analysis, Entity Relationship Diagram (ERD), Business Process Model and Notation Diagram (BPMN) and other widely known planning and strategy methodologies were reviewed. These techniques helped with the project's planning and strategy formulation.

• CSE307- System Analysis and Design: -The techniques and methods employed in the design analysis and information systems are covered in CSE307. Some of the techniques and strategies covered in this course-such as requirement analysis, data flow diagrams, entity relationship modeling, user interface design and software testing were used in this project. Communication with various stakeholders and

documentation of the system specs and design decisions were also made easier thanks to the knowledge gained from this training.

•CSE309+L-Web Application: - A thorough introduction to web-related technologies and their applications is provided in this course. The front-end languages discussed in the course are HTML and Cascading Style Sheet (CSS), as well as the back-end languages PHP, MySQL and jQuery have had the biggest contribution in this project.

• CSE451-Software Engineering: - This course gives fundamental insights of the Software Development Life Cycle (SDLC), which enables the execution of projects and software development in a well-structured manner. The SDLC outlines a detailed roadmap consisting of various stages or phases, each with its own defined processes and outcomes. By following the SDLC, we can mitigate project risks and reduce costs, while also accelerating the development process and improving overall production efficiency. This newfound knowledge proves to be immensely beneficial and advantageous for my future endeavors and particularly this system.

2.2 Related works

I am working on an Employee Management System for my internship. Although there are other websites like this one on the internet, below I have mentioned a few:

monday.com: monday.com is a comprehensive work management solution designed to enhance team productivity by facilitating seamless collaboration and efficient handling of intricate projects. Developed as a cloud-based platform, it aims to simplify work processes through a range of useful tools and applications.

Paycor: Paycor is a cloud-based human resources system specifically tailored for small and medium-sized enterprises. It encompasses a wide range of essential HR functions such as recruitment, onboarding, learning and development, time tracking, and payroll.

BambooHR: BambooHR is a US-based tech company offering human resources software as a service. It operates as a comprehensive HR information system (HRIS) that combines numerous HR functionalities, including applicant tracking, time tracking, payroll processing, employee engagement, and tools to gauge employee satisfaction. Designed primarily for small and medium-sized businesses, BambooHR aims to cater to the needs of the people working in these organizations.



Chapter 3

Project Management & Financing

3.1 Work Breakdown Structure

The work breakdown structure serves as a valuable tool for arranging and strategizing the different phases of a project. It comprehensively outlines all the essential work packages, deliverables, and activities necessary for the successful completion of the project. At the highest level of the WBS diagram, the final project product is depicted, along with the related activities and work packages essential for its creation. By offering a well structured and transparent view of the required tasks, the WBS facilitates a clear understanding of the work essential to achieve the project's objectives.

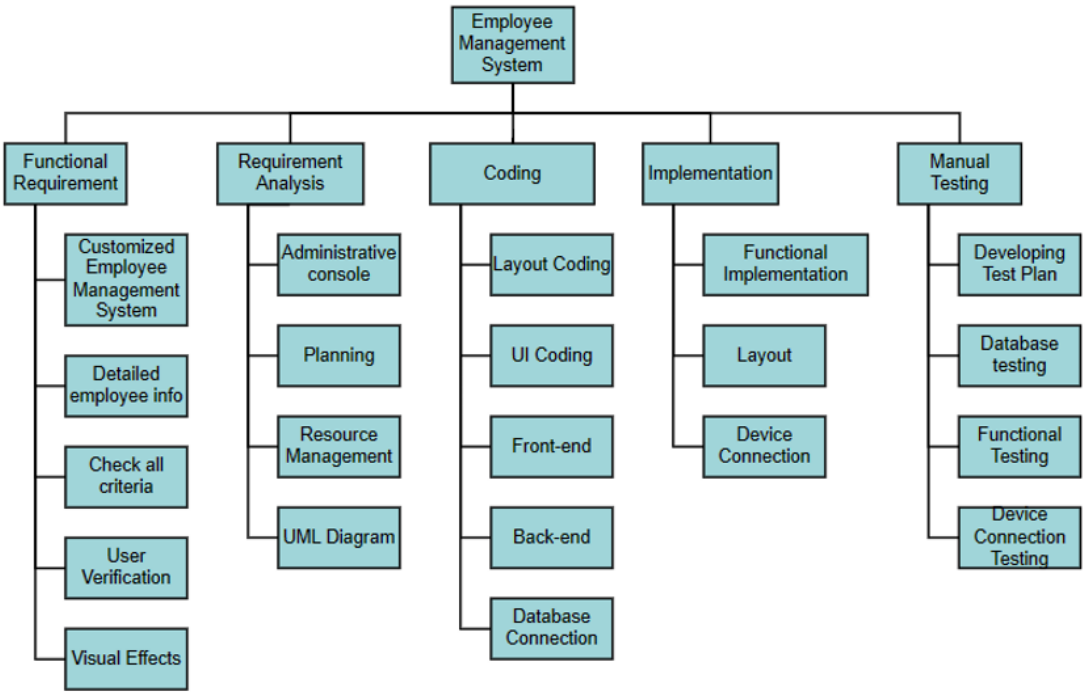


Fig 3.1 Work Breakdown Structure (WBS)

3.2 Process/Activity wise Time Distribution

Process wise time distribution is defined as the amount of time needed to complete a project successfully. This aids the developers in developing a mind map outlining how quickly they must work in order to fulfill deadlines. The biggest obstacle to effectively building an application is time management. Therefore, fixing the content comes first, and development takes this context into account. Time management is a process of organizing and controlling the amount of time spent on different tasks. An employee who has effective time management can achieve more in less time, feel less stressed, and succeed professionally. To finish any job, time distribution is crucial.

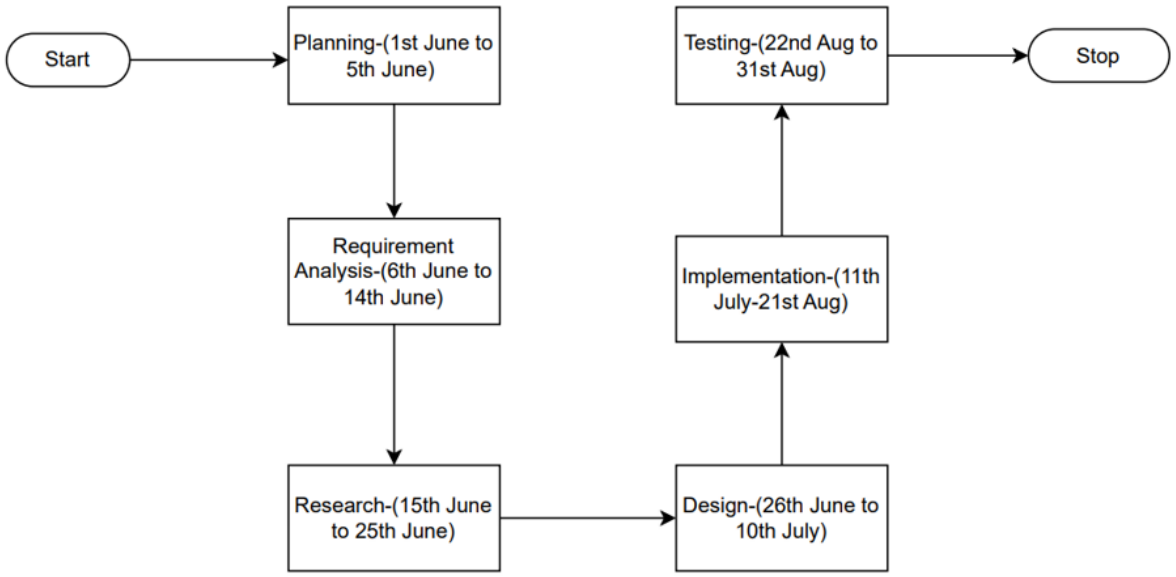


Fig 3.2 Activity-Wise Time Distribution

3.3 Gantt Chart

A Gantt chart is a project management tool which helps with the scheduling and planning of projects. They are extremely useful for streamlining complex projects thoroughly. Horizontal bar charts are usually created using project management timelines and tasks to display start and end dates, dependencies, scheduling, and deadlines, as well as the percentage of a task that has been completed in each step along with the task owner. When there is a big team and numerous stakeholders, the Gantt Chart helps to keep work on track when the scope changes.

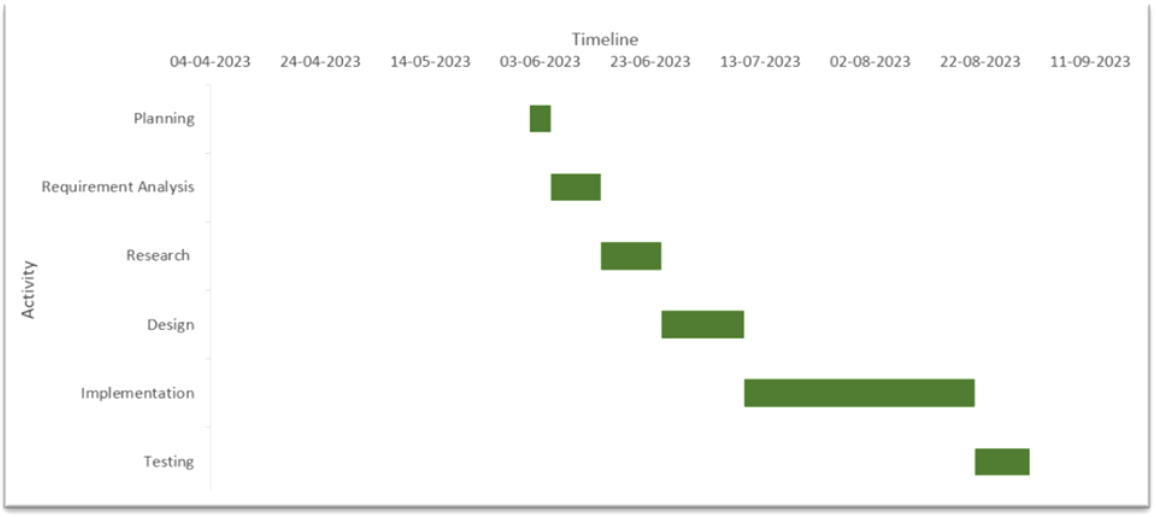


Fig 3.3 Gantt Chart

3.4 Process/Activity wise Resource Allocation

Planning: Efficient planning is very important and crucial. It serves as a means to point out essential tasks, distribute responsibilities among team members and create a well-structured approach to project completion. By conducting a systematic and all encompassing planning process, potential obstacles such as plan modifications or resource constraints can be anticipated and mitigated. Furthermore, effective project planning facilitates improved management of time and resources.

Requirement Analysis: The outcome of a project's success heavily relies on the caliber of its requirement analysis. This crucial process enables organizations to indulge into the existing system and acquire the requirements of stakeholders at a profound level. Moreover, it aids the development team in effectively communicating with stakeholders through the utilization of visual aids like charts, models, and flowcharts. Through this approach, a clearer and more comprehensive understanding of the project's needs is achieved, significantly influencing the project's ultimate success or failure.

Research: Conducting this research was imperative to facilitate this project's design process. It entailed crucial tasks such as identifying the most optimal technology stack for both the back-end and front-end. It also addressed inquiries regarding application creation, design, automation and quality evaluation. Additionally, the research evaluated suitable approaches for the application's development.

Design: UI/UX design exerts a substantial influence on user engagement and overall productivity. Research indicates that users form their opinion about a website's appeal within a mere 50 milliseconds, underscoring the critical role of superior UI design.

Implementation: In this phase, the development team begins creating the program, integrating components, and carrying out other activities in accordance with the project 5 schedule. Project managers make sure the project continues on pace to meet its goals throughout this critical phase by regularly monitoring progress, resolving any problems that may develop, and so forth.
Testing: After concluding the implementation phase, the team will initiate testing for the application. This stage will involve assessing elements like manual authentication, website responsiveness, and design.

Activity	Days	Work percentage
Planning	5	5.43%
Requirement Analysis	9	9.78 %
Research	11	11.96%
Design	15	16.30%
Implementation	42	45.65%
Testing	10	10.88%
Total	92	100%

Fig 3.4 Activity wise work percentage

3.5 Estimated Costing

The estimated costing provided encompasses various elements, including the remuneration of the employees involved in the app's development, which includes myself and other members of the team. It is important to note that the costing outlined in the table does not encompass the entirety of the app's lifecycle, but rather focuses specifically on the RD phase. Therefore, the costs reflect the financial commitment associated with personnel salaries during this crucial period of development.

Features	Costs
Internet Bills	5000
Project Manager	30000
Hosting	5000
Frontend Developer & UI/UX Designer	8000
Backend Developer	40000
Testing	15000
Total Cost	**103000**

Fig 3.5 Estimated Costing Table

Chapter 4

Methodology

Course Of Action

The Software Development Life Cycle (SDLC) is an essential process to create software from inception to delivery. It is an industry-standard practice that ensures the development of high-quality software with the optimal utilization of time, resources, and cost. The SDLC process comprises several models, and each organization selects the most suitable model for their project management needs.

The usual SDLC process consists of the following steps: first, problem identification; then, requirements determination; then, analysis of all system requirements; then, design of the suggested system; development of the system; testing and maintenance; and lastly, system evaluation.

Software Development LifeCycle model :

The following SDLC models were considered for the development process of the project:

-Agile

-WaterFall

-Spiral

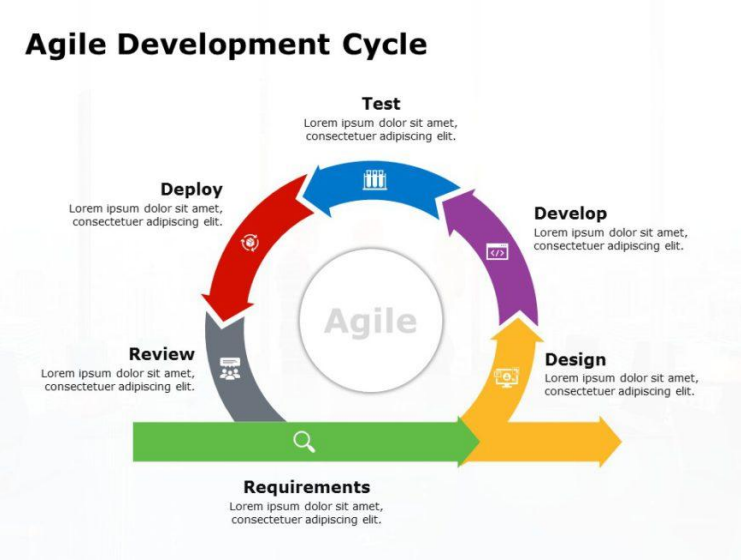
-Incremental

-Rapid Application Development

-Prototype

Methodology:

Throughout the internship, an agile approach was adopted to address different tasks and challenges. Unlike other engineering teams at the company, extensive documentation or intricate diagrams were not obligatory unless handling complex state flows. Instead, the focus was on writing code that could stand as its own documentation, achieved by adhering to strict style guidelines and ensuring clear and meaningful naming of variables and functions. When faced with intricate questions about the framework or business logic, discovering bugs, or considering new features, communication with senior foreign engineers who had experience with the framework was facilitated through direct conversation or video calls. The development process was guided by using user stories, use cases, and valuable user feedback, providing valuable insights to steer the project in the right direction.This approach encourages constant communication between the development team and the employees. The primary objectives of each iteration is the addition of new features, API integration, protocol configuration and ensures compliance with industry standards. By following this method, the development team can efficiently address backlogs and consistently deliver improved versions of the solution at the conclusion of each iteration. Different types of analysis were performed for “EmploEdge” and for the backend development, functional analysis was performed. It has been built using Express, React, and Node.js. Node.js is a runtime environment that allows the development of server-side applications using JavaScript outside of web browsers. MySQL serves as the database for storing data and supporting easy distribution over multiple devices. Express, a routing library for Node.js, simplifies the implementation of CRUD operations using various HTTP requests.



Chapter 5

Body of the Project

The main body of the project contains all the details of the work completed and serves as the project's main content. It includes what needs to be done, how to achieve it, and the expected outcomes should all be clearly outlined. It is crucial to identify the issue or problem being addressed and to sketch out a plan of action for solving it.This includes describing the situation as it is at the moment and providing an explanation for why the suggested remedy is appropriate. It is crucial to be precise when describing the methods used to collect and evaluate the data, as well as how the results will be presented. Overall, the project's body should be logically structured, informative, and should provide the facts in a way that is transparent and easy to comprehend.

5.1 Work Description:

The employee management system aims to provide a seamless and user friendly experience for the employees. It is very dynamic. It offers features such as login,create,delete and update to enable employees to keep a record of all the existing employees and their salaries. The details can also be viewed whenever needed. An insight of the options that the site will have is mentioned below:

1. Login in: This will be accessed by clicking on the Login option using their fixed employee credentials. The users will use their unique email and password to log in into the system.The login process ensures the security and integrity of the system.If the username or password is incorrect, the user will see an alert and will further require to enter the login credentials. Overall, EmploEdge’s login process provides a secure and efficient means for drivers to access the system, minimizing the risk of unauthorized access and ensuring the integrity of the employee management operations. The login page has a combo box, from which the user must select:
a.Admin
b.Employee
The employee will be able to log in from the credentials that the Admin has created in the database.

2. Admin Interface: An admin dashboard is an important component of many software applications and websites, providing a centralized interface for 3 administrators or system operators to manage and control various aspects of the

system. It is a web-based or software interface designed for privileged users, such as administrators, superusers, or moderators,in this case, the admin, to monitor and manage the backend of an application or website.

3. Dashboard: EmploEdge utilizes the MySQL (a relational database management) to fetch the API to provide accurate and reliable data of the employees. This technology enables the admin to check the total number of employees and the salaries as a whole. The entire page gives a preview of the list of admins and their emails so that the admins can contact each other in case of any queries. All the data included is fetched from the API. This enables the admins to quickly and easily find the information of any of the employees. If they want they can also edit and update the date if any changes are necessary.

4. Employees: This section of the employee management system provides the admins the ability to add and enlist a new employee. Upon clicking on the page, they will see the name,image, email, address and salary of the existing employees. There will be additional two buttons that will allow them to edit or delete the employee details. Upon successful integration, they can save the changes. Upon clicking on the ”Add Employee” button, they will be able to add a new employee and the information will be saved in the database. EmploEdge integrates the activity transition API that has been saved in the ”server.js” part of the project.Here, ”server.js” is the entry point or main script that starts the server for the application. If a file in the project changes, nodemon will automatically restart the application. Nodemode has additionally been defined in the json package of the Server component. The Admin will also be able to edit the Salary upon clicking on the “Edit” button. He will also be able to delete any employee upon clicking on the “delete” button.

5. Total Count: In this part, a chart has been generated that will allow the admins to see the total number of employees in each department. This will be updated by the developers. One of the key features of this part is that the details of each worker can be viewed separately allowing a user-friendly interface without creating any confusion.

6. Log Out: Logging out is essential for account switching or user management. In a shared computer environment or in situations where multiple employees may use the same device, logging out allows another user to log in with their own credentials without having to restart the application. Logging out helps to manage server resources efficiently. When a user logs out, the session can be properly terminated, freeing up server caches that were being used to maintain the session. This is important for scalability and resource optimization.

5.2 Requirement Analysis:

Rich Picture of EmploEdge:

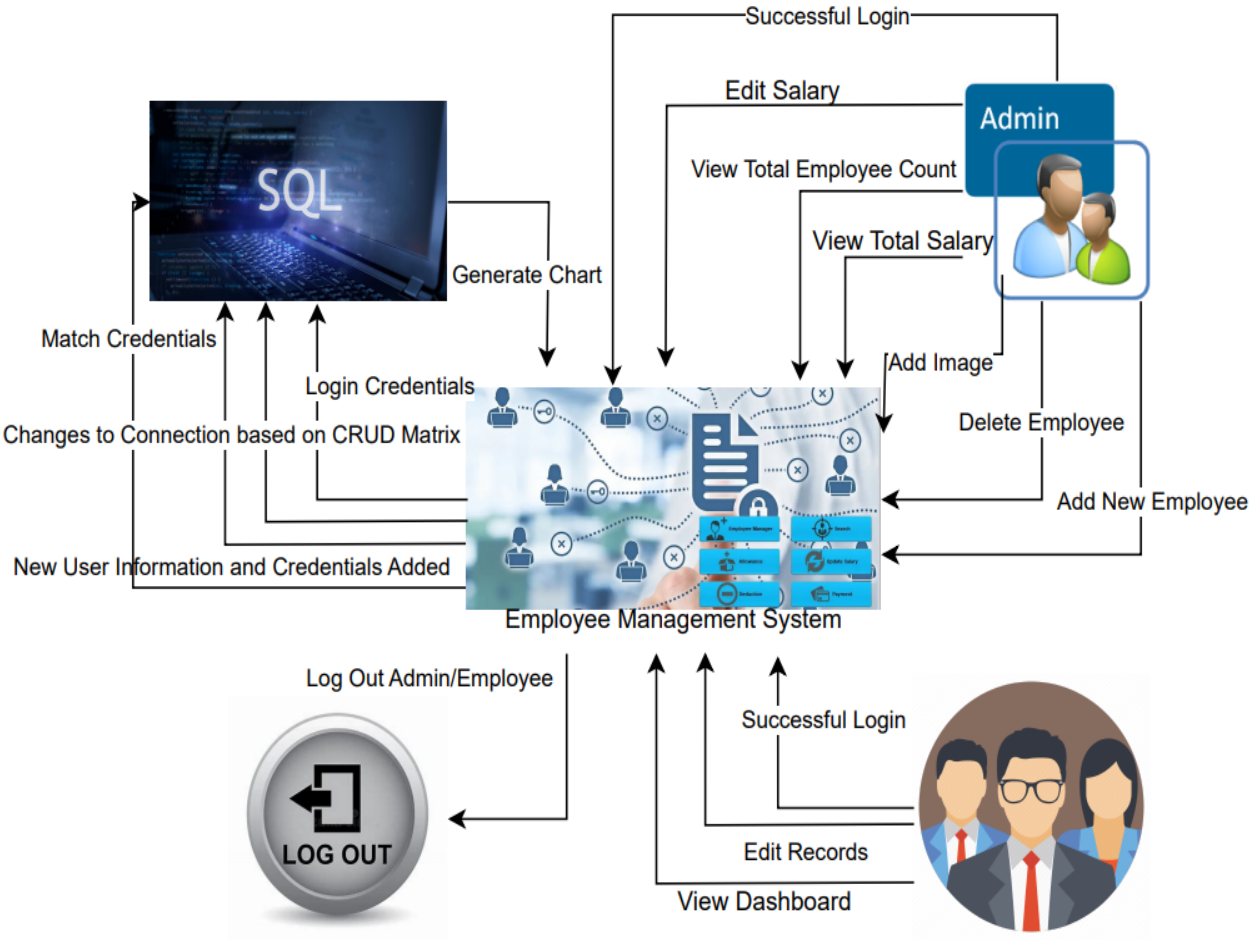


Fig 5.2 Rich Picture of EmploEdge

5.3. Functional and Non-Functional Requirement:

5.3.1 Functional Requirements:

5.3.11 User Login Table:

Functional Requirement- User login			
Input	**Process**	**Output**	**Priority**
1. Email 2. Password	1. The user will Log in to the website. 2. Enter the authenticated credentials.	After successful login, the user will be redirected to the main dashboard.	High
Precondition: • Users should have proper access to the system. • Must have an internet connection.			
Postcondition: • The system will send the input detail to the database for authentication. • System will direct the user to the dashboard. • System should be able to provide accurate data based on the query			
Alternate Options: • If the credentials are not authenticated, the system will respond with an error message. • If the input is not valid the system will generate an error message. • If no data is given for the input fields, the system will generate an error message.			

5.3.12 User Dashboard with Functionalities Table:

Name of the Function: User Dashboard with Functionalities			
Input	**Process**	**Output**	**Priority**
1. Email 2. Password	1. The user will Log in to the website. 2. Enter the authenticated credentials. 3. Select the required option from the dashboard.	After successful login, the user will be redirected to the main dashboard. They will be able to add, delete, edit, and update employee records.	High
Precondition: • Users should have proper access to the system. • Must have an internet connection.			
Postcondition: • The system will send the input detail to the database for authentication. • System will direct the user to the dashboard. • System should be able to provide accurate data based on the query			
Alternate Options: • If the credentials are not authenticated, the system will respond with an error message. • If the input is not valid the system will generate an error message. • If no data is given for the input fields, the system will generate an error message.			

5.3.13 Employee Login Table:

Name of Function: Employee Login			
Input	**Process**	**Output**	**Priority**
1. Email 2. Password	1. The user will log in using the credentials provided by the Admin. 2. Enter the email and password.	After successful login, the user will be redirected to the main page.	High
Preconditions: • Users should have proper access to the system. • Users must have an internet connection.			
Postcondition: • The system will send the input detail to the database for authentication. • System will direct the user to the main page • The system should be able to provide accurate data based on the query.			
Alternate Option: • If the credentials are not authenticated, the system will respond with an error message. • If the input is not valid, the system will generate an error message. • If no data is given for the input fields, the system will generate an error message.			

5.3.14 Employee Dashboard and Functionalities Table:

Name of Function: Employee Dashboard and functionalities			
Input	**Process**	**Output**	**Priority**
1. Email 2. Password	1. The user will log in using the credentials provided by the Admin. 2. Enter the email and password.	After successful login, the user will be redirected to the main page. They will be able to edit their information and log in.	High
Preconditions: • Users should have proper access to the system. • Users must have an internet connection.			
Postcondition: • The system will send the input detail to the database for authentication. • System will direct the user to the main page • The system should be able to provide accurate data based on the query.			
Alternate Option: • If the credentials are not authenticated, the system will respond with an error message. • If the input is not valid, the system will generate an error message. • If no data is given for the input fields, the system will generate an error message.			

5.3.2 Non-Functional Requirement

1. Performance: Performance refers to how quickly an application reacts to user input and is a key component of its overall functionality. The demand placed on the

application and the effectiveness of the system can both have an impact on this. It is essential to make sure that in order to give the best user experience. Hence, the website should load within a limited range, usually taking no longer than a second or two to load. Furthermore, the website should be created in a way so that it enables users to be promptly redirected to their desired view when clicking on an option in order to promote smooth navigation.

2. Scalability: In order to ensure that the application can support anticipated expansion over several years, the load and concurrency levels should be increased.

3. Portability: The platform will support Linux, Windows, iOS, and Mac. The system can be accessed using any web browser. The term "portability" refers to how well a system works in one environment versus another. Any future device will be able to use the system.

4. Reliability: The system will function well for a predetermined amount of time under specific conditions.

5. Accessibility: A user must be able to access the system at any time. The proportion of time the system is operating correctly. Every day of the week, at any moment during the day, users can upload information on the system. The system is accessible to users at any time of the day

6. Maintainability: Assesses the capacity for quick and economical replacement. The time it will take to solve a defect, improve performance or other factors, or adapt to a changing environment must be estimated by the system.

7. Usability: Once users view the interface, they should be able to carry out the primary functions. User-friendly and conceptual integrity are requirements for the user interface.

8. Security: The website must guarantee that every piece of data included within it or a portion of it will be safe from malware or unauthorized access. To access the data saved in the system, each user will need to register for an account. Additionally, each user will have a profile with their unique information that only they can access. Normally, users can access their accounts by entering the appropriate username and password that will be provided to them.

9. Localization: The system or a key component of it must fit well within the context of the target local market. Native languages, laws, money, cultures, spellings, and other details are all part of the context.

5.4 System Analysis

5.4.1 Six Element Analysis of EmploEdge:

Process	System Rules				
User login	Human	Computing hardware	Database	Software	Network and communication
User Dashboard	1. Admin 2.Employee	1. Computer/ Laptop 2. Printer 3. Networking devices- (Router, Switch, Bridge, Hub)	MySQL	Web Browser - (Chrome, Firefox, Microsoft Edge)	Internet
Employees	Admin	1. Computer/ Laptop 2. Printer 3. Networking devices- (Router, Switch, Bridge, Hub)	MySQL	Web Browser - (Chrome, Firefox, Microsoft Edge)	Internet
Total Count	Admin	1. Computer/ Laptop 2. Printer 3. Networking devices- (Router, Switch, Bridge, Hub)	MySQL	Web Browser - (Chrome, Firefox, Microsoft Edge)	Internet
Log Out	1. Admin 2.Employee	1. Computer/ Laptop 2. Printer 3. Networking devices- (Router, Switch, Bridge, Hub)	MySQL	Web Browser - (Chrome, Firefox, Microsoft Edge)	Internet

5.4.2 Feasibility Analysis

A feasibility study is a procedure for determining if a proposed project is realistic and viable. By examining parameters like payback duration, developmental term, return on investment, and present value, it evaluates a project's technical, operational, financial, and economic viability. It also assesses the project's capacity to meet user needs and pinpoints potential dangers. The objective of the feasibility study is to decide whether the project is a viable choice and whether it should go to the following stage of development. The research is carried out at the start of the project, prior to the commitment of any significant resources, and it is an essential tool for system analysts to decide whether to move forward with a project or take a second look at alternative strategies. Before any significant costs are committed, a rapid evaluation is conducted to ascertain whether a planned project can be completed effectively.

Technical Feasibility:

To determine the organization's capacity to build the suggested system, a technical feasibility study is conducted. The knowledge of the developers regarding the prospective target software, operating systems and hardware, as well as the system's size, complexity, and the group's experience with analogous systems, should all be evaluated as part of this analysis. In this step, it's crucial to evaluate the project's risk. Knowing potential risks as early as possible in a project is crucial since risks must be controlled in order to be reduced. Determined by this assessment will be the project's possible effects on the organization and its stakeholders.Additionally, it will assist the team in creating a project budget and implementation strategy. The project is a specific size, the developers are working under strict guidelines with a set of specifications, and everyone is well-versed in the relevant technology and has plenty of experience in this field. Therefore, there is a very low risk based on this.

Operational feasibility:
The operational feasibility of a project entails assessing whether a system will be used once it has been deployed and configured. This is done by the project's human resources. It evaluates how effectively a proposed system satisfies the standards set during the requirements analysis stage of system development, as well as how well it solves issues and takes advantage of scope-defining opportunities. The organization's willingness to support the suggested system is estimated. The acceptance of the employee base of, however, is extremely important.Web-based portals are provided by EmploEdge. Since the proposed system's UI is user-friendly and requires internet access, people shouldn't have any trouble utilizing it. Additionally, because the proposed system satisfies all stated requirements and will give the users the needed analysis, users won't need any additional training or time to learn how to use it.

Economic feasibility:
Economic feasibility is a type of cost-benefit study that determines whether this e-commerce project can be implemented. Research on the market, the economy, technology, and strategy are all included. An economic feasibility analysis is carried out to estimate the financial benefits and costs associated with the development project.

Schedule feasibility:
The timeline that allows for the implementation of all project functions is known as the schedule feasibility. In this stage, the development period is the main focus rather than any deadlines established by the client or the business. To achieve the project's development schedule, we must assign priority based on situations such as must have, should have, and could have. In quite a lot of situations, when the client requests a high-quality system in a short period of time, the company must hire more resources, which has an impact on the economic viability, and focus entirely on creating this system.

EmploEdge, the proposed system, is expected to take 4-6 months to develop.

Identification:
Beta testers are hired to properly test the application and report any faults they uncover. In addition to documenting their user experience, testers offered insightful input that helped identify bugs.

5.4.3 Effect and Constraints Analysis

• **Effect:** This is the act of evaluating, projecting and calculating the optimal results before applying a change in the deployed product like this one, focusing on unexpected side effects of a choice or modification in a system and highlighting potentially affected locations. It enables us to handle potential problems before they arise by informing us which system component might be adversely affected by a modification. When a system or set of requirements needs to be improved, for example, a software effect analysis is carried out with the aim of directing a developer in focusing on those areas that are affected by a change or those activities that may be urgent and require immediate corrections due to modifications. Ignoring this analysis—that is, the probable outcomes and unexpected behaviors of a potential adjustment in a single module—can have a negative impact on the system's ability to function as intended. In addition to quality, history, and relationships between the module that requires the update and other modules, it may cause issues with the software's cost and time estimations. Roadblock detection and removal are procedures based on the idea of limits. This is critical since a strong application frequently increases production efficiency.

• **Time:** Despite the potential benefits, the development of EmploEdge was not without constraints. One of the major challenges was ensuring that the application performed well across a wide range of devices. Initially, the application was only optimized for modern devices, however, since the intended user base included individuals with older devices, it was necessary to optimize the application for performance across a wider range of devices. This was achieved by employing compatible dependencies to ensure that the application could be utilized on devices ranging from the latest models to older, less powerful models. The timeframe for the project completion includes the due dates for each step and the day on which the final deliverable will be made available, is referred to as the "time" constraint factor.

• **Cost:**The amount of money and resources needed to complete the project on schedule and within the allocated budget make up the cost of any project, another limitation that is frequently referred to as the project's budget.

• **Scope:** Constraints are things like project objectives, deliverables, features, and functionalities that must be met, along with the work required to complete the project modules.

5.5 System Design

UML Diagrams

Unified Modeling Language, or UML for short, is a standardized modeling language with a built-in set of diagrams that was developed to help software developers specify, visualize, construct and document the artifacts of software systems as well as for business modeling and other non-software systems. The UML stands for a collection of outstanding engineering techniques that have been proven effective through modeling of enormous and complicated systems. The UML primarily uses graphical notations to explain how software program projects are organized. Project teams can communicate, find potential designs, and verify any software program's architectural structure by using the UML. Use cases are a useful tool for capturing a system's functional needs. They discuss the system's interactions with users and its actions in various situations. The use case model is a visual depiction of a system made up of actors, use cases, and the interactions between them.

Admin Panel:

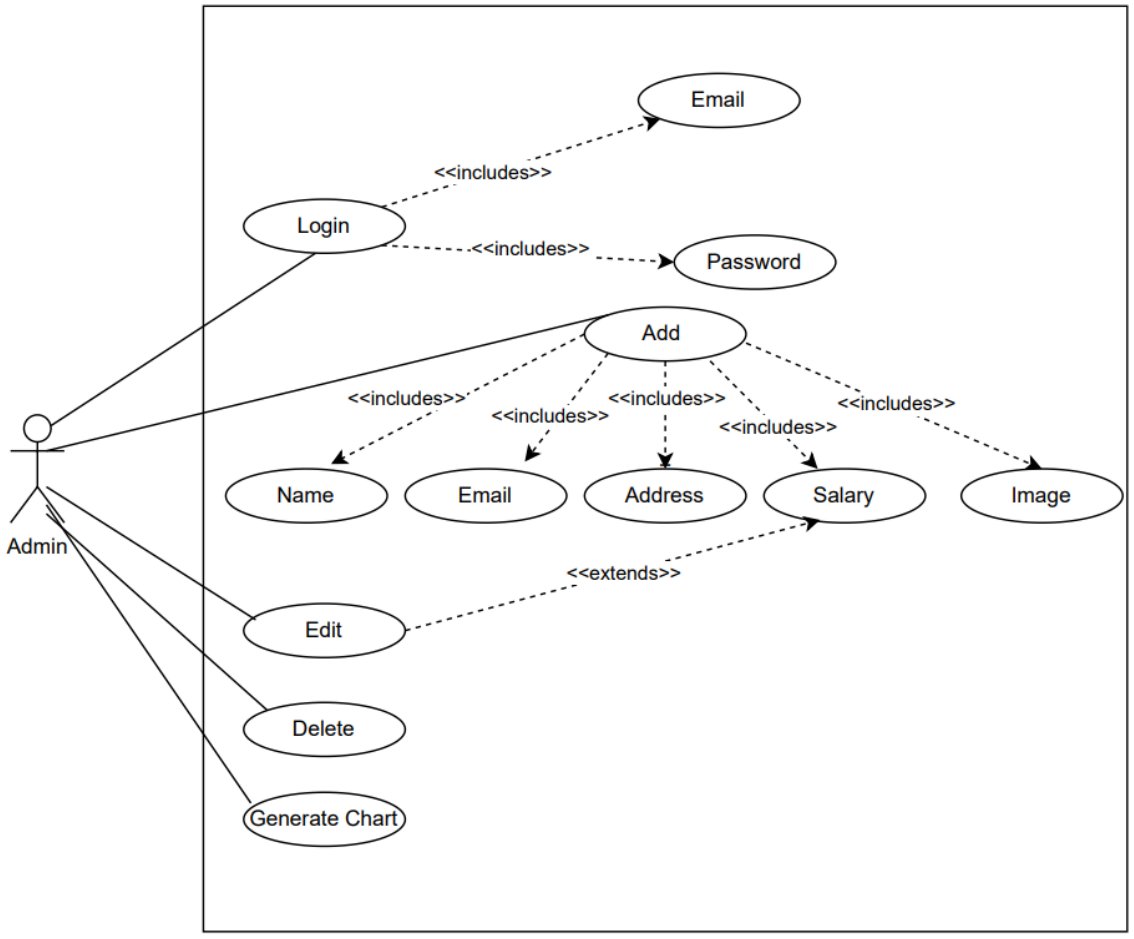


Fig 5.5.1 Use Case Diagram for Admin

Employee Panel:

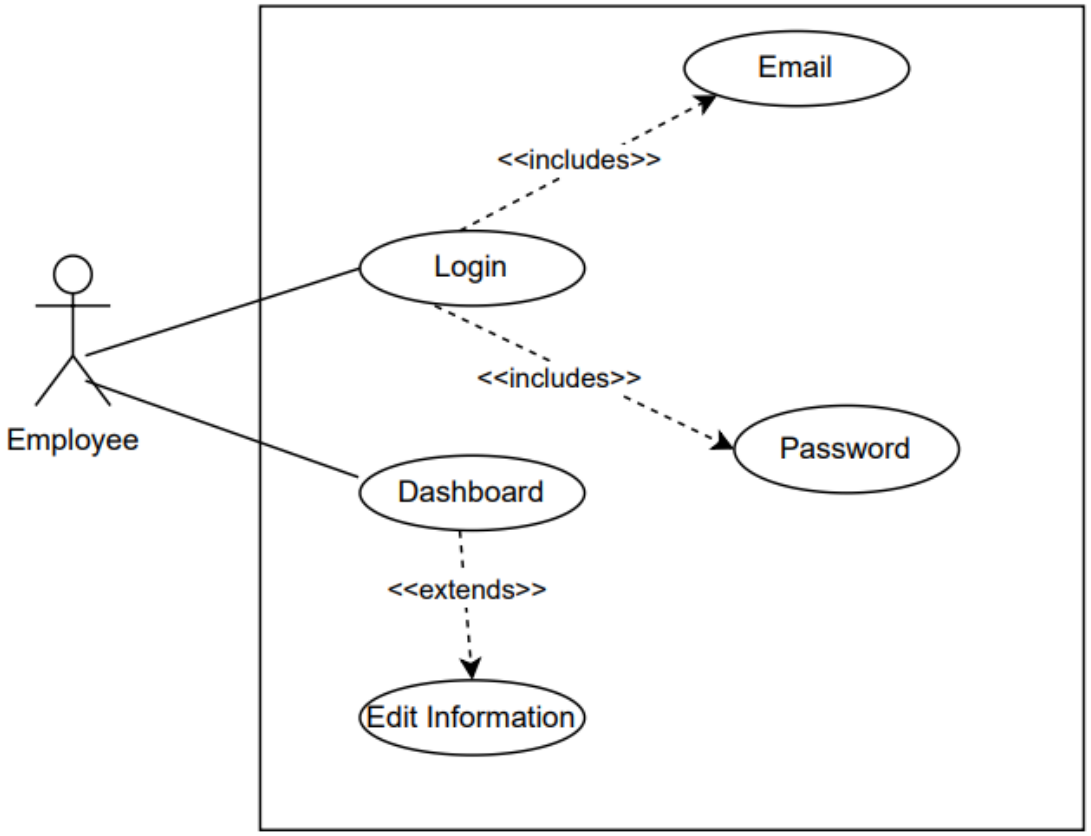


Fig 5.5.2 Use Case Diagram for Employee

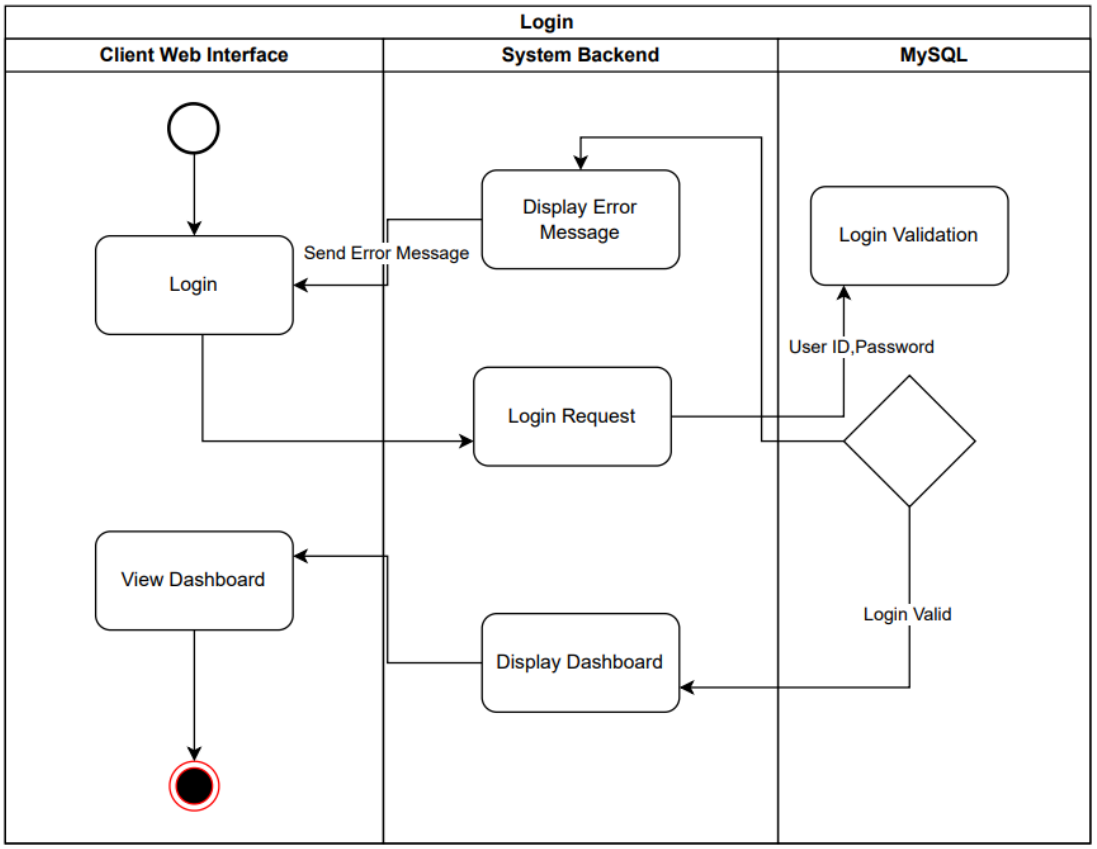


Fig 5.5.3 Log in into the system

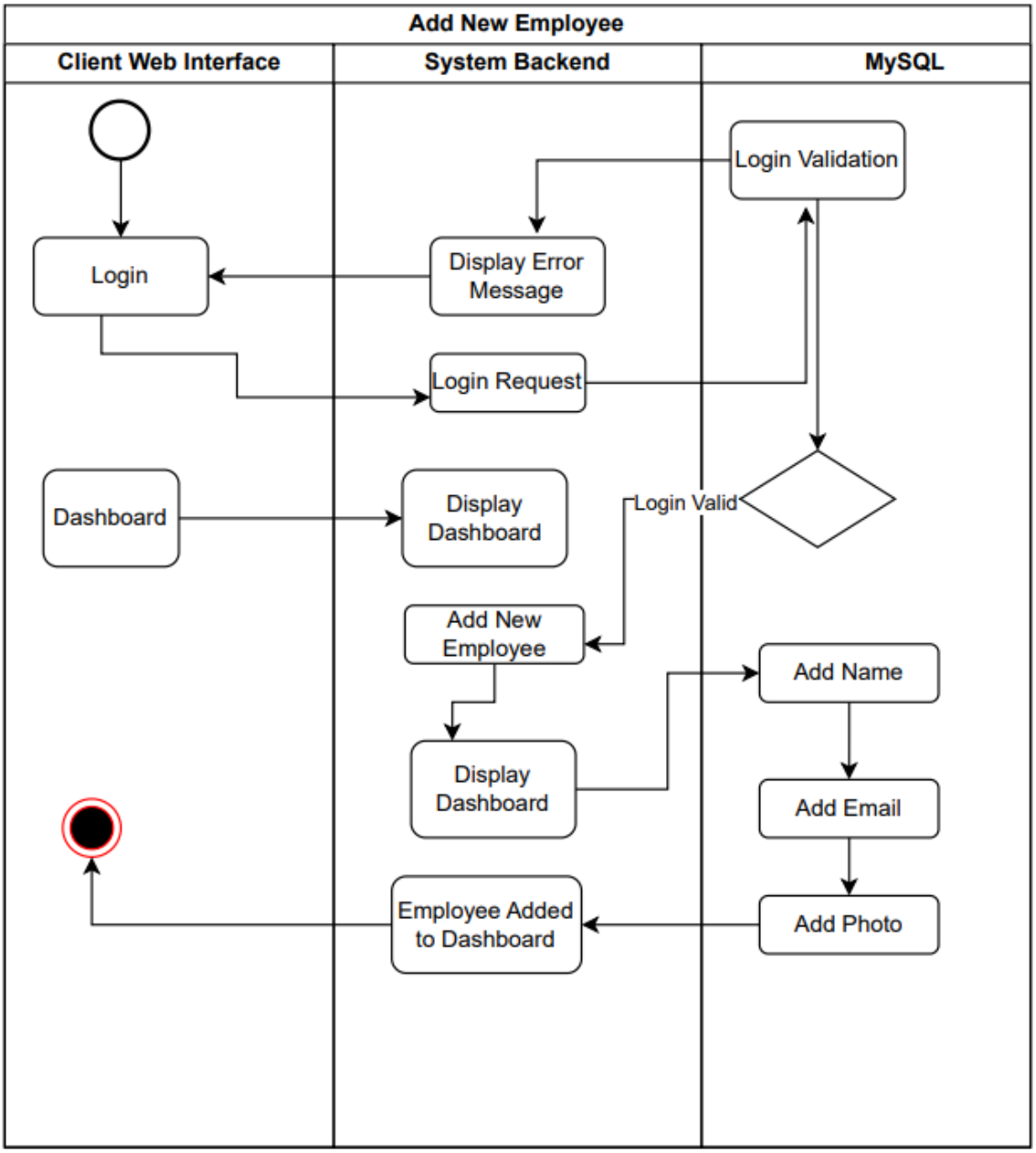


Fig 5.5.4 Add New Employee

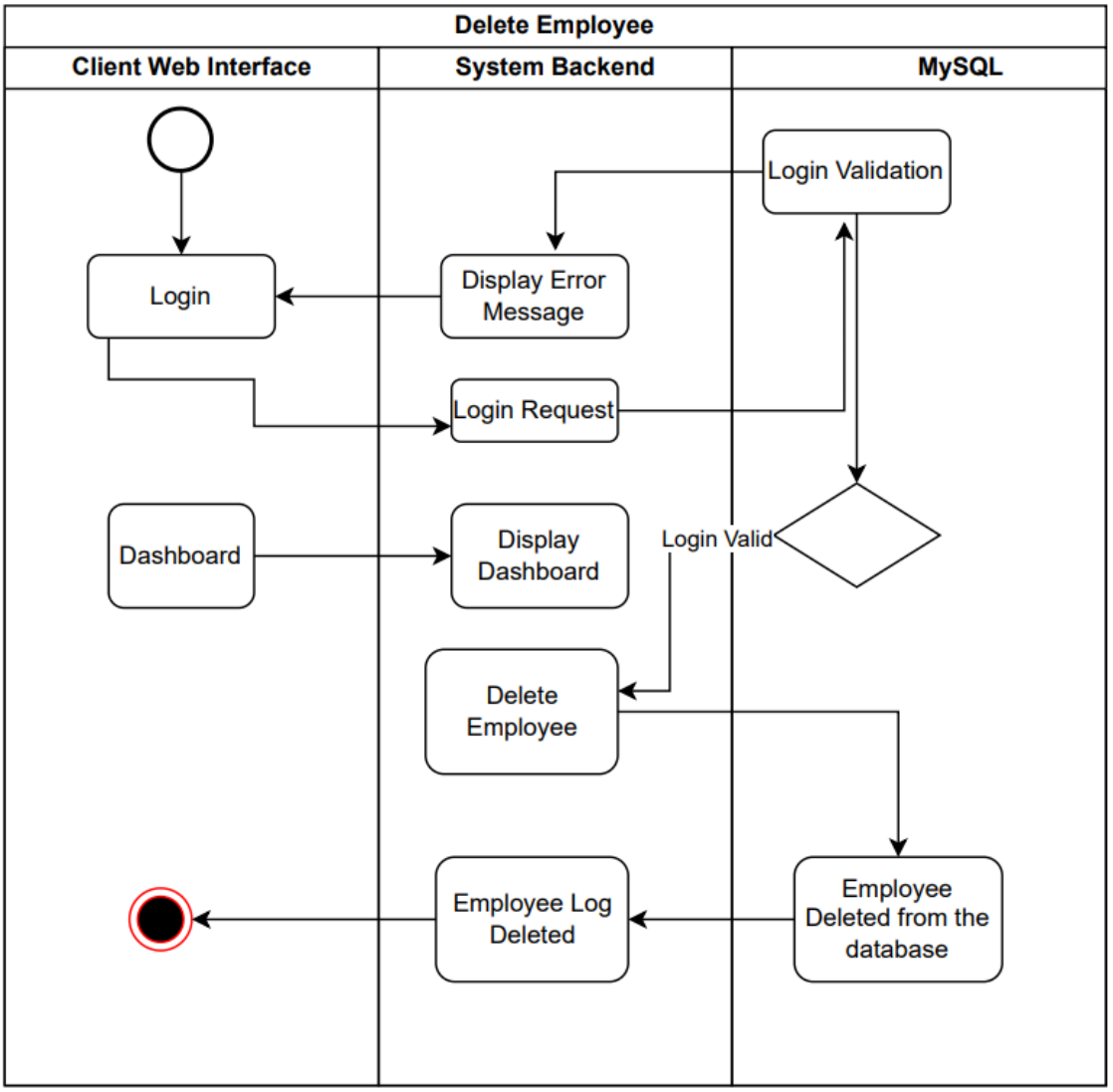


Fig 5.5.5 Delete An Employee

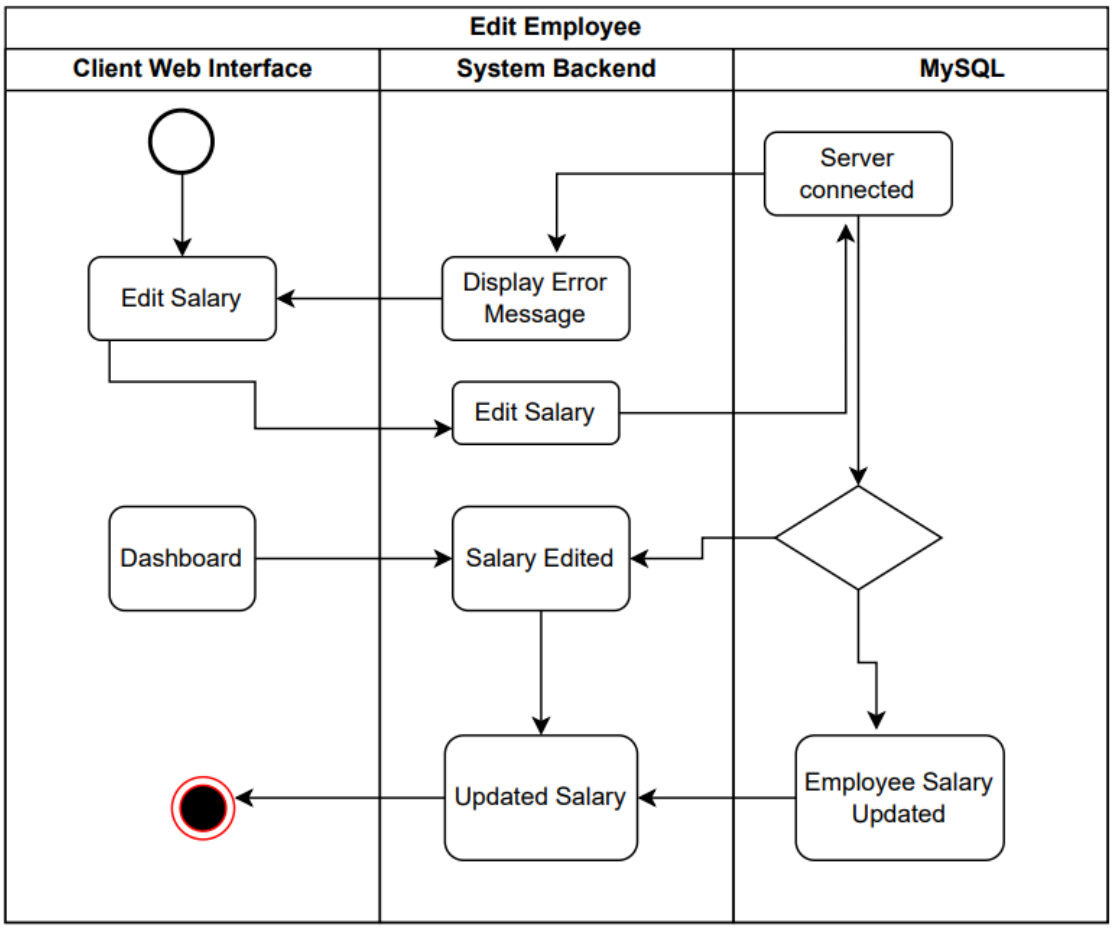


Fig 5.5.6 Edit Employee Salary

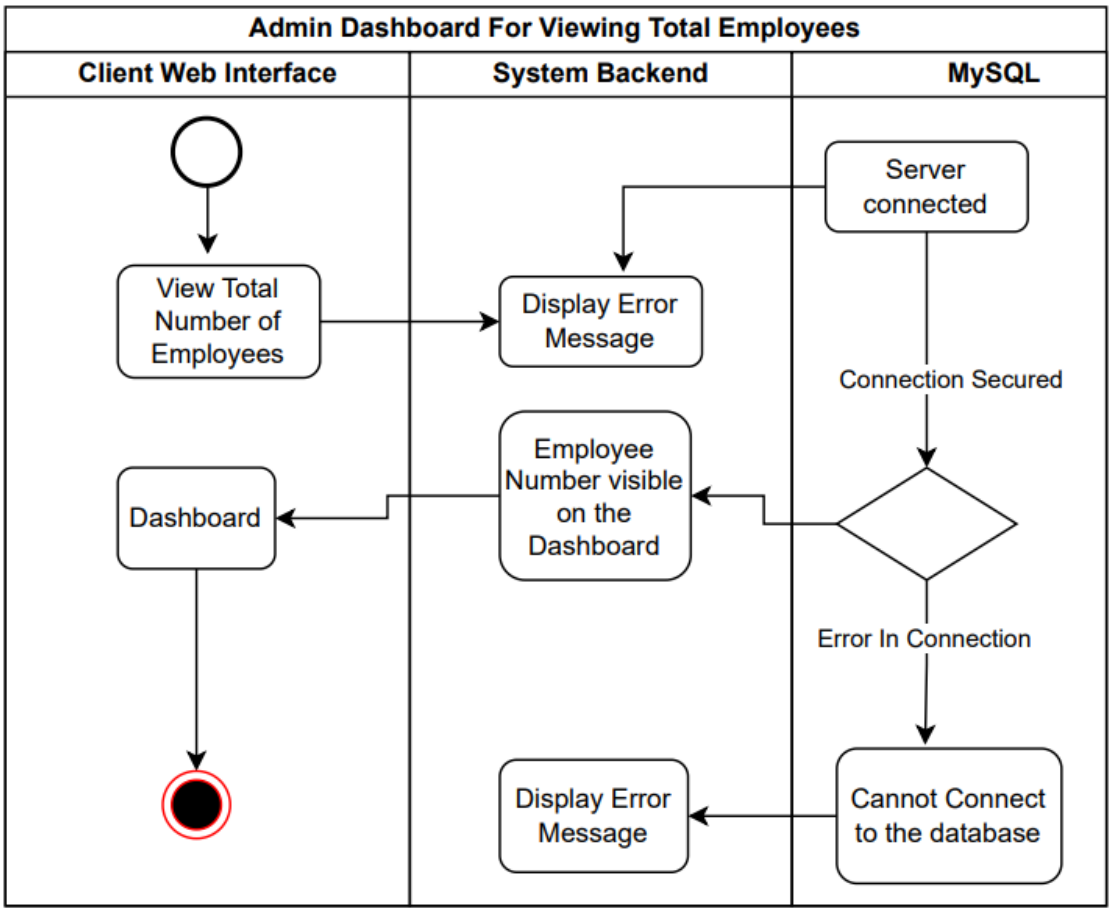


Fig 5.5.7 Total Employee Count on the Dashboard

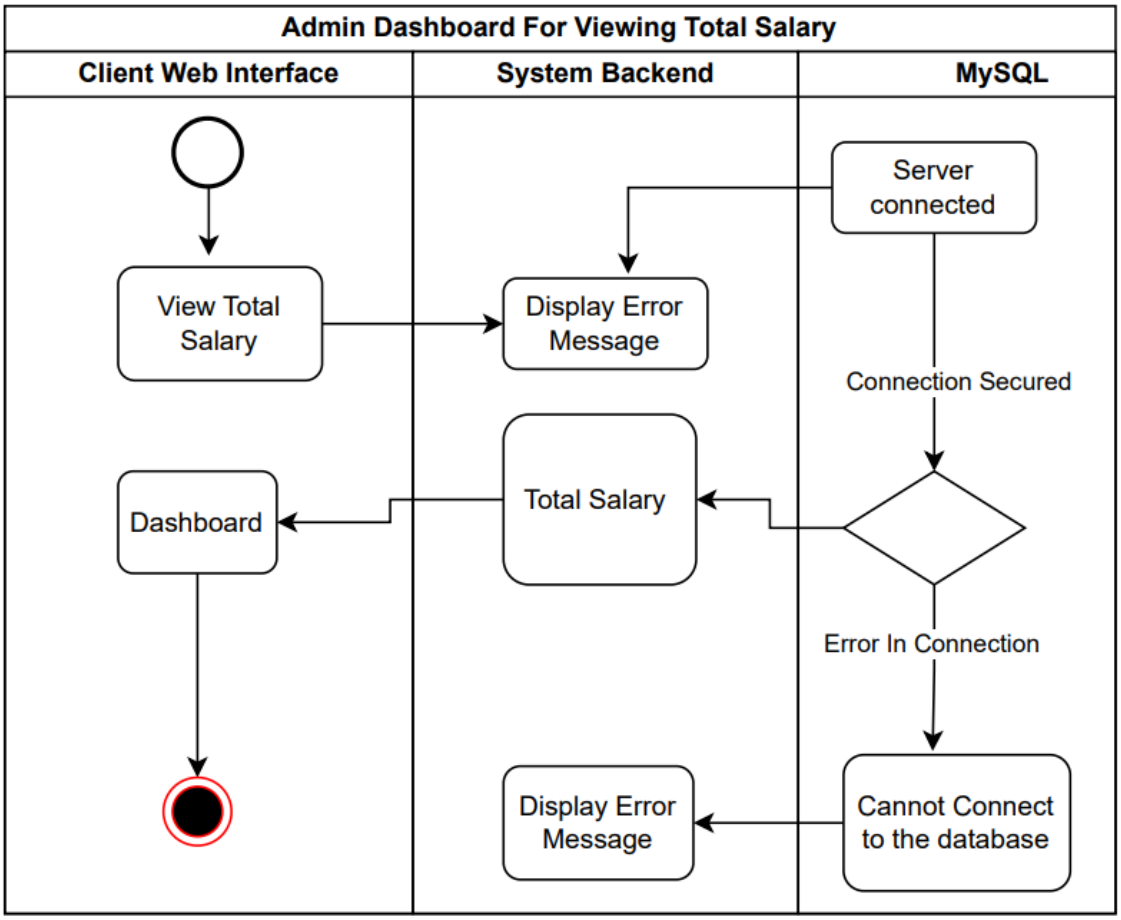


Fig 5.5.8 Total Employee Salary on the Dashboard

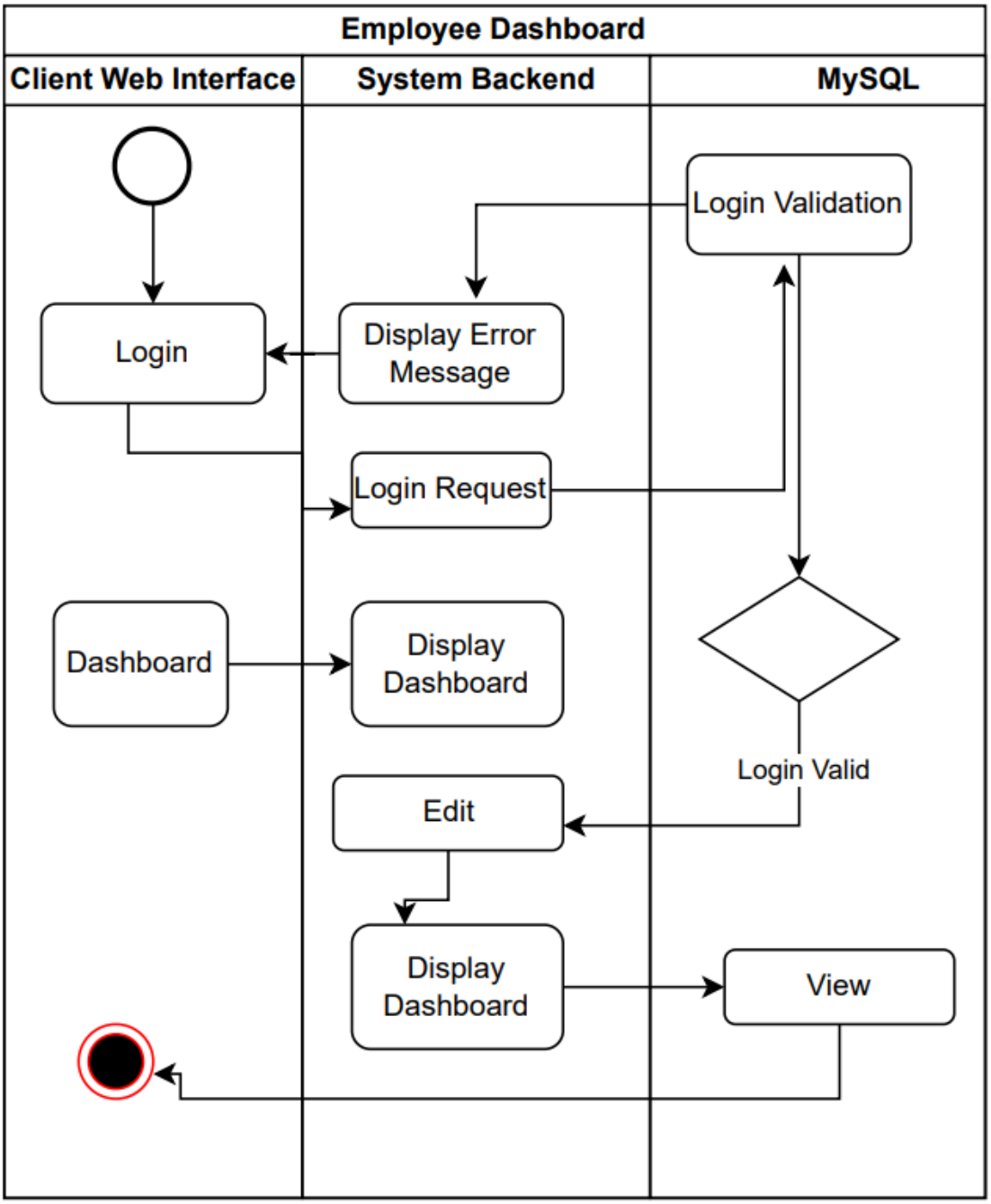


Fig 5.5.9 Edit Employee Data

Entity Relationship Diagram:

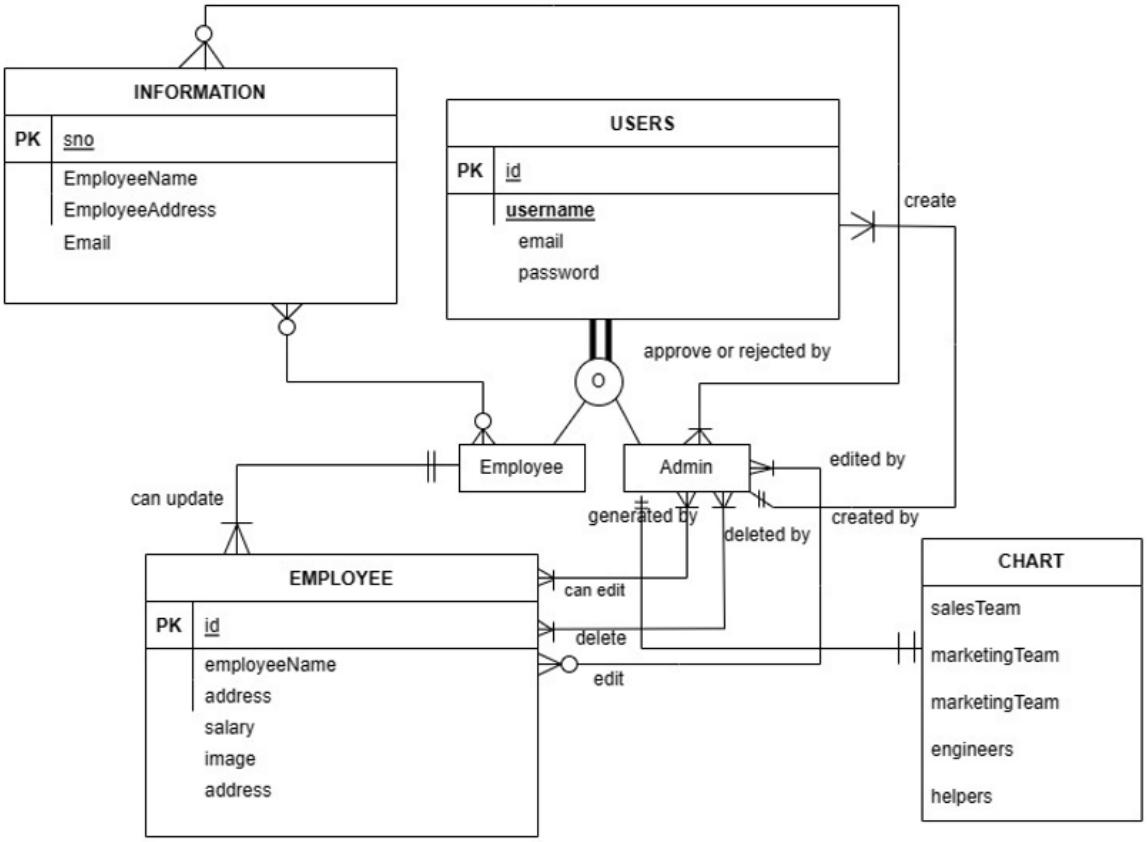


Fig 5.5.10 Entity Relationship Diagram of EmploEdge

Architecture:

It is made up of four different technologies: MySQL for the database layer, Express and Node js for the application tier, and React js for the front-end display tier.Using only JavaScript and JSON, this architectural method makes it simple to create the front-end, back-end and the database. With the use of this technology, web developers can quickly create applications that enable CRUD functions, manage server-side routing, and store data.

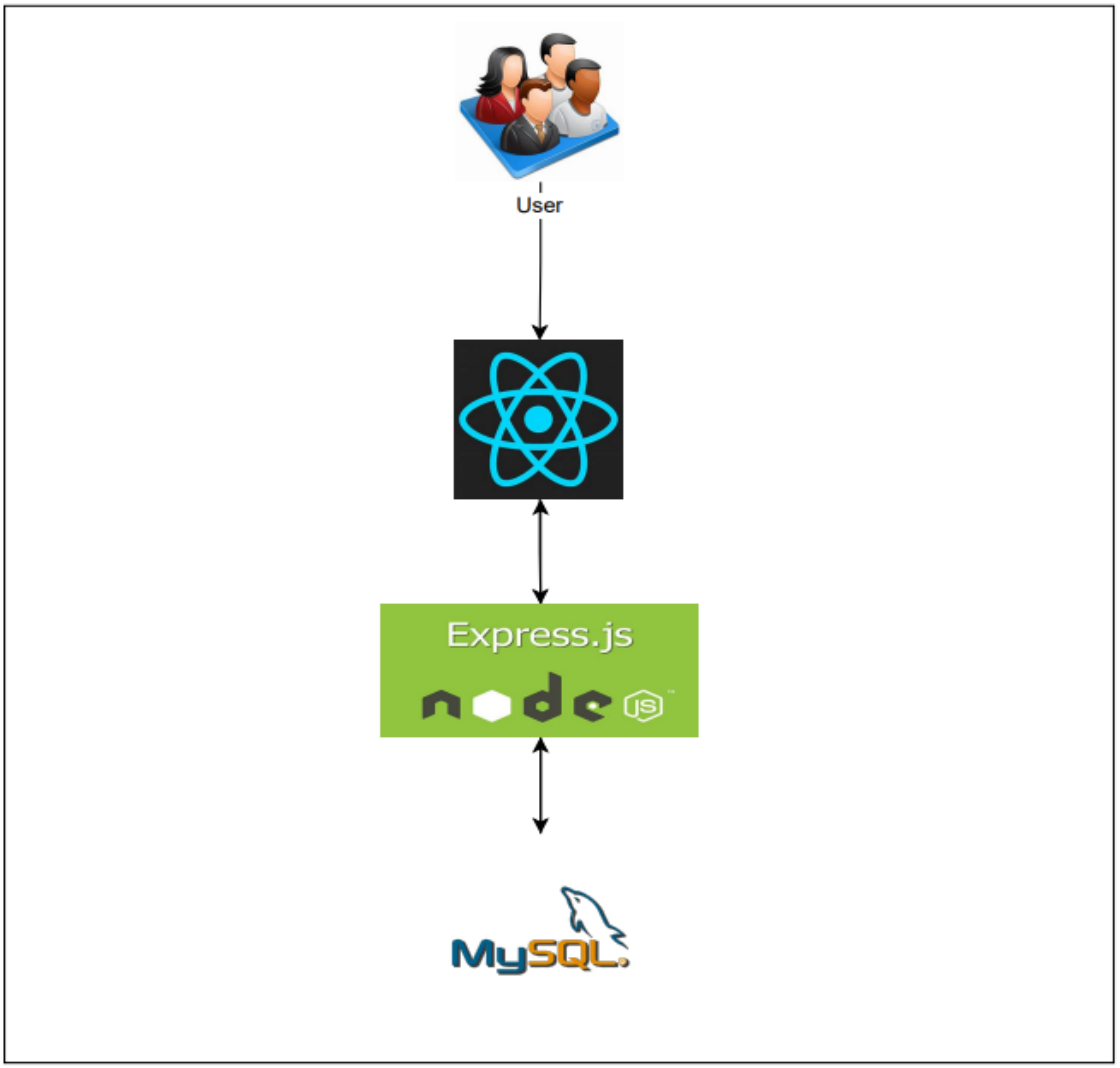


Fig 5.5.11 System Architecture for Employee Management System

Chapter 6

Result and Analysis

Result:

The outcome and its analysis are the technical part of performance tests. Software testers use these methods to improve optimization for the existing outcomes. There must be no errors, the tests must run for a defined period of time, and other key ideas must also be grasped. They must identify the performance highs and lows during the performance testing services. Filter options can be used by testers to eliminate any unnecessary tests. They look at a system's non-functional requirements to make sure that when more people use it, it won't perform worse. All of these testing procedures are carried out to ensure that a high-performance application is delivered. The evaluations are still under process. However, it has now been thoroughly tested after the first phase of testing using only the most basic requirements. However, real-time user testing is still pending. The test cases that were run were recorded, and various problems relating to non-functional needs were also discovered and recorded. The essential test cases that were tested were supported by the testing technique. User testing and other procedures will be repeated as soon as the hosting is up and running. As a result, when testing continues, additional adjustments are probably going to be made.
The creation and widespread use of GUIs was one of the important factors that improved the usage of digital technologies like computers for regular and less tech-savvy people. Actually, GUIs are made to be simple enough for even extremely novice staff to use without any programming knowledge. If a user gets the access of a movie from a streaming video player inside of a website, eg , they will interact with different GUIs,i.e, four in total where information will be provided to the user through the OS, browser, website, and video player, and their designs are always user-centered. This is because they are very user-centered and are no longer inherently machine-centered.

Analysis:

The developed project is very responsive. If any changes are made, the requests are very abrupt and feasible making the software very user-friendly and adaptable. Furthermore, after the testing phase, a number of errors have been solved. The errors sometimes occur due to the error in connection to the database.

Software Testing:

Table 6.1 Admin Panel:

Admin Panel						
Test Case	Name	Description	Executive Steps	Expected Outcomes	Actual Outcome	Pass/Fail
TC1	Dashboard	The admin can see the total number of employees and their total salaries.	1. Admin will log in to the system. 2. Click on the dashboard. 3. He will be able to see the total employee number and salary.	Admin must be able to easily check all the information.	The database connection is secure. Users can check all the information.	Pass
TC2	Employees	Admin can add, create, delete, and edit.	1. Admin will log in into the system. 2. Click on "Employees". 3. The user will create, add, delete, and edit according to the requirement.	Admin must be able to add, create, edit, and delete.	The database connection is secure. Data is saved in the database and can be deleted whenever necessary.	Pass
TC3	Total Count	Admin can see the total number of employees generated in a pie chart.	1. Admin will log in into the system. 2. Click on "Total Count".	Admin must be able to generate a chart.	Data can be generated successfully.	Pass

Table 6.2 Employee Panel:

Employee Panel						
Test Case	Name	Description	Executive Steps	Expected Outcomes	Actual Outcome	Pass/Fail
TC1	Login	The employee can log in using the credentials provided by the admin.	Employees will log in to the system.	The user must be able to easily log in.	The database connection is secure. Users can log in.	Pass
TC2	Dashboard	User can see their own information using the database	1. The user will log in into the system. 2. User will see their own information. 3. The user must be able to edit	Employees must be able to edit.	The database connection is secure. Data is saved in the database and can be edited whenever necessary.	Pass

User Interface:

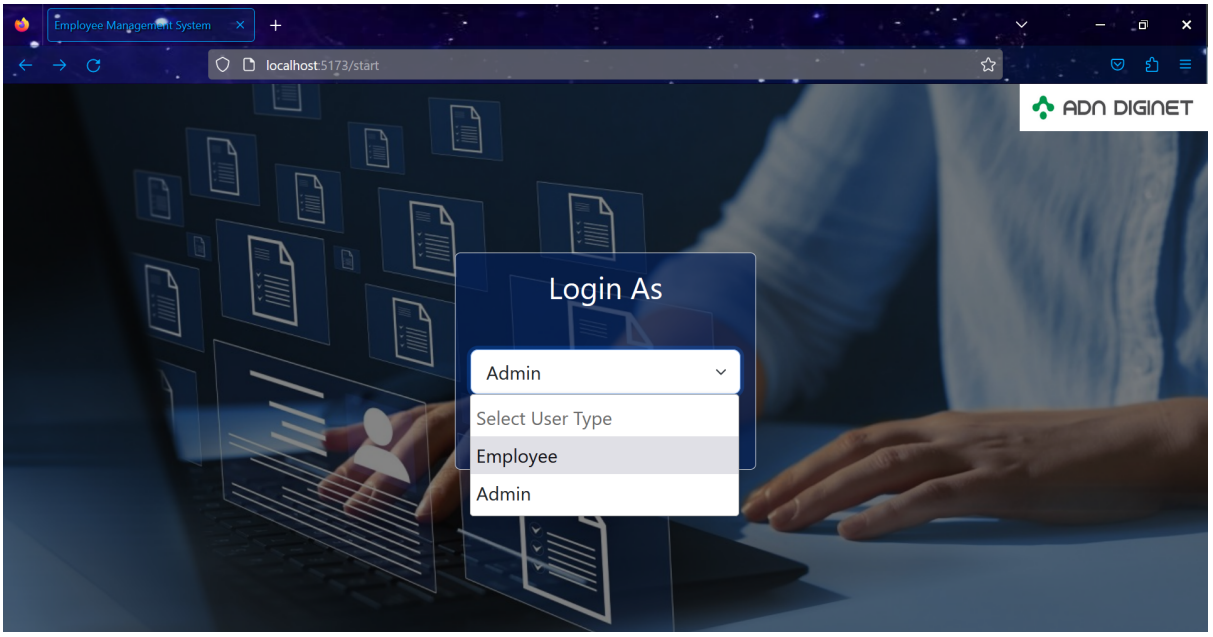


Fig 6.3 Admin/Employee choose user type

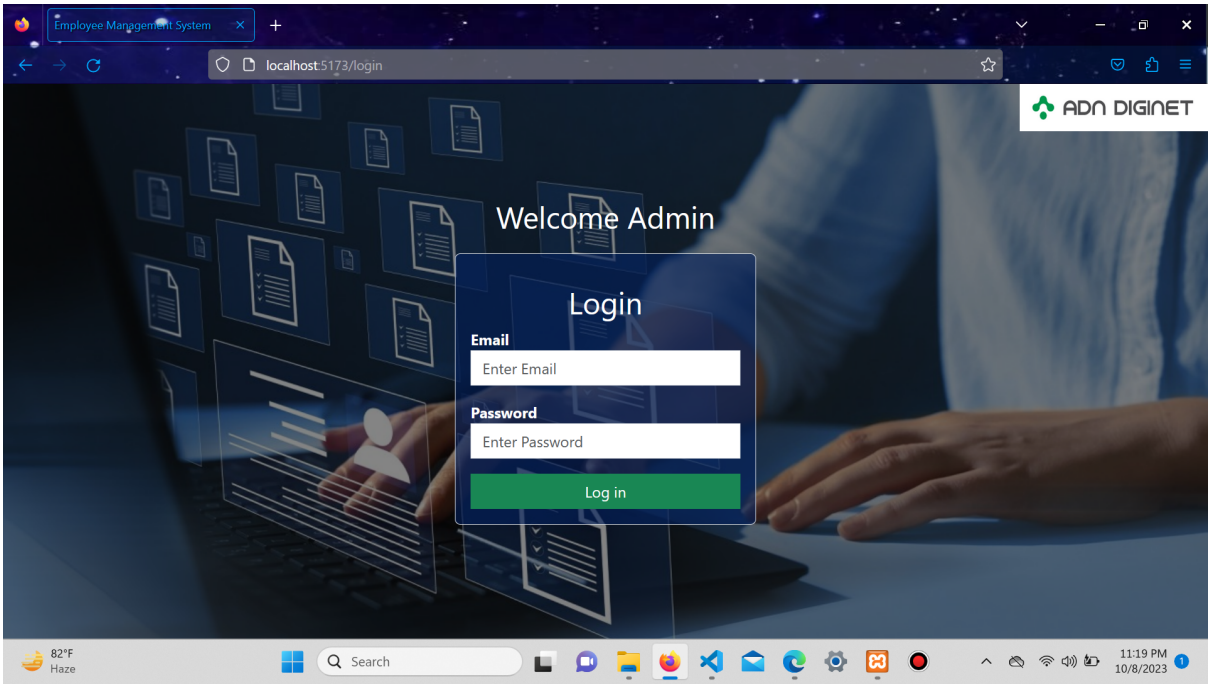


Fig 6.4 Admin Login Page

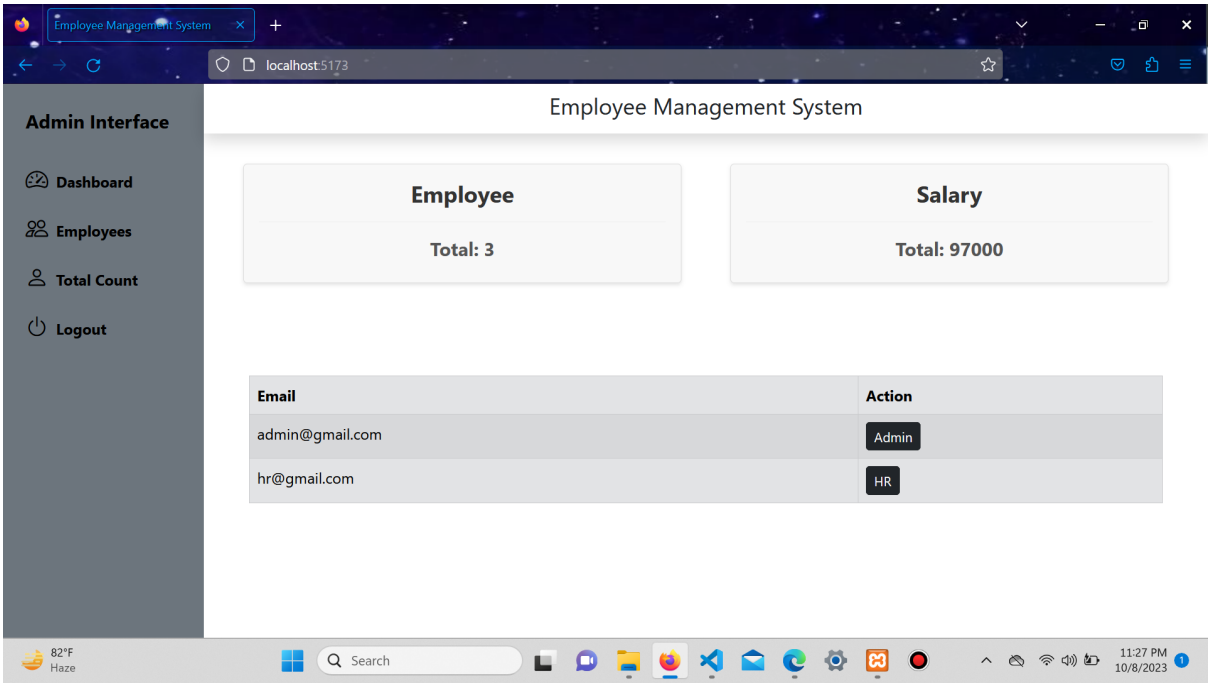


Fig 6.5 Admin Dashboard

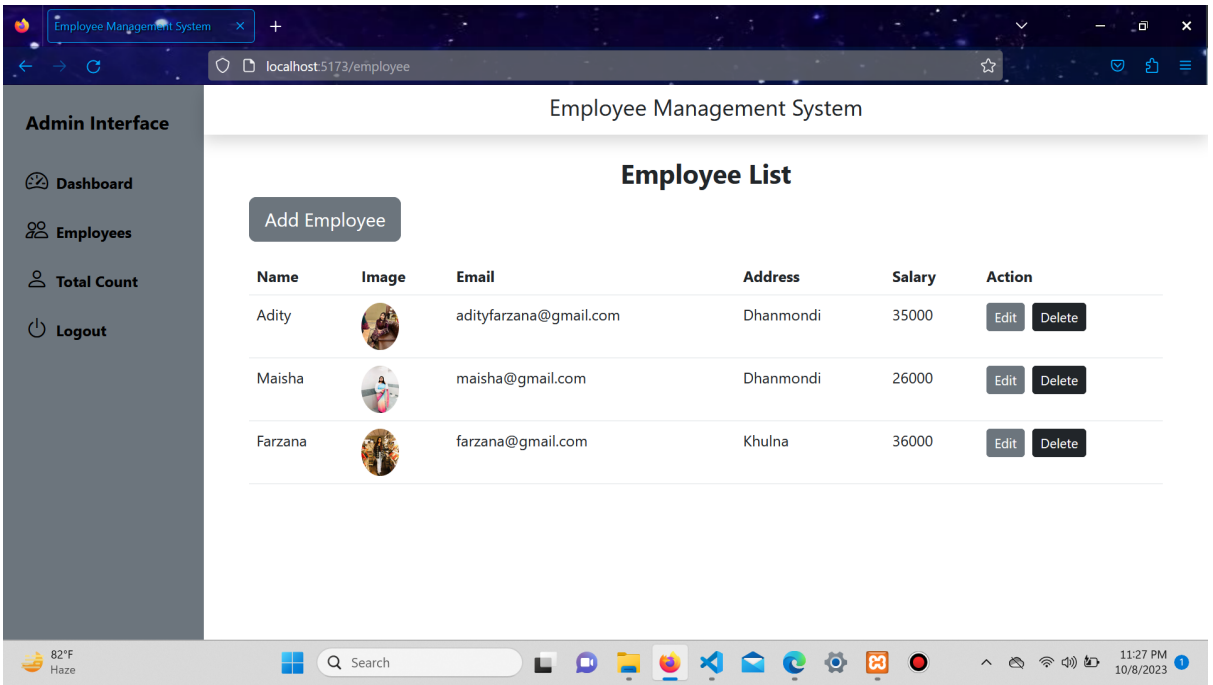


Fig 6.6 Employee List

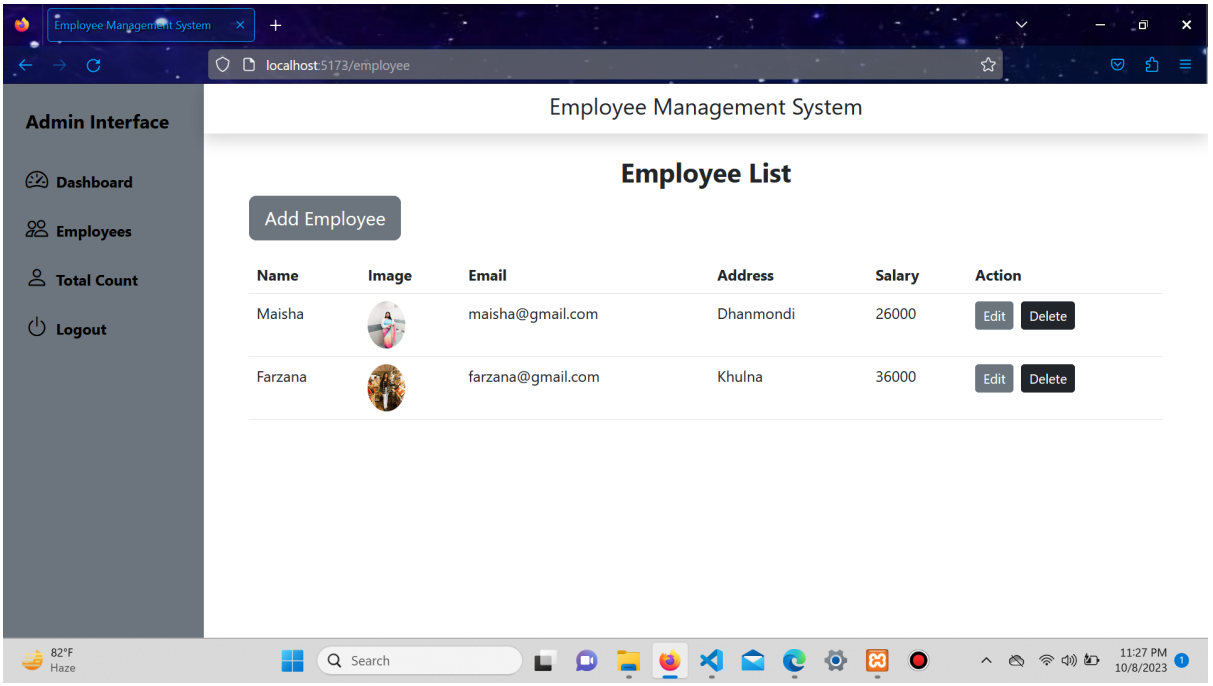


Fig 6.7 Employee deleted from database

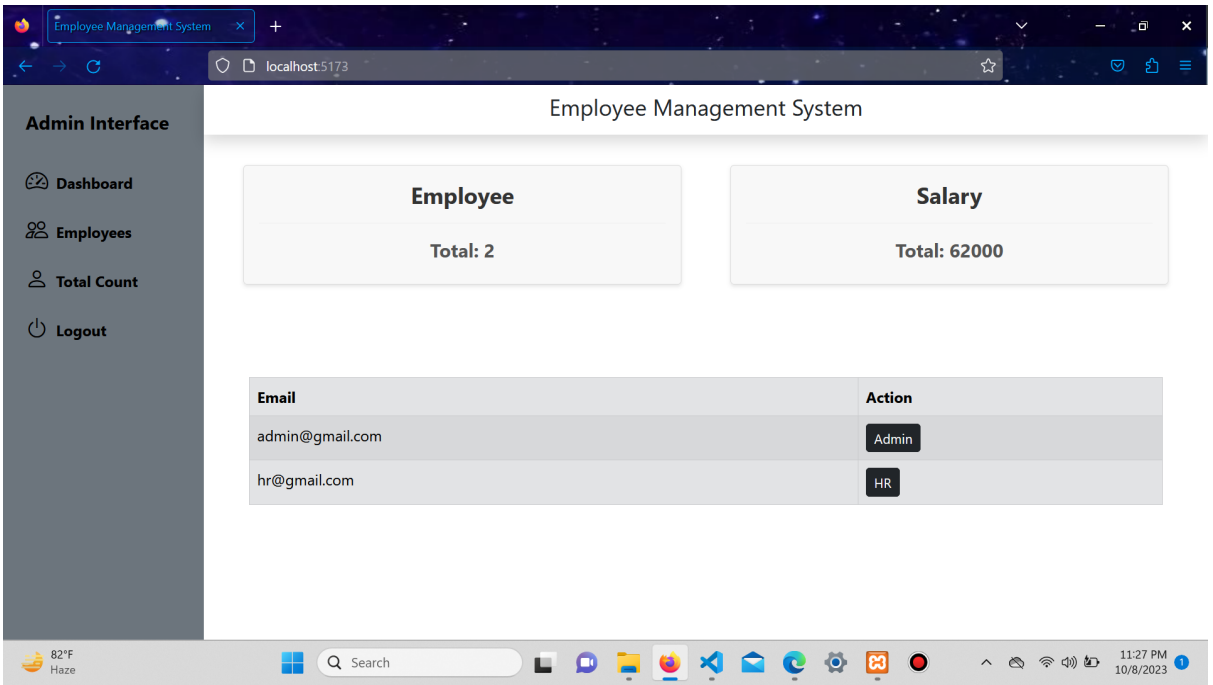


Fig 6.8 EmploEdge Dashboard After Deleting an Employee

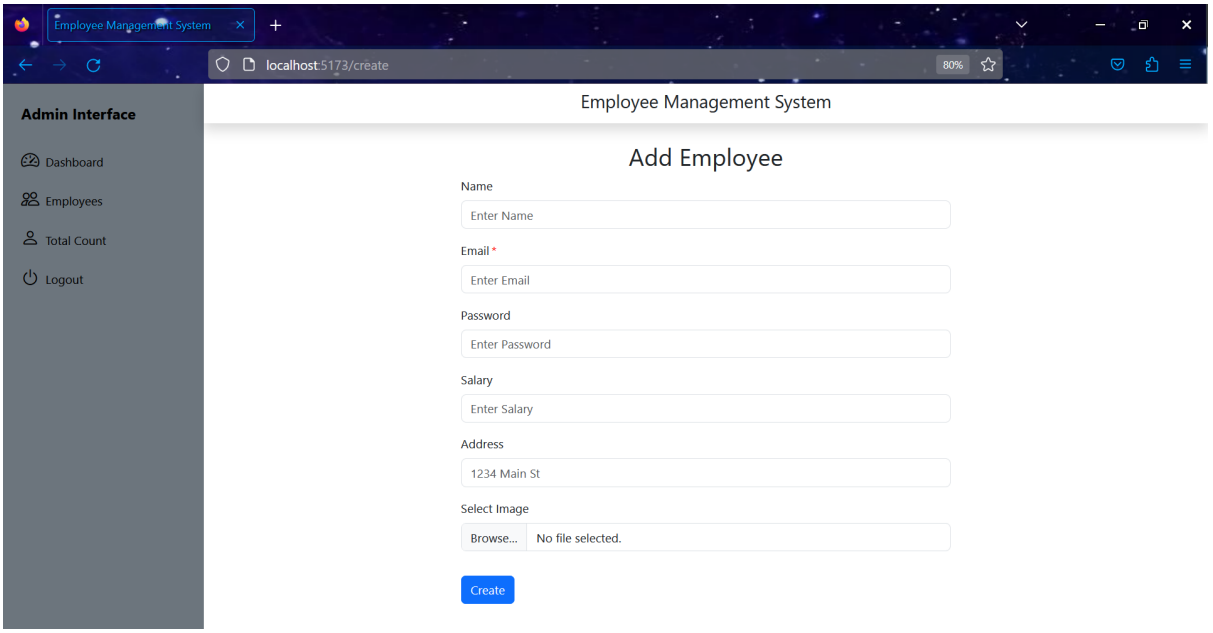


Fig 6.9 Admin “Add Employee” Functionality

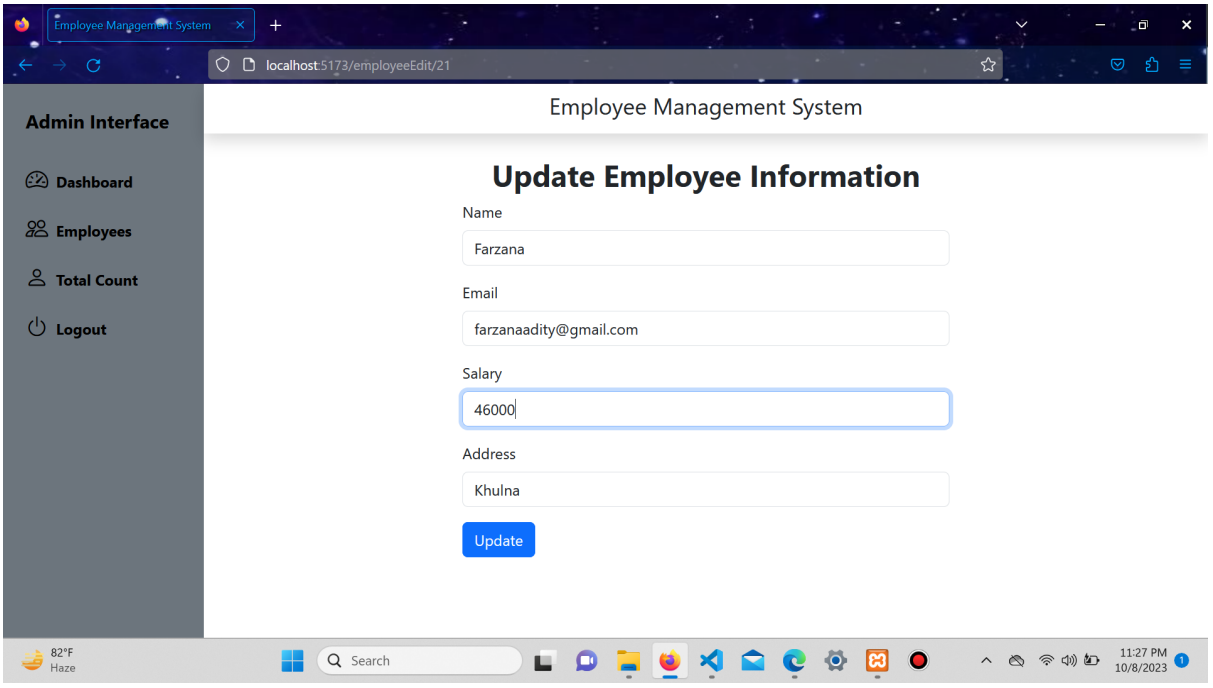


Fig 6.10 Admin “Update Employee Information” Functionality

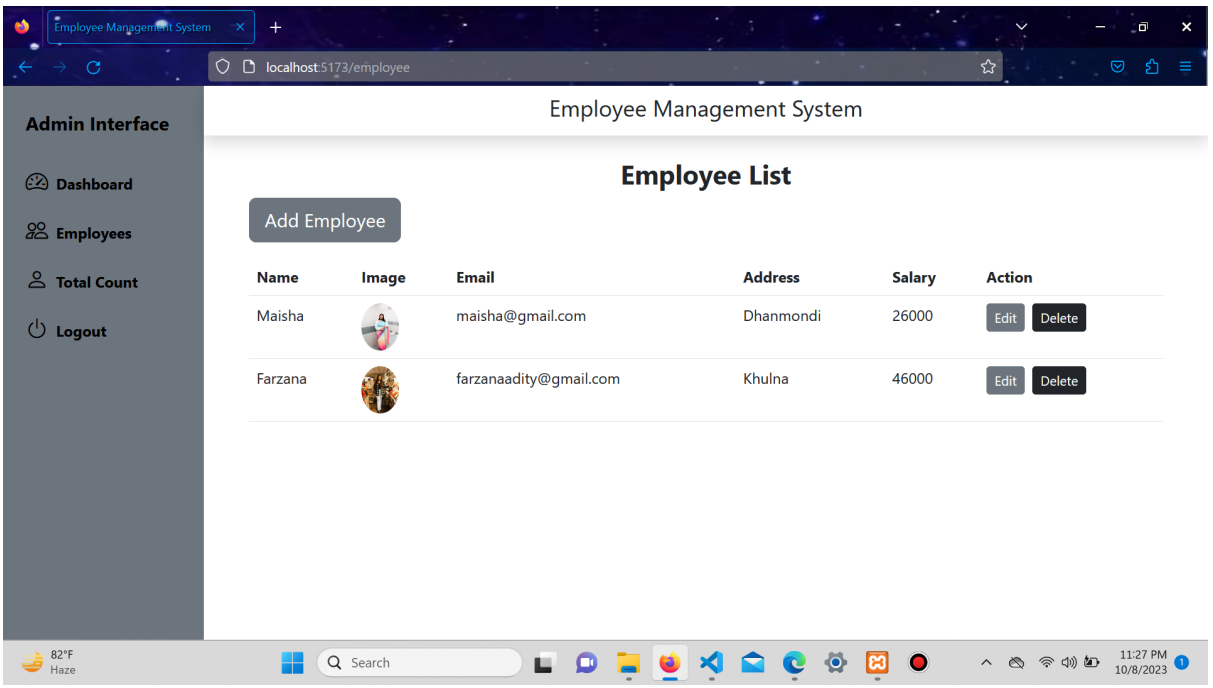


Fig 6.11 Employee list after updating information

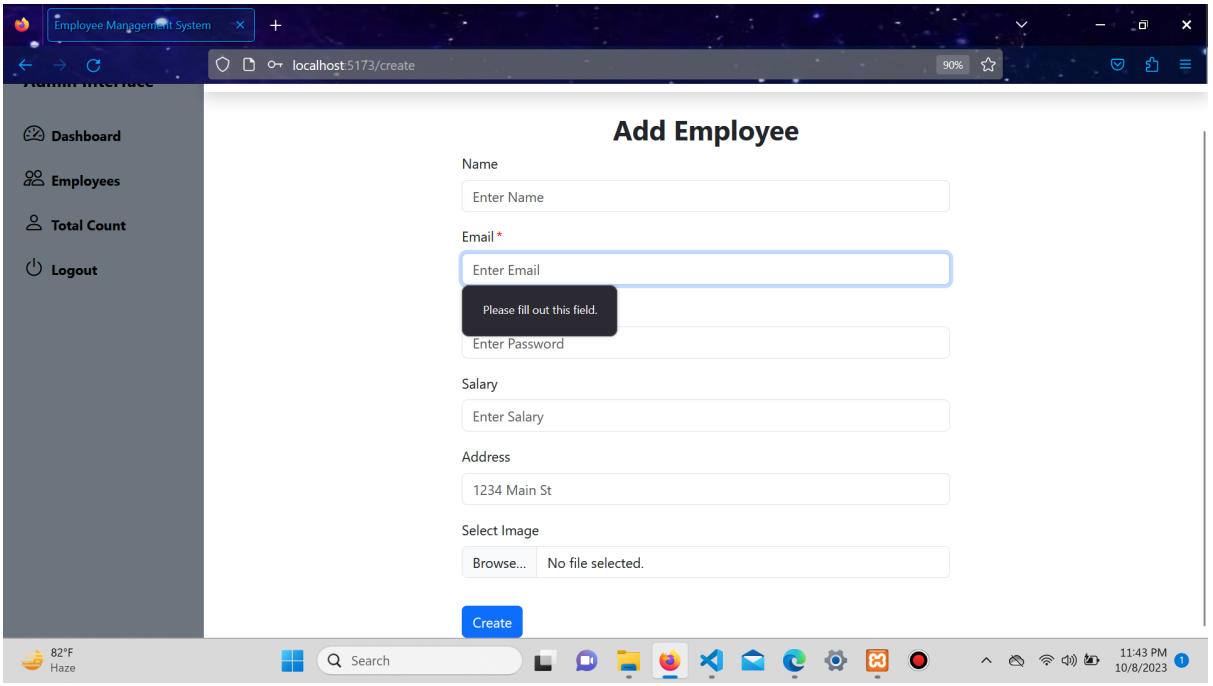


Fig 6.12 Mandatory Email Field

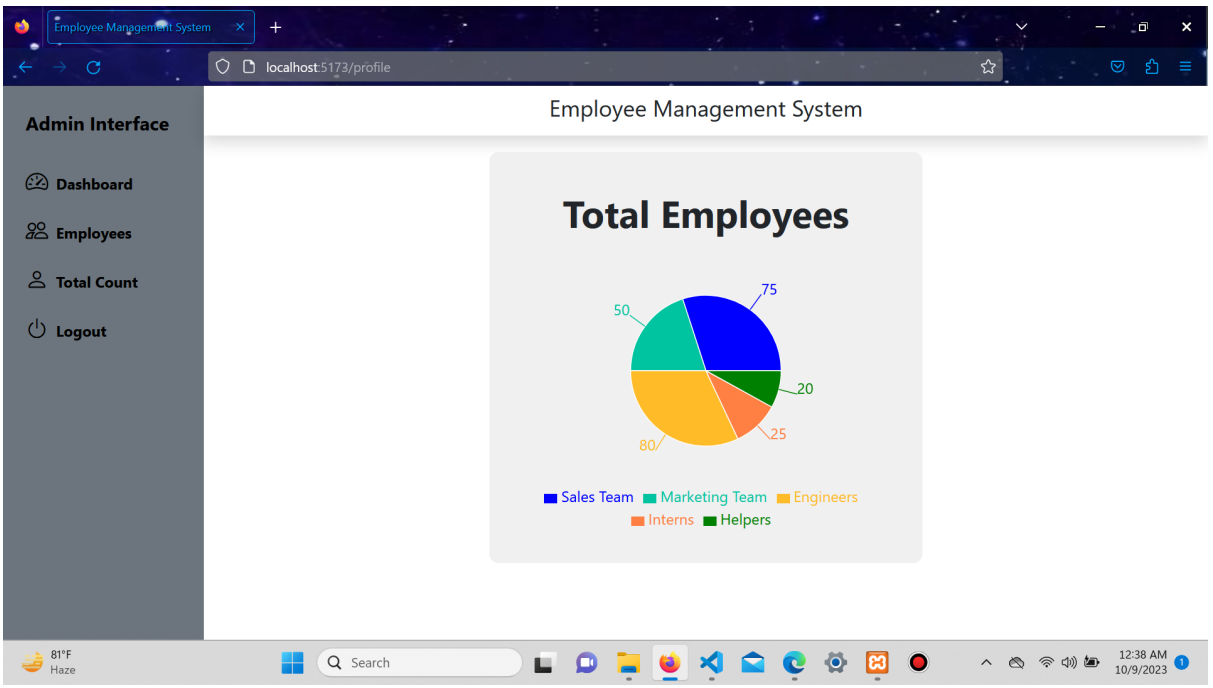


Fig 6.13 Total Employee Chart

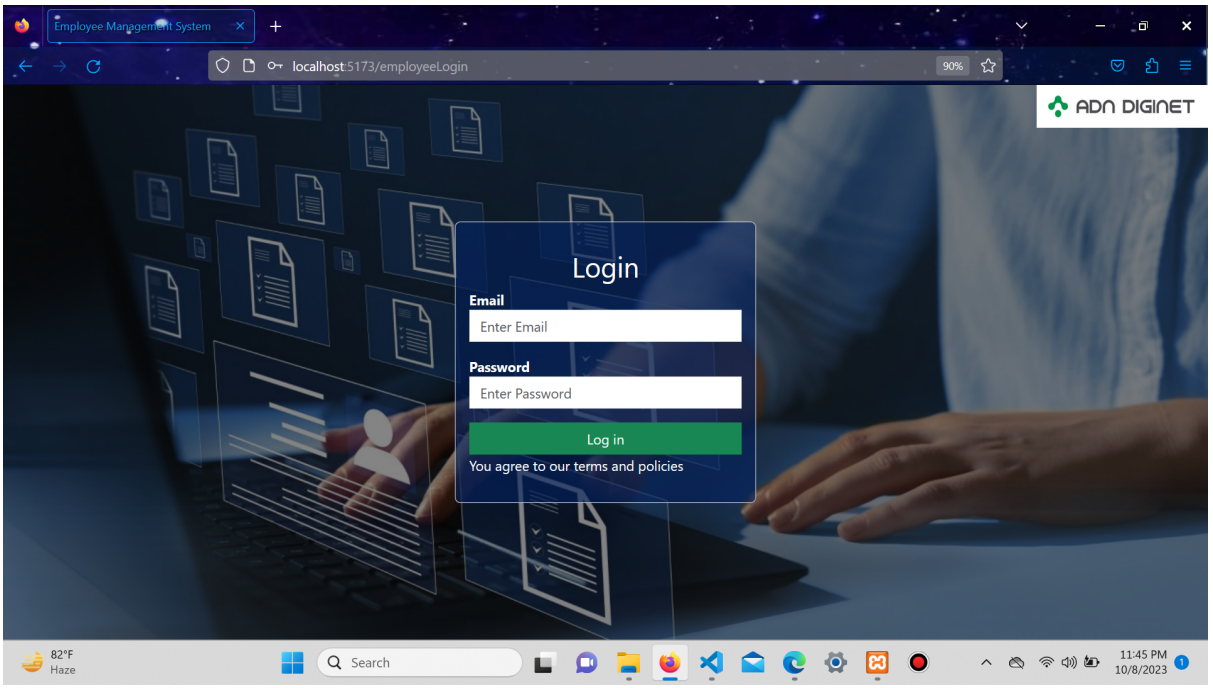


Fig 6.14 Employee Login Page

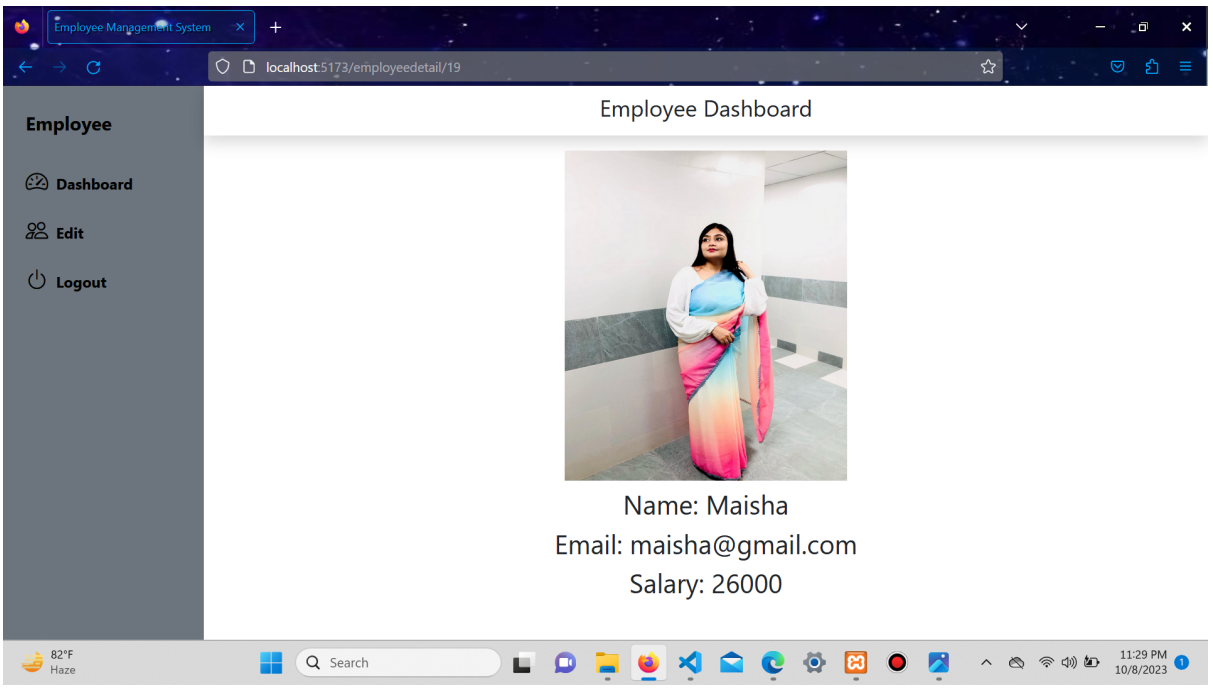


Fig 6.15 Employee Dashboard

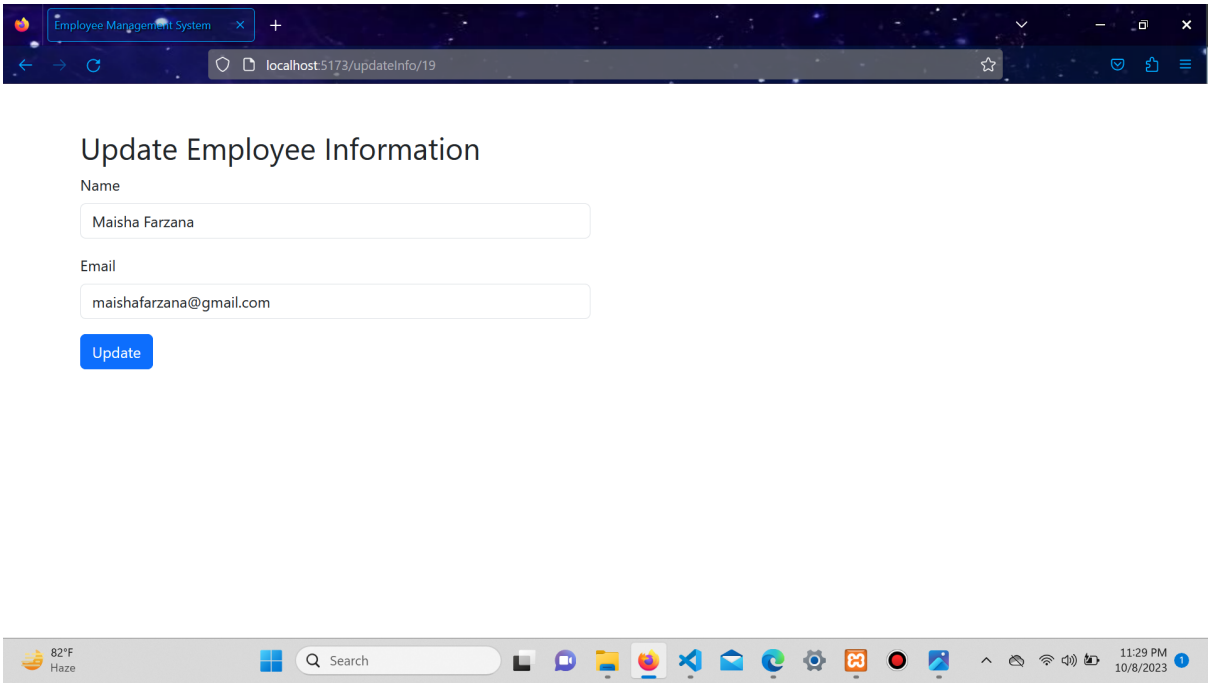


Fig 6.16 Employee updating his/her own information

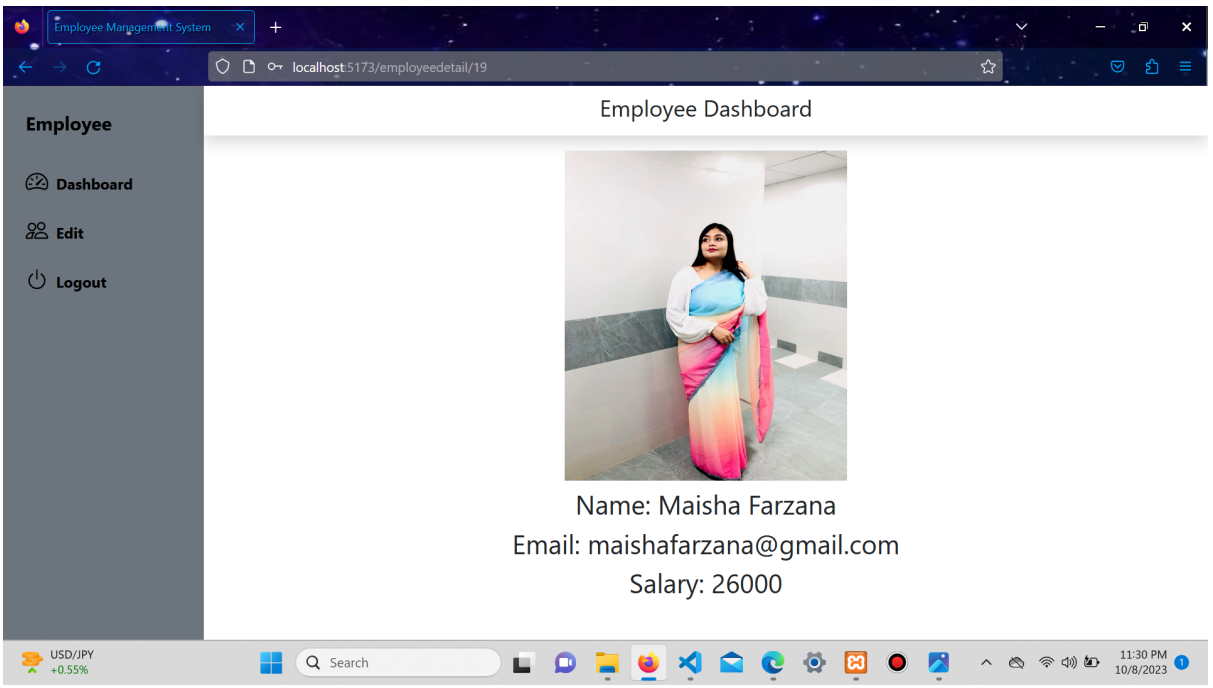


Fig 6.17 Employee information updated in the database

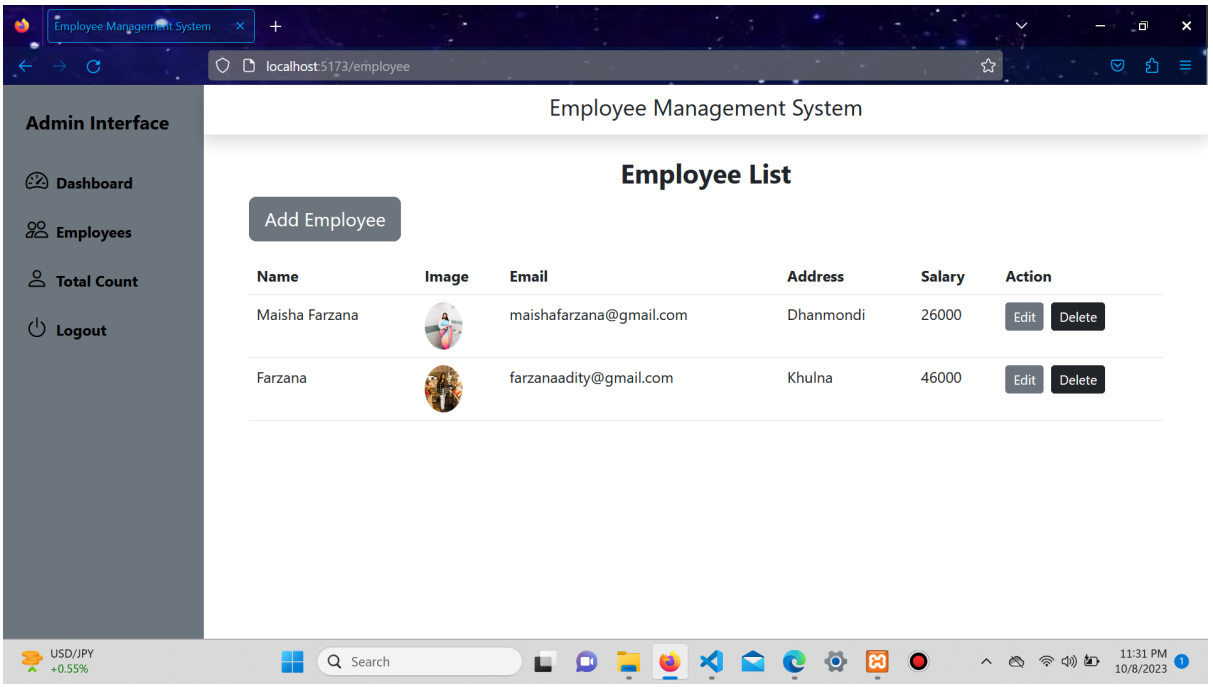


Fig 6.18 Employee information updated in the admin panel

Chapter 7

Project as Engineering Problem Analysis

7.1 Sustainability of the Project/Work:

In terms of software engineering, sustainability is the capacity of a software system to continue serving the needs of its users over an extended period of time. A software project is sustainable if it can continue to provide value to its customers for a long time without needing a lot of upkeep or regular upgrades. A software engineering project's sustainability can be influenced by a number of factors, including the following:

• **Quality of Code:** Good code is simpler to extend, update, and maintain, which can increase the project's sustainability**.**

• **Test coverage:** Ensuring the program is dependable and functions as intended with adequate test coverage can increase the application's sustainability.

• **Documentation: T**horough documentation can increase the project's sustainability and make it easier to manage.

• **Collaboration:** By ensuring that the project is in line with the needs of its users, collaboration between administrators and staff can assist to increase the project's sustainability.

• **Delivery and continuous integration:** Using continuous integration helps ensure that the project is updated and enhanced regularly, that increases its sustainability. Software developers can ensure that their projects are long-lasting and capable of satisfying the requirements of the clients by concentrating on these aspects.

• **Security and privacy:** Sustainability demands both the protection of user privacy and strict security measures. The reputation of the app and user trust could suffer from the leakage of data or any sort of privacy infringement. Long-term profitability requires ongoing investment in security measures, up-to-date database knowledge, and fast rectification of flaws.

7.2 Social and Environmental Effects and Analysis:

There may be a wide range of advantageous social and environmental benefits and potential positive social and environmental effects that can result from an employee management project. Some of the key benefits can bring include:

Responsive User Interface: The user experience will be smooth along with improved usability and user satisfaction.
Component-Based Architecture: The system is very useful for organizing and for the

management of data. Furthermore, reusable features can be created.

Efficient Updates: If the employee data is changed, React Js will only update the necessary components. Full-page enhancing will no longer be necessary.

Security: High security is ensured because employee data is very confidential. Accurate Record-Keeping: The system maintains up-to-date employee records using personal information.

Performance Tracking: The performance of each employee can be maintained using this interface. When analyzing the favorable social and environmental consequences of a software engineering employee management project, it's crucial to take into account the platform's unique features, functionality, and application.

7.3 Addressing Ethics and Ethical Issues:

Any software engineering project, including ones involving personnel management, must take ethics and ethical considerations into account. Key ethical difficulties that could come up in such undertakings include the following:

User experience: Platforms for employee management should put a strong emphasis on the user experience, making sure that users can easily access, use, and benefit from them**.**

Privacy: Since these projects deal with sensitive financial and personal data, it is crucial to make sure that it is safeguarded and handled in an ethical manner.

Traditional Management System: It is no longer required to save personnel data using analog methods like noting down with a pen and paper and keeping records in diaries.

Time: Everything is entered into the database with a single click and can be examined and changed again if necessary.

Chapter 8

Lesson Learnt

8.1 Problems Faced during this internship

- **No experience:** It was difficult for me as an intern with no knowledge of or expertise in the software engineering field to properly comprehend the concepts and technologies.

- **Lack of Knowledge:** My initial lack of familiarity with React Js and its different components, including axios, and also the backend like Node.js, Express, and React, caused me to struggle as well. Because of this, I found it challenging to write and troubleshoot code, and I had to ask my more experienced coworkers for advice.

- **Barriers in communication:** Working with experienced software developers caused additional communication difficulties because I had to explain my thinking while simultaneously trying to comprehend theirs.

- **Errors in Xampp:** There is,sometimes, an error in xampp while connecting it to the database. This delays the data fetching process.
    -
- **Time management:** It was difficult for me to efficiently manage my time while I was juggling several tasks and pressing deadlines. In order to fulfill my obligations, I had to learn how to efficiently prioritize my work and use my time.

- **Getting used to a new work environment:** For me, getting used to a new workplace and business culture was a hardship. I had to become accustomed with the new rules and regulations as well as discover how to function well in this brand-new setting.

8.2 Solution of those Problems

- **Asking questions and seeking advice:** To overcome my lack of expertise or understanding, I sought advice from colleagues and sought clarification where necessary. This made duties easier for me to complete and helped me better comprehend the ideas and technology involved in creating an employee management system.

- **Learning opportunities:** In order to make up for my lack of knowledge or experience, I actively looked for learning opportunities, such as browsing internet documentation. I was able to acquire the knowledge and abilities I required to excel in my internship as a result.

- **Overcoming communication barriers:** To get rid of communication barriers with experienced engineers, I simply interacted as clearly and proactively as I could. This involved outlining my reasoning, seeking clarification, and remaining open to advice and criticism.

- **Resolving errors in Xampp:** There are possible two fixes:
  Reinstallation of Xampp.
  Creating a new file and keeping all the sql tables in the new file.

- **Managing Time:** To overcome time management difficulties, I prioritized my duties and maintained organization. I scheduled my tasks using tools and methods like making a list of all the tasks I needed to complete and adding a timestamp.

- **Adapt to the work environment:** In order to settle into a new workplace, I became familiar with the policies and practices of the organization and actively sought out opportunities to learn about the culture and operations of the business. I was very receptive to criticism and prepared to change my strategy if needed.

Chapter 9

Future Work & Conclusion

9.1 Future Work:

Self-service portals for employees: These portals will advance further, enabling staff to easily update personal information, obtain pay stubs, request time off, and handle benefits. This can free up HR staff from administrative duties.

Mobile Accessibility: Mobile apps will continue to play a big role in employee management systems, giving staff members and managers the ability to access crucial data and complete activities while on the go.

Accommodate for Remote Work: To accommodate the growing trend of remote and hybrid work, employee management systems will need to be modified. This entails measuring productivity, keeping track of remote work hours, and making sure that local labor rules are followed.

Integration with various Systems: To provide a thorough perspective of employee data, personnel management systems will need to smoothly interact with other HR and business systems, including payroll, performance management, and learning and development platforms.

VR for training: For remote workers in particular, virtual reality (VR) can be used for immersive onboarding and training experiences, creating a more stimulating and efficient learning environment.

Virtual assistants: More sophisticated chatbots and virtual assistants will be used to respond to employee questions, automate repetitive operations, and enhance user experience.

Improved user service: For a more personalized and effective user service experience, the platform might be improved with capabilities like live chat assistance or video consultation.

Improving the current system: By repairing flaws, enhancing performance, or adding new features that increase the platform's usability, it may be possible to improve the current system. This can entail updating certain features or procedures, or changing the platform's technical stack.

9.2 Conclusion:

In conclusion, my internship at ADN Diginet has provided me with a priceless chance to advance both professionally and personally. The employee management website project gave me the chance to improve and develop my abilities and expertise in a practical situation and gave me the chance to work and learn with an accomplished group of experts. This is the first time that I have used React Js, Express Js and Node Js to develop a server. There were a lot of problems that I faced in connecting the dependencies and the server to MySQL. Each error has led to debugging and I provided an improvised version of the code to solve the issues. I'm extremely appreciative of the opportunity to work on a real project. It is uncommon for a beginning intern to be handed the chance to work on an ongoing project, so I am appreciative to my company team and the organization for giving me this responsibility. My sincere appreciation goes out to my office and university supervisors for their leadership and support during my internship. I am incredibly grateful for their insightful advice, which has been crucial to my development and success. Overall, working for ADN Diginet has been a genuinely pleasant and enlightening experience for me. I am appreciative of the chance to intern with such a gifted and encouraging group, and I will always cherish the memories of this time. I want to express my gratitude to everyone who made this internship a success for me. I also want to thank Allah, the Almighty, for everything.

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5. Employee Management System: 6 Reasons Why You Need It - RazorpayX Payroll

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By

Maisha Adity Farzana

Student ID: **1921278**

Summer, 2023

Consent from Supervisor

The student modified the internship final report as per the recommendations made by his/her academic supervisor and/or panel members during and/or before final viva, and the department can use this version for archiving as well as the OBE course material for CSE499.

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Mahir Al Kamal

(Signature of the Supervisor)

Mahir Al Kamal
Adjunct Lecturer
Department of Computer Science & Engineering
School of Engineering, Technology & Sciences
Independent University, Bangladesh