

Streamlining Employee Benefits: Automating Pension Form Filling and Leave Management with an Application

*A project report submitted as a partial fulfillment of the degree of
Master of Computer Applications (MCA)*

Submitted by

*Sharanam Maheshbhai Chotai
Seat No.: 88*

of

**Post Graduate Department of Computer Science and Technology
Sardar Patel University
Vallabh Vidyanagar**

Submitted to

**SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar**

May 2023

Post Graduate Department of Computer Science and Technology
Sardar Patel University
Vallabh Vidyanagar

Certificate

This is to certify that **Chotai Sharanam Maheshbhai** of MCA IV semester has worked on the project entitled "**Streamlining Employee Benefits: Automating Pension Form Filling and Leave Management with an Application**" satisfactory towards the partial fulfillment of the degree of Master of Computer Science and Applications during the final semester at the Post Graduate Department of Computer Science and Technology, Sardar Patel University, Vallabh Vidyanagar, Gujarat, India.

Date of Submission
1st May, 2023

Internal Project Guide

Head of the Department

Abstract

This document presents a detailed account of my experience working on two distinct software projects over a period of four months. The first project involved the development of a Graphical User Interface (GUI) to automate the tedious task of filling out pension forms for Sardar Patel University personnel. The primary goal of the project was to create an intuitive and user-friendly interface that could streamline the process and reduce errors. However, the application lacked flexibility from the user's perspective due to some rigid fields that could not be updated dynamically. The project has been developed using JavaScript-based framework: Svelte [1]. Svelte, a modern web framework that emphasizes a declarative approach to building user interfaces, has gained popularity due to its small bundle size, easy-to-learn syntax, and high-performance rendering. Using Svelte for this project allowed me to quickly prototype and develop a responsive and dynamic GUI that provided a seamless experience for the users, thanks to its reactivity system that enabled easy interface updates and response to user interactions without any additional code. Overall, the use of Svelte proved to be an effective choice for the first project and its simplicity and flexibility make it a great option for future web development projects.

The second project, undertaken as a Trainee Engineer at Investis Digital India Pvt Ltd [2], focused on developing a web-based application for managing employee leave requests. The application aimed to track employee leaves and enable managers to interact with employees and take appropriate actions. For this project, the MERN (MongoDB, Express, React, Node.js) stack was utilized to develop a web-based application for managing employee leave requests. MERN is a popular web development technology stack that allows for the seamless integration of the front-end and back-end components of an application. MongoDB was used as the database management system, Express as the back-end web framework, React as the front-end library, and Node.js as the run-time environment. The MERN stack provided a robust and flexible development environment, allowing for the creation of a highly scalable and responsive application. The use of MERN allowed for efficient and effective development, enabling the team to meet project deadlines and deliver a high-quality application. The project was carried out in an environment where requirements were continuously updated and changed, making it challenging to keep up with the evolving needs of the application.

The documentation provides a detailed description of the methods and tools employed for both projects, as well as a presentation of the results obtained.

Company Certificate

investisdigital.

Date: 25th April 2023

TO WHOMSOEVER IT MAY CONCERN

This is to certify that Sharanam Chotai student at Sardar Patel University of Vallabh Vidhyanagar is doing internship with **Investis Digital India Pvt. Ltd.** Presently he has completed 2.5 months of internship starting from 1st February 2023 and the journey of internship continues till 30th June 2023. During internship, He is working with good attitude.

During his internship with us, we found Sharanam to be sincere and result oriented.

We wish Sharanam all the best for his future endeavors.

For Investis Digital India Pvt. Ltd



Daisy Anthony
Talent Experience Director

Sharanam Chotai

INVESTIS DIGITAL INDIA PRIVATE LIMITED
5th FLOOR, BUSINESS PARK EAST,
ALEMBIC ROAD, GORWA
VADODARA – 390003, GUJARAT, INDIA

CIN NO. U72900GJ2009PTC058693
M. 90999 64708
E. contactindia@investisdigital.com
www.investisdigital.com

Acknowledgment

I want to express my gratitude towards Prof. (Dr.) Niranjan P. Patel, Offg. Vice Chancellor of Sardar Patel University, for providing me with the inspiration to work on this project. I also want to acknowledge the support and guidance of Mr. Atul Patel, Development Officer of Sardar Patel University, and Mr. Nitin Parekh, who not only provided valuable feedback and suggestions but also shared their knowledge and expertise related to the special cases of the pension system. Their explanations, although unique to their own perspectives, provided me with the necessary insights to produce effective results.

I would also like to express my sincere gratitude to Dr. Dipti B Shah, who was the Head of the Department at the time and currently my internal guide, for entrusting me to work on this project. She believed in my abilities and thought that I could come up with effective results for their current issue. Without her support and guidance, I would not have been able to complete this project. Dr. Dipti Shah's encouragement and mentorship have been invaluable to me.

I want to express my sincere gratitude to the esteemed faculty members, Prof. Jignesh Smart, Prof. Bharat Patel, and Prof. Darshan Choksi for their unwavering support and guidance throughout this project. Their valuable insights and suggestions have been instrumental in shaping the direction of this project and ensuring its successful completion. I would also like to extend my heartfelt thanks to Dr. Priti Sajja, the current Head of the Department, for her constant encouragement and motivation.

I would also like to express my gratitude to my friends, Mr. Aryaman Karde and Mr. Parth Vaswani (Gold Medalist), for their valuable help with situational debugging. Their assistance has been instrumental in identifying and resolving several issues, and I couldn't have done it without their support. I'm thankful to have such reliable and skilled friends in my network.

As my semester work was divided into two phases, I would like to express my heartfelt gratitude to the individuals who played a crucial role in shaping my career path as a Trainee Engineer at Investis Digital. I am grateful to my interviewer and currently my mentor, Mr. Zeelani Shaikh, who believed in my potential and gave me the opportunity to prove myself. I also extend my appreciation to Mr. Simon Varghese and Mr. Sohil Mirza for their constant support and guidance.

I am thankful to the HR team, especially Ms. Dhara Mehta and Ms. Riya Pandya, for their seamless coordination during the recruitment process. Their efforts helped me to join Investis Digital without any hassle. Last but not least, I am grateful to our Vice President, Mr. Mandar Risbud, for providing me with the opportunity to work on an industrial project and for offering me full-time employment. I truly appreciate their belief in my abilities and support in my professional development.

In addition, I would like to extend my gratitude to the visiting mentors who have taken sessions on soft skills, and Mr. Abhishek Pujara, who conducted a workshop on advanced web semantics. His workshop not only enhanced my technical skills but also helped me improve my

behavior and performance, which earned me an Amazon voucher. I would also like to thank Investis Digital for providing informative sessions to their trainees, which have been very helpful in my professional development.

In addition, I would like to express my appreciation to Mr. Kuntesh Bhatt for his friendly attitude towards us trainees. I also want to thank everyone who presented about Investis Digital during the induction sessions, which helped us acclimate to the new environment.

Apart from those who directly contributed to my project, I would also like to express my gratitude towards my team members Mr. Vaibhav Patel and Mr. Deep Patel. Although their approaches differed from mine, they were always willing to engage in discussions and share ideas. Their perspectives and insights helped me think outside the box and consider alternative solutions to the challenges I faced during the project. Their support and willingness to collaborate made the overall experience more enriching and productive.

And when it comes to discussions, I would like to express my gratitude to Mr. Faisal Khan and Mr. Mahip Parekh. They were always available to discuss real-life solutions for real-life problems, and I have learned so many new things during my internship because of their insights and knowledge.

I would like to take this opportunity to express my sincere gratitude towards my parents and friends for their constant support and encouragement throughout the development of this project. Their unwavering belief in me and my abilities has been a source of inspiration and motivation that has helped me to overcome challenges and achieve success. I feel truly blessed to have such amazing people in my life and am grateful for their presence every day. Thank you, from the bottom of my heart.

Table of Contents

<i>Certificate</i>	<i>i</i>
<i>Abstract</i>	<i>ii</i>
<i>Company Certificate</i>	<i>iii</i>
<i>Acknowledgment</i>	<i>iv</i>
<i>Table of Contents</i>	<i>vi</i>
<i>Table of Figures</i>	<i>viii</i>
<i>Introduction</i>	<i>1</i>
What is the big picture?	<i>1</i>
What were the Two Phases of the Semester and How Did They Contribute to the Overall Learning Experience?	<i>1</i>
How did I maintain confidentiality while documenting the projects that were subject to a Non-Disclosure Agreement (NDA)?	<i>1</i>
<i>Phase – I: Pension Form Filler Project</i>	<i>3</i>
How did things get started?	<i>3</i>
What tools did I use for this project?	<i>3</i>
What were some of the valuable skills and knowledge I gained from this project?	<i>3</i>
Use Case Diagram: Visualizing System Functionality	<i>4</i>
Activity diagram: Workflow for the data operators	<i>5</i>
Features included in version 1.1:	<i>7</i>
Features planned in version 2.0:	<i>7</i>
Screenshots and explanation	<i>8</i>
User Manual	<i>21</i>
<i>Phase – II: Internship at Investis Digital</i>	<i>26</i>
How did my internship get started?	<i>26</i>
What is the core business of Investis Digital and how they use technology to help their clients build deeper connections with their audiences?	<i>26</i>
How the bootcamp would help me in my role/project?	<i>28</i>
Summary of the concepts that I practiced and learned during the workshop	<i>29</i>
What measures is Investis Digital taking to ensure that new employees fit seamlessly into their workplace culture, and what initiatives are being implemented to support this goal?	<i>38</i>
When and how were the project assignments given to us during our internship?	<i>38</i>
What are the technologies and libraries that we depend on for our project?	<i>39</i>
How can we create visual representations of this application for different user roles?	<i>40</i>
How did we determine the structure of our database for the leave management application?	<i>43</i>

Screenshots and explanations	45
How do our RESTful API endpoints look like?	82
What security measures I have taken to ensure the safety of my application?	84
How can we enhance this application in the future?	85
<i>Conclusion</i>	86
<i>Bibliography and References</i>	- 1 -
<i>Appendix – I: Glossary of Difficult Words</i>	- 3 -

Table of Figures

<i>Figure 1PFF: Use case diagram</i>	4
<i>Figure 2PFF: Workflow to initialize the form filling</i>	5
<i>Figure 3PFF: Reuse the exported JSON file</i>	6
<i>Figure 4PFF: Landing Page</i>	8
<i>Figure 5PFF: Menu bar</i>	9
<i>Figure 6PFF: Printable area (Output)</i>	9
<i>Figure 7PFF: Input - interface</i>	9
<i>Figure 8PFF: Checkbox for under-aged nominative</i>	10
<i>Figure 9PFF: Fields for under-aged nominative</i>	10
<i>Figure 10PFF: Parts selector</i>	11
<i>Figure 11PFF: Sample Record in Part – 2</i>	11
<i>Figure 12PFF: Sample entries in date format</i>	11
<i>Figure 13PFF: Complex/tedious calculation</i>	12
<i>Figure 14PFF: Dynamic table example</i>	12
<i>Figure 15PFF: Sample Input for calculating Monthly average Pensionable Salary</i>	13
<i>Figure 16PFF: Final result of calculations</i>	13
<i>Figure 17PFF: Based on the above calculations further section is filled</i>	14
<i>Figure 18PFF: Using the previously calculated details, calculating સ્વાસ્થ્યસેળા</i>	14
<i>Figure 19PFF: Examples of reusable fields</i>	14
<i>Figure 20PFF: Example of Reusable Content in the Application</i>	15
<i>Figure 21PFF: Version - 2 (Under Development)</i>	16
<i>Figure 22PFF: Lines of code (github insights)</i>	16
<i>Figure 23PFF: Github Project</i>	17
<i>Figure 24PFF: Factory Function</i>	17
<i>Figure 25PFF: Calendar Utils</i>	18
<i>Figure 26PFF: File Structure</i>	19
<i>Figure 27PFF: Performance Report</i>	20
<i>Figure 28PFF: User manual</i>	21
<i>Figure 29ID: Investis_Digital_Academy - Information Security User Awareness Training Certificate</i>	27
<i>Figure 30ID: Investis_Digital_Academy-GDPR awareness training program Certificate</i>	27
<i>Figure 31ID: New Joinee in Bootcamp</i>	28
<i>Figure 32ID: Practice of various HTML elements</i>	29
<i>Figure 33ID: CSS tricks</i>	30
<i>Figure 34ID: My business card using position property of the CSS, with animation on mouse-hover</i>	31
<i>Figure 35ID: Carousel with slider using bootstrap and jquery.</i>	31
<i>Figure 36ID: Personal Portfolio using bootstrap, jquery and custom CSS</i>	32
<i>Figure 37ID: Contact form in personal portfolio, validations using jquery</i>	33
<i>Figure 38ID: My Project's section in the personal portfolio</i>	34
<i>Figure 39ID: Experience section in my personal portfolio</i>	35
<i>Figure 40ID: Finalized Database schema for the Hotel Management Application</i>	36
<i>Figure 41ID: Finalized DB Schema for Application like Ola, normalized upto 3NF</i>	36
<i>Figure 42ID: DB Schema of Mini Ola contd...</i>	37
<i>Figure 43ID: Git commits of practiced code during the workshop.</i>	37
<i>Figure 44ID: UC Authentication and Authorization</i>	40
<i>Figure 45ID: UC Requesting Leave</i>	41
<i>Figure 46ID: UC Global State Management</i>	42
<i>Figure 47ID: ER Diagram for LMA</i>	43
<i>Figure 48ID: Data dictionary for LMA</i>	44
<i>Figure 49ID: Landing page of LMA</i>	45
<i>Figure 50ID: Login Page of LMA</i>	46
<i>Figure 51ID: Validation example in Login page</i>	47
<i>Figure 52ID: Example of required input fields</i>	47
<i>Figure 53ID: Sign up Form for LMA</i>	48

<i>Figure 54ID: Forgot password page of LMA</i>	48
<i>Figure 55ID: Sample Email being sent to the user (in console)</i>	49
<i>Figure 56ID: Reset Password Page with provided token and user id</i>	49
<i>Figure 57ID: Super admin dashboard</i>	50
<i>Figure 58ID: Super admin's view for leave requests</i>	50
<i>Figure 59ID: Super admin is applying filters on leave requests (To fetch data of specific period)</i>	51
<i>Figure 60ID: Filtering out the leave requests having specific status</i>	51
<i>Figure 61ID: super admin searching for the leave requests of specific employee</i>	51
<i>Figure 62ID: Super admin deciding how many records should be visible on single page</i>	52
<i>Figure 63ID: Custom pagination component to change the page of records</i>	52
<i>Figure 64ID: URL with search params</i>	52
<i>Figure 65ID: custom stats for viewing the countings of the records</i>	52
<i>Figure 66ID: Super admin viewing the pending leave request from an employee</i>	53
<i>Figure 67ID: Super admin viewing the already approved leave request from an employee</i>	53
<i>Figure 68ID: Super admin is viewing already rejected leave request from an employee</i>	54
<i>Figure 69ID: Super admin is viewing the canceled leave request from an employee</i>	55
<i>Figure 70ID: Super admin can export the leave requests from LMA</i>	56
<i>Figure 71ID: Super admin is viewing the exported data into MS Office Excel</i>	56
<i>Figure 72ID: Super admin viewing all the employees in the organization</i>	56
<i>Figure 73ID: Employee Card; Super admin can click and view each employee's data (This is hover effect on card)</i>	57
<i>Figure 74ID: Super admin managing specific employee's data in database</i>	58
<i>Figure 75ID: Super admin is having pagination to see all the employees</i>	58
<i>Figure 76ID: Add employee button for super admin</i>	59
<i>Figure 77ID: Super admin viewing the modal for adding employees</i>	59
<i>Figure 78ID: Super admin downloaded the template file</i>	59
<i>Figure 79ID: Super admin inserting employee's data into MS Office Excel</i>	60
<i>Figure 80ID: Super admin uploading the inserted data in MS Excel</i>	60
<i>Figure 81ID: Super admin getting response from the server while adding new employees</i>	60
<i>Figure 82ID: Super admin getting success message from the server while adding new employees</i>	61
<i>Figure 83ID: Super admin viewing the organization chart of the employees</i>	61
<i>Figure 84ID: Hover effect on each employee</i>	62
<i>Figure 85ID: Hierarchical tree is collapsible to view larger data at once</i>	62
<i>Figure 86ID: Super admin manages official holidays</i>	63
<i>Figure 87ID: Super admin filtering out the holidays (5 years back and 5 years forth)</i>	64
<i>Figure 88ID: Super admin can instantly view the calendar based on the selected month</i>	64
<i>Figure 89ID: Rows of the holiday table are clickable</i>	65
<i>Figure 90ID: Super admin can perform Update or Delete operation by selecting the specific holiday</i>	65
<i>Figure 91ID: Custom calendar component made using ReactJS</i>	66
<i>Figure 92ID: Super admin adding new holiday into the database</i>	66
<i>Figure 93ID: User of the LMA can update their profile</i>	67
<i>Figure 94ID: Log out screen</i>	68
<i>Figure 95ID: Responsiveness of the LMA</i>	68
<i>Figure 96ID: Manager's dashboard in LMA</i>	69
<i>Figure 97ID: Compact Leave cards on manager's dashboard</i>	70
<i>Figure 98ID: Dedicated page for admin to view leave requests from the employees</i>	70
<i>Figure 99ID: Available filter options for the admin on leave requests' page</i>	71
<i>Figure 100ID: Available sorting options for the admin on leave requests' page</i>	71
<i>Figure 101ID: Admin (Manager) viewing the Leave Card</i>	72
<i>Figure 102ID: Admin viewing already responded leave's leave-card</i>	72
<i>Figure 103ID: All the employees and managers can request time off</i>	73
<i>Figure 104ID: From date to request for a leave</i>	74
<i>Figure 105ID: To date to request for a leave</i>	74
<i>Figure 106ID: Total working days being calculated by the system</i>	75
<i>Figure 107ID: Employee Can apply for the half day</i>	76
<i>Figure 108ID: Type of half day</i>	77

<i>Figure 109ID: Type of leaves</i>	77
<i>Figure 110ID: Employee viewing their applied leaves</i>	77
<i>Figure 111ID: Employee cancelled their own leave request</i>	77
<i>Figure 112ID: Employee reapplying for leave on the day they applied already</i>	78
<i>Figure 113ID: Employee applying for the leave on holiday</i>	79
<i>Figure 114ID: Employee reapplying for leave after cancelling first request</i>	79
<i>Figure 115ID: Employee's Dashboard</i>	80
<i>Figure 116ID: Custom elements in react-js</i>	80
<i>Figure 117ID: Lighthouse report of LMA Landing Page</i>	81

Introduction

What is the big picture?

MCA students at Sardar Patel University [3] are required to complete a final semester project by joining an IT company, organization, or team involved in software development, system programming, database technology, object technology, network technology, visual technology, or web technology. The project duration should be a minimum of four months, and a documentation report must be submitted to the college at the end of the semester. This practical experience is a crucial aspect of the MCA program, providing students with the opportunity to apply theoretical knowledge to real-world scenarios and gain valuable insights into the field of software engineering.

What were the Two Phases of the Semester and How Did They Contribute to the Overall Learning Experience?

As MCA students, we were required to join an organization as either an intern or a full-time developer before January 2023, and our semester was scheduled to run from January to April of the same year. However, some students, including myself, received offer letters stating that we could begin work in late January or the first week of February. Despite these exceptions, the department could not modify the academic schedule, and as a result, we had to work for the department or the university itself during the remaining gap period until our actual onboarding in the company occurred.

In my free time after November 2022, I embarked on a project for the university which is described in detail in the subsequent chapter of this document. As part of the requirement to choose a project that would benefit the university, I continued working on this project during the one-month gap before I officially joined the IT company as an intern.

Since both projects were developed to be used in a real-life environment, it was essential that they were not only useful but also well-tested and thoroughly determined. To ensure their usefulness, I conducted extensive research and requirements gathering to understand the needs of the end-users. I also engaged in continuous feedback and iteration throughout the development process to incorporate user feedback and improve the overall user experience.

How did I maintain confidentiality while documenting the projects that were subject to a Non-Disclosure Agreement (NDA)?

As a responsible professional, I take non-disclosure agreements (NDAs) very seriously, and I understand the importance of maintaining confidentiality in all aspects of my work. During the documentation process of my projects, I have taken several measures to ensure that I do not breach any NDAs or reveal any confidential information.

For my first project, I had initially planned to make the code open source with an appropriate license, but later found out that the code was considered an essential asset of the university. Therefore, I ensured that the code was not shared with anyone outside of the approved

project team, consisting of my mentors and university authorities, in strict compliance with the NDA. In my second project, which was meant for the company, I signed a legal NDA to protect all confidential information.

To ensure compliance with all NDAs, I carefully reviewed the terms of all relevant agreements and contracts. I made sure that any sensitive information related to the projects, such as client data or employee information, was redacted or removed from my documentation. Overall, I have taken every necessary precaution to maintain the confidentiality of my work while still providing a comprehensive and informative documentation of my projects.

Phase – I: Pension Form Filler Project

How did things get started?

As mentioned earlier, I began working on the Pension Form Filler project in November 2022, after being asked to contribute to the university's welfare by Dr. Dipti Shah, the Head of the Department at the time. The aim of the project was to streamline the lengthy form-filling process and assist university clerks in their duties. I dedicated my free time after the external exams of my third semester to work on this project and make a positive impact on the university.

Initially, I was given the freedom to choose any technology I preferred, but I opted to use basic web technologies such as HTML/CSS and JS. However, as the project requirements grew more complex, I decided to employ a reactive framework based on JS to improve its performance. After researching different options, I chose to learn Svelte JS, which eliminates the need for a virtual DOM and is known for its efficiency.

What tools did I use for this project?

The focus of this project was on the pension form, which requires all fields to be in Gujarati, although the user can fill it out in either English or Gujarati. To provide details in Gujarati, I used Google Input Tools to create the required form fields.

As for my text editor and IDE (Integrated Development Environment), I primarily used Visual Studio Code. Additionally, I used Git for version control history to keep track of my code changes as well to learn professional tools provided by GitHub, such as issues in repositories, GitHub Project, etc. I utilized them to plan my tasks in advance and to be well-focused.

What were some of the valuable skills and knowledge I gained from this project?

One of the best things that I learned from working on the Pension Form Filler project was the value of print layouts using CSS. While many people may not prefer this approach, I found that it can be a highly effective and efficient way to create well-designed and readable documents.

Additionally, I gained valuable insights into the pension process and gratuity, including the specific requirements and regulations that must be followed. This knowledge will be useful not only in future projects but also in my personal life as I navigate these processes myself.

Another important skill that I developed during this project was the ability to introduce and adapt to non-conventional ways of data management. More information has been given in this chapter.

Use Case Diagram: Visualizing System Functionality

The Use Case diagram [4] is a powerful UML diagram that helps us understand the tasks a user can perform within a system. In this section, I am presenting the Use Case diagram for the Data Operator role in our application.

As the primary user of the system, the Data Operator has access to all the features listed below. The diagram provides a clear visual representation of the various tasks and interactions that the Data Operator can perform within the application.

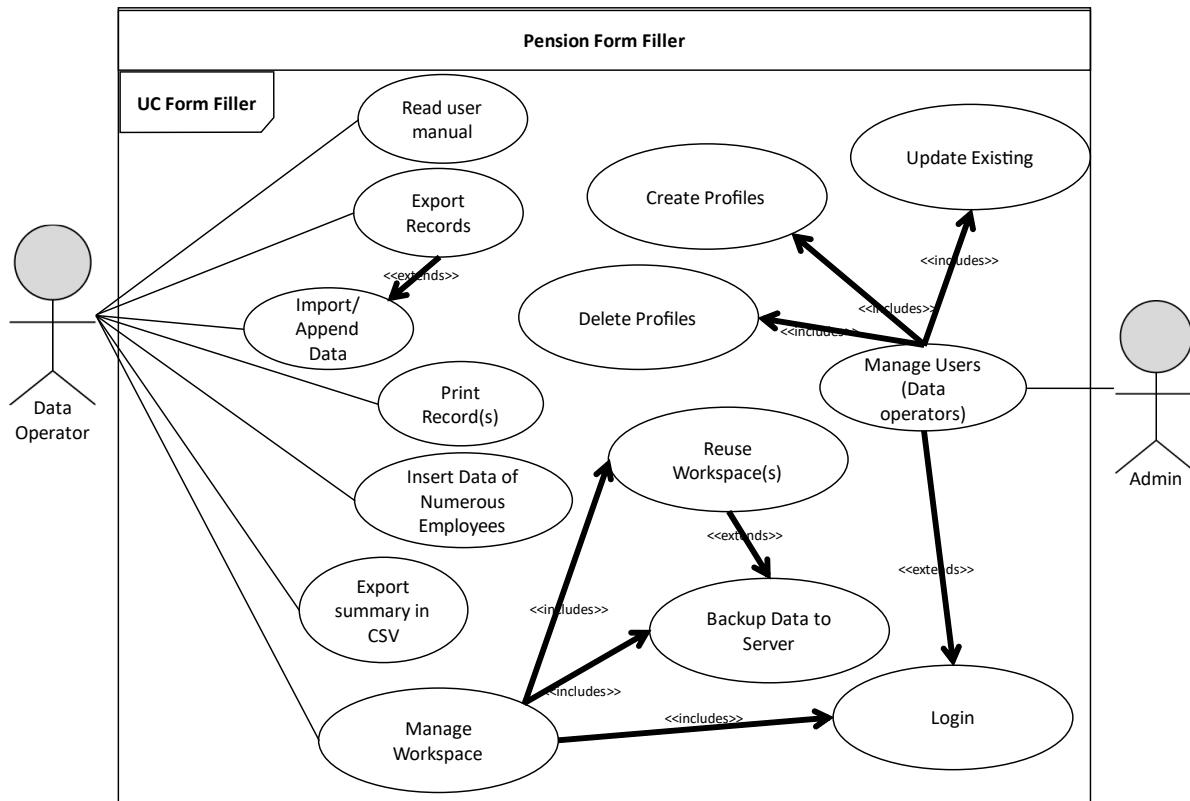


Figure 1PFF: Use case diagram

At the time of documenting the application's features, it currently includes all the major features necessary for practical use. However, there are additional features that would make it more flexible and useful. These features are part of version 2.0, which is still in development. Version 1.0 was developed for personnel with a standard pension form, while version 1.1 was created to handle cases of deceased personnel, where their families are responsible for the legal process. Data operators will receive significant updates with version 2.0, including authorization and authentication features and a workspace facility to store employee data on a dedicated web server.

Activity diagram: Workflow for the data operators

An activity diagram is a type of UML (Unified Modeling Language) diagram that is commonly used to visualize the flow of activities in a system or process. It shows the sequence of actions and decisions made during a process or activity, providing a clear understanding of how the system works.

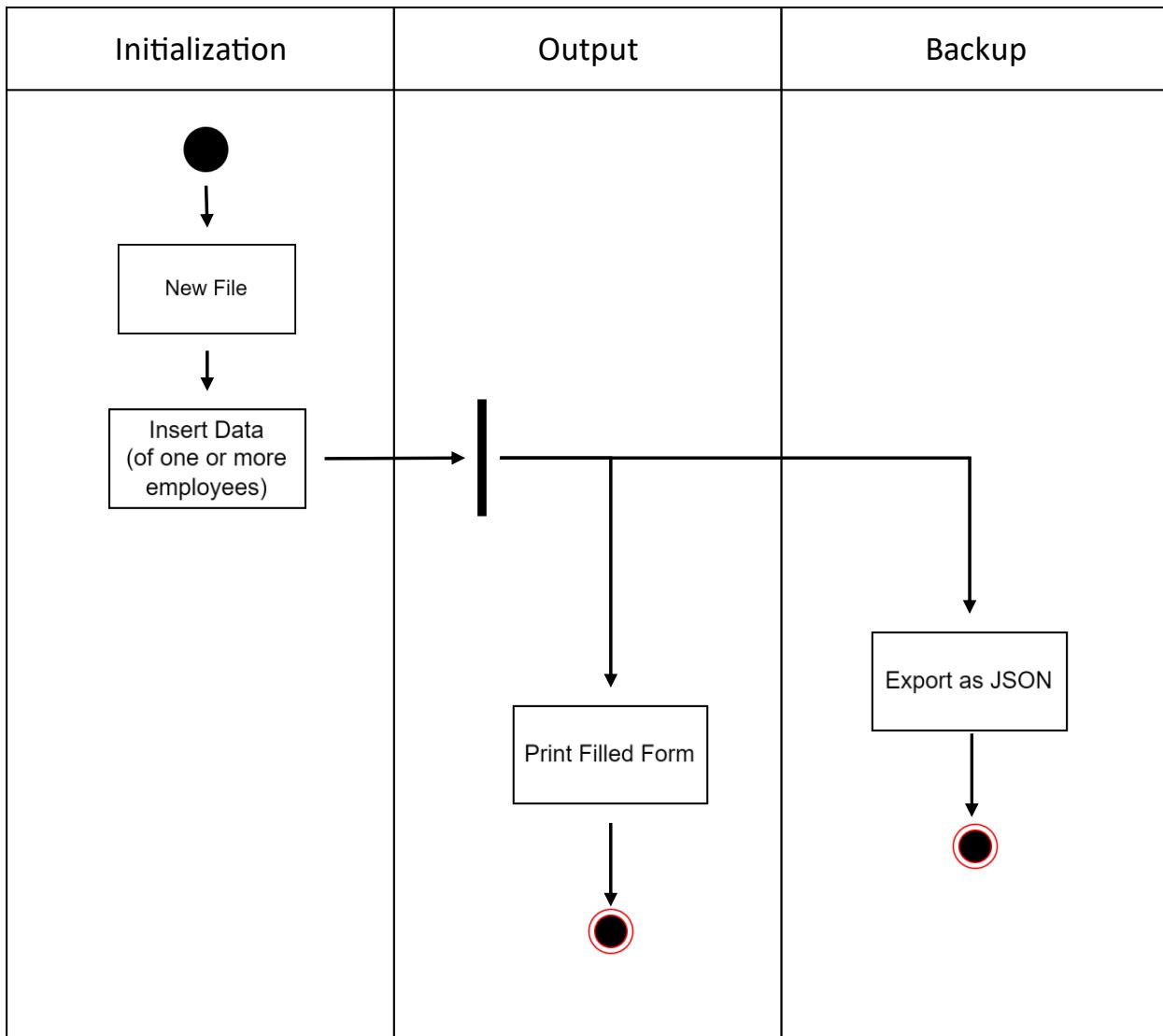


Figure 2PFF: Workflow to initialize the form filling

Based on the provided activity diagram, we can see how data operators are currently using the version 1.1. The diagram illustrates the sequence of steps that the data operator must follow to complete their tasks. This includes creating new file, which can consist records of multiple employees at once. Fill data into the form, take a print out of the form and also take a backup into JSON file.

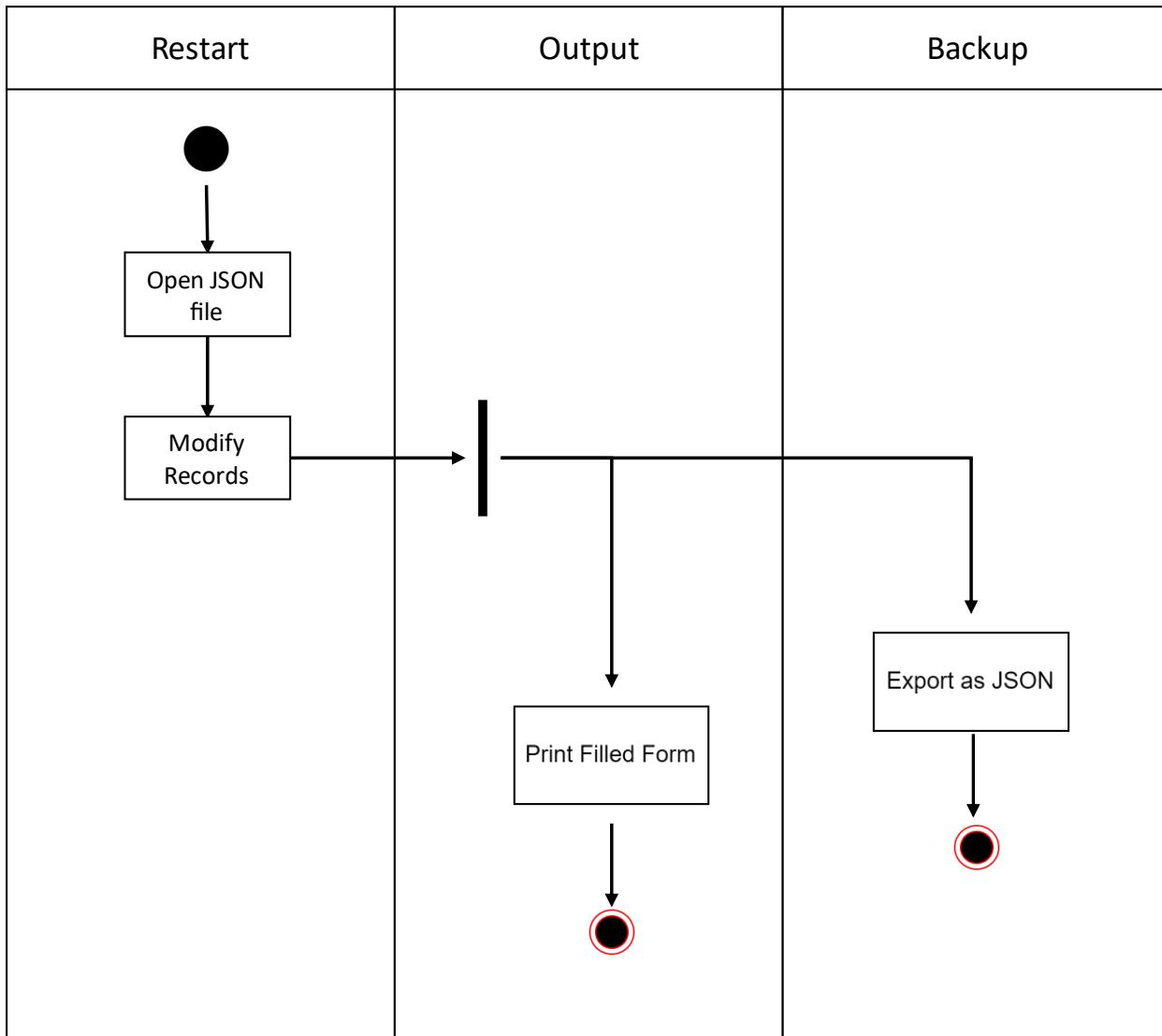


Figure 3PFF: Reuse the exported JSON file

The activity diagram presented above demonstrates how the exported JSON file can be leveraged to modify and restore data. By reusing the exported file, operators can easily make changes to the data already inserted. Additionally, the ability to restore the data to its previous state provides a safety net in case of any unexpected changes or issues.

This approach makes data portable, allowing it to be easily transferred between systems and applications. This concept is further discussed in the subsequent part of this chapter.

Features included in version 1.1:

A user manual in HTML/CSS format has been created to help users understand the workflow of the application. This manual is publicly available from the application menu and provides guidance on handling exceptional situations.

The main functionality of this application is to export the output in both soft and printed copy formats. To achieve this, I used the JSON file format to save all the necessary data locally on the data operator's system. And for printed copy, I am using vanilla CSS to manage the page layout along with its formatting.

Users can work with multiple employee – records at once with the help of a navigation panel. Another useful addition is the ability to import exported data into the application, further simplifying data management. And summarized data can be exported as a CSV (Comma Separated Values) file to keep the list of saved employee's data.

The application is designed with a server-less architecture, which means that the user will be served a “dist” folder containing all the code for the front-end. This allows the application to be fully functional on the client's computer, without the need for an internet connection. The front-end is capable of performing all necessary tasks, including data storage and retrieval, without relying on a server. This not only improves the performance and speed of the application but also reduces the dependency on external resources.

Features planned in version 2.0:

Version 1.1 of the application was considered stable enough for deployment. However, as the project progressed, additional requirements surfaced. One of the most critical of these requirements was the need for user authentication and secure on-server storage. These features were essential to ensure that the sensitive employee data being handled by the application would be protected from unauthorized access and data loss. It will enhance the security and reliability of the application. As a result, I have to incorporate these features into the application, which involved significant development work and testing.

In version 2.0, my focus will be on making the application more generic and adaptable to the needs of various organizations. To achieve this, I will be building the application using Node.js, a powerful and widely used platform that allows for the creation of fast, scalable, and highly efficient applications. With this technology, we will be able to enhance the overall performance and flexibility of the application, making it more versatile and user-friendly.

Moreover, we will be incorporating a navigation panel in the application to enable users to easily access and manage multiple employee records simultaneously. We will also be introducing the ability to import/export data, allowing users to seamlessly transfer data between different applications.

Overall, version 2.0 promises to be a significant upgrade over the previous version, with a host of new features and improvements that will enhance the functionality, security, and usability of the application.

Screenshots and explanation

Figure 4PFF: Landing Page

In the image above, you can see the header which displays the logo of the university [3] and other options on the right side. Below the header, you can check/uncheck you can find the option to check/uncheck how you want to see the printable area, whether you want to see all the records at once or not. Next, there is the navigation table that allows you to select the current record to modify. The actual interface section follows where user can perform the data entry task. This is known as Input – Interface which consists of over 160 unique input fields for various purposes.

At the bottom-right corner of the interface, there is a fixed but closable pop-up box that contains several buttons such as a font-size slider, a default button to reset the font size to its original size, the same checkbox to toggle between viewing all records or not, and a navigation button that allows users to jump to the first or last record, as well as the next or previous one.

The menubar is located at the top-right corner and consists of various utilities such as opening an existing file with a dedicated file format or appending records from another existing file into the same workplace.

You can export the data into JSON format from here, and also print the records by clicking on the print button given in the menu bar or simply pressing **ctrl + p**. Additionally, you can export a summary of the records in a CSV file.

It's important to note that since this application uses local storage of the browser, simply refreshing the webpage or application won't create a new file as the data will be saved into the local storage. Instead, you will need to click on the 'new file' button to explicitly refresh the workspace.

Lastly, the helping menu is also available where you can access the user manual in case you encounter any difficulties.

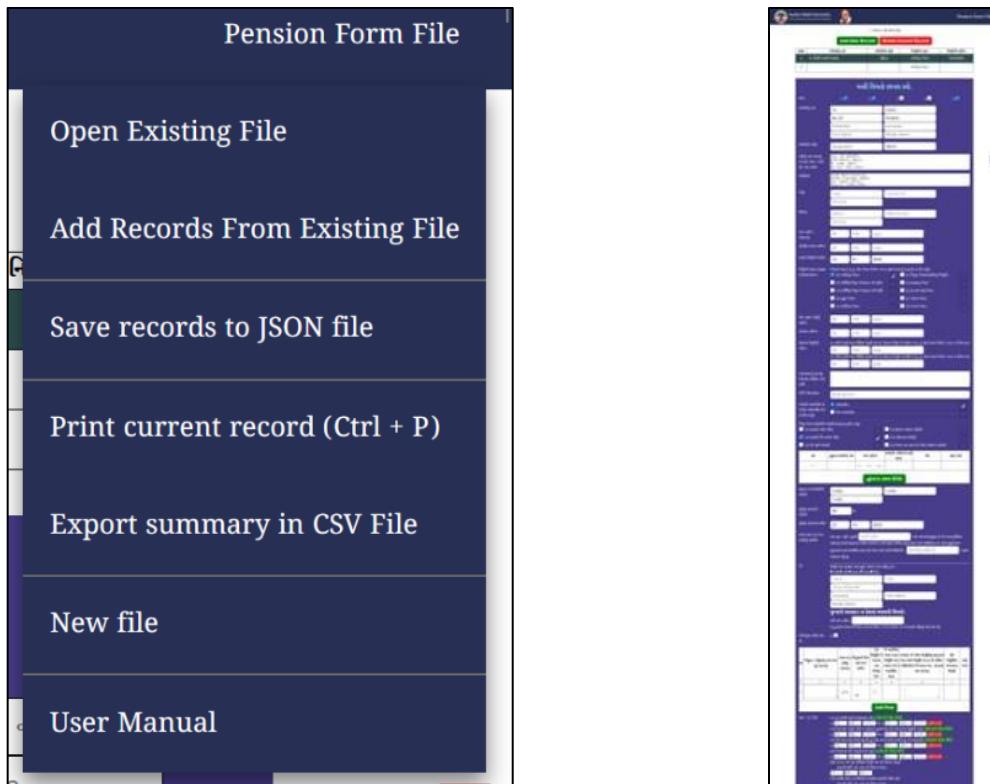


Figure 5PFF: Menu bar

Figure 6PFF: Printable area (Output)

Figure 7PFF: Input - interface

જો નિયુક્ત સગીર		હા <input type="checkbox"/>	હોય તો:				
ક્રમ	નિયુક્ત / નીયુક્તતોનું નામ અને પૂરું સરનામું	બચત દાર સાથેનું સગપણ	નિયુક્તની ઉભર અને જન્મ તારીખ	દરેક નિયુક્તિ ને આપવા પાત્ર હિસ્સો (%)	જો આકસ્મિક નિયુક્તિ ને આપવા પાત્ર આમાન્ય છરે તે આકસ્મિક ઘટના	ઘટના બનતા નિયુક્તિ પાત્ર આમાન્ય છરે તે આકસ્મિક ઘટના	બચતદાર ની પહેલ મૃત્યુ થાય તેવા પ્ર નો હક જે વ્યક્તિ મળે તેમના નામ અને સગ
૧	૨	૩	૪	૫	૬	૭	
૧		wif		1			

Figure 8PFF: Checkbox for under-aged nominative

જો નિયુક્ત સગીર	હા <input checked="" type="checkbox"/>
હોય તો:	જન્મ તારીખ
DD	MM
YYYY	
સદરહુ રકમ જે વ્યક્તિને વાલી તરીકે આપવાની હોય તેનું નામ	
સરનામું પીનકોડ સહિત	
પેન્શનર સાથે સંબંધ પુત્રી	

Figure 9PFF: Fields for under-aged nominative

In the above image, you may notice that certain fields are only displayed if specific criteria are met. For instance, there is a checkbox in the image that enables the relevant fields only if the user selects 'under-age'.

Similarly, the pension form is divided into five major parts, but the retired personnel will mainly utilize only the 1st, 2nd, and 5th ones. This interface allows the users to check and uncheck the required forms or parts, making the process more efficient and user-friendly.

ભાગા:	1 <input checked="" type="checkbox"/>	2 <input checked="" type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input checked="" type="checkbox"/>
-------	---------------------------------------	---------------------------------------	----------------------------	----------------------------	---------------------------------------

Figure 10PFF: Parts selector

The image below showcases how the application ensures a seamless transition from input interface to printable output. It does so by fitting the provided content perfectly into the designated printable area.

અંગેજમ્ના : (in block letters)			
SURNAME	X	Y	Z
FIRST NAME	A	B	C
SECOND NAME	T	E	S

૨ લોંબા:

અંગેજમ્ના:

૩ જન્મ તારીખા:

૪ નોકરીના દાખલ તારીખા:

પસ્થિત નિવૃત્તિના તારીખા:

૫ પેન્શનનો પ્રકાર (ગુ. મુ. સેવા પેન્શન નિયમો-૨૦૦૨ મુજબ) (લાખ પણ્ઠું હોથ તે ટીક કરવું)

<input checked="" type="checkbox"/> (૧) વચ્ચિલુત્ત પેન્શન	<input type="checkbox"/> (૨) નિવૃત્ત પેન્શન(અપરિપક્વ નિવૃત્તિ)
<input type="checkbox"/> (૩) સ્વીચ્છિક નિવૃત્ત પેન્શન(૨૫ વર્ષ પછી)	<input type="checkbox"/> (૪) અશક્તા પેન્શન
<input type="checkbox"/> (૫) સ્વીચ્છિક નિવૃત્ત પેન્શન(૩૫ વર્ષ પછી)	<input type="checkbox"/> (૬) ધા અને ઈજા પેન્શન
<input type="checkbox"/> (૭) ફુટાં પેન્શન	<input type="checkbox"/> (૮) વળતર પેન્શન

Figure 11PFF: Sample Record in Part – 2

The application can perform all the basic to complex calculations on its own based on the given input,

૧૬.	તર્ફ	માસ	દિવસ
(એ) એકદર નોકરી તા. 6/9/2001 થી તા. 16/7/2023 બાદ પેન્શન માટે ન ગણયાનો	૨ ૧	૧ ૦	૧ ૦
સમય			
(૧) તુક માસથી વધારે અસાધારણ રજા	૦ ૦	૦ ૦	૦ ૦
તા ____/____/____ થી તા ____/____/____			
(૨) પેન્શનપાત્ર નોકરી તરીકે ન ગણયાના હુકમો થયા હોથ તેવો ફરજ મોકૂફીનો			
સમય			
તા 12/1/2023 થી તા 13/1/2023	૦ ૦	૦ ૦	૦ ૪
તા 5/2/2023 થી તા 8/2/2023			
(૩) ગ્રા માસ કરતાં વધારે મુહૂરતી તૂટ હોથ લાં એ ગાળા વચ્ચોનો તૂટ નો			
સમયગાળો			
તા ____/____/____ થી તા ____/____/____	૦ ૦	૦ ૦	૦ ૦
(૪) પેન્શનપાત્ર નહિ ગણયાનું મુહૂરતી	૦ ૦	૦ ૦	૦ ૦
તા ____/____/____ થી તા ____/____/____			
(૫) પેન્શનપાત્ર નોકરી નહિ ગણયાનો નોકરી નો સરવાળો (૧) થી (૪)	૦ ૦	૦ ૦	૦ ૪
(૬) ગોણ્યો પેન્શનપાત્ર નોકરી (એ-(૫)) :	૨ ૧	૧ ૦	૦ ૬
(સી) ૨૦/૨૫ વર્ષ બાદ સ્વીચ્છિક નિવૃત્તિ હોથ તો નોશનલ નોકરી	૦ ૦	૦ ૦	૦ ૦
ગુ. મુ. સેવા પેન્શન નિયમો-૨૫/૪૮ મુજબ (વધુમાં વધુ પણે વર્ષ)	૦ ૦	૦ ૦	૦ ૦
(૭) ન્યાયિક સેવા ના અધિકારી મદદનિયા સરકારી વડીલ માટે:			
ગુ. મુ. સેવા પેન્શન નિયમ ૩૭ મુજબ મળ્યા પણ નોશનલ નોકરી કુલ (બી+સી+ડી)	૨ ૧	૧ ૦	૦ ૬
(૮) ગણતરી માં લેખારી પૂર્ણ વર્ષ ની નોકરી			
			= 22 વર્ષ

Figure 12PFF: Sample entries in date format

(૨) ચાલુ નોકરીમાં અવસાન : (નિયમ -૮૦ (૧) (૧))	
(એ) કુટુંબ પેન્શન - ૧	
ચાલુ નોકરીએ અવસાન થાય ત્યારે અવસાનની તારીખ પછીની તારીખથી પ્રથમ દશ વર્ષ સુધી નીચે મુજબ કુટુંબ પેન્શન મળવાપાત્ર થશે. ચાલુ નોકરીએ અવસાન થાય ત્યારે અવસાનની તારીખ પછીથી તારીખથી પ્રથમ દશ વર્ષ માટે પરંતુ કર્મચારી જીવતા હોત અને ફાપ વર્ષની ત્યારે પહોંચે તે તારીખ સુધી બે વર્ષી જે વહેલું હોય તથા સુધી નીચે મુજબ કુટુંબ પેન્શન મળવાપાત્ર થશે.	
પેન્ટડ _____ + ગ્રેડ પે -	
છેલ્લો પગાર _____ રૂ. \times 50% = _____/-	
છેલ્લા પગારના 50% જેટલી રકમ રૂ. _____/-	
(બી) કુટુંબ પેન્શન -૨ (બી) કુટુંબ પેન્શન - ૨	
તારીખાં એટાંકે કે કર્મચારીના અવસાનની તારીખ પછીની તારીખથી ૧૦ વર્ષ પછી છેલ્લા પગારના ૩૦% જેટલી રકમ	
છેલ્લો પગાર _____ રૂ. \times 30 % = રૂ. _____/-	
૨૪. મૃત્યુ-સહ-નિવૃત્તિ ગ્રેન્યુઝની / સેવા ગ્રેન્યુઝની :	
૧. મૃત્યુ-સહ-નિવૃત્તિ-ગ્રેન્યુઝની (ગ્રુ.૨.સેવા (પેન્શન) નિયમોના નિયમ-૮૧) (૧) (એ)	
નિવૃત્તિ સમયે : [(છેલ્લો પગાર + મોધવારી) \times પેન્શનપાત્ર નોકરી વર્ષમાટે ૩૩ વર્ષ] / 2 =	
(45000 + 15300) \times 22 / 2 =	
= 663,300/-	
૨. ચાલુ નોકરીએ અવસાન સમયે : ગુમું સેવા (પેન્શન) નિયમો-૨૦૦૨ના નિયમ-૮૧(૧) (બી)	
(એ) એક વર્ષ કરતાં ઓછી પેન્શનપાત્ર નોકરી હોય તે પ્રસંગે	
(છેલ્લો પગાર + મોધવારી) \times ૨ = _____	
(બી) એક વર્ષ કે કરતાં વધુ પરંતુ પાંચ વર્ષ કરતાં ઓછી પેન્શનપાત્ર નોકરી હોય તે પ્રસંગે	
(છેલ્લો પગાર + મોધવારી) \times ૬ = _____	
(શી) પાંચ વર્ષ કે વધુ પરંતુ ૨૦ વર્ષ કરતાં ઓછી પેન્શનપાત્ર નોકરી હોય તે પ્રસંગે	
(છેલ્લો પગાર + મોધવારી) \times ૧૨ = _____	
(શી) ૨૦ વર્ષ કે તેના કરતાં વધુ નોકરી કરી હોય તથા મહન્તમ હોય મહન્તમ ૩૩ વર્ષની મર્યાદામાં જેટલા વર્ષની પેન્શનપાત્ર નોકરી હોય તેટલા પગાર	
(છેલ્લો પગાર + મોધવારી) \times પુરા કરેલા પેન્શનપાત્ર નોકરીના વર્ષ (મહન્તમ ૩૩ વર્ષ) = _____	

Figure 13PFF: Complex/tedious calculation

The input interface of the tables is highly dynamic, allowing you to add or remove rows as per your requirements. An example of this dynamic feature can be seen in the image below.

ક્રમ	કઈ કઈ સંસ્થામાં નોકરી કરી તેનું નામ	સમયગાળો તારીખ થી તારીખ	કુલ નોકરીના			પેન્શનપાત્ર નોકરીના			Delete
			વર્ષ	માસ	દિવસ	વર્ષ	માસ	દિવસ	
૧	સરદાર પટેલ યુનિવર્સિટી, વલ્લભ વિધાનગર	dd <input type="button" value="▼"/> mm <input type="button" value="▼"/> yyyy <input type="button" value="▼"/> dd <input type="button" value="▼"/> mm <input type="button" value="▼"/> yyyy <input type="button" value="▼"/> વધુનિવૃત્તિ	૧ <input type="button" value="▼"/>	૧ <input type="button" value="▼"/>	૧૬ <input type="button" value="▼"/>	૧ <input type="button" value="▼"/>	૧ <input type="button" value="▼"/>	૧૬ <input type="button" value="▼"/>	<input type="button" value="X"/>
૨		dd <input type="button" value="▼"/> mm <input type="button" value="▼"/> yyyy <input type="button" value="▼"/> dd <input type="button" value="▼"/> mm <input type="button" value="▼"/> yyyy <input type="button" value="▼"/> વધુનિવૃત્તિ	૧ <input type="button" value="▼"/>	૧ <input type="button" value="▼"/>	૧૬ <input type="button" value="▼"/>	૧ <input type="button" value="▼"/>	૧ <input type="button" value="▼"/>	૧૬ <input type="button" value="▼"/>	<input type="button" value="X"/>
Add Row									
		કુલ નોકરી	<input type="button" value="▼"/>	<input type="button" value="▼"/>	<input type="button" value="▼"/>	<input type="button" value="▼"/>	<input type="button" value="▼"/>	<input type="button" value="▼"/>	
ઉપર જાણવેલ હકીકત કર્મચારીની સેવાપોથીમાંથી પૂરતી ચકાસણી કરીને લાગેલ છે અને તે સાચી છે									

Figure 14PFF: Dynamic table example

૨૦. નિવૃત્તિ સમયનો છેલ્લો પગાર:

પે બેન્ડ	25000	+ શ્રેષ્ઠ પે	0
----------	-------	--------------	---

૨૧. સ્વૈચ્છિક નિવૃત્તિ હોય નોકરીનો છેલ્લી તારીખે સંભવિત મુણ પગાર:

પે બેન્ડ	0	+ શ્રેષ્ઠ પે	0
----------	---	--------------	---

૨૨. ખરેખર મેળવેલ પેન્શનપાત્ર પગારની વિગતો (મુસેવા (પેન્શન) નિયમોના નિયમ-૪૩)

તા.	12	03	2004	થી તા.	06	11	2025
-----	----	----	------	--------	----	----	------

(૨૫ વર્ષ બાદની સ્વૈચ્છિક નિવૃત્તિ હોય તો નોશનાલ પગાર ધ્યાને લેવો)

ક્રમ	માસ	પે બેન્ડ	શ્રેષ્ઠ પે
૧	૦૧/૦૨/૨૦૨૫ થી ૨૮/૦૨/૨૦૨૫	25000	0
૨	૦૧/૦૩/૨૦૨૫ થી ૩૧/૦૩/૨૦૨૫	25000	0
૩	૦૧/૦૪/૨૦૨૫ થી ૩૦/૦૪/૨૦૨૫	25000	0
૪	૦૧/૦૫/૨૦૨૫ થી ૩૧/૦૫/૨૦૨૫	25000	0
૫	૦૧/૦૬/૨૦૨૫ થી ૩૦/૦૬/૨૦૨૫	25000	0
૬	૦૧/૦૭/૨૦૨૫ થી ૩૧/૦૭/૨૦૨૫	25000	0
૭	૦૧/૦૮/૨૦૨૫ થી ૩૧/૦૮/૨૦૨૫	25000	0
૮	૦૧/૦૯/૨૦૨૫ થી ૩૦/૦૯/૨૦૨૫	25000	0
૯	૦૧/૧૦/૨૦૨૫ થી ૩૧/૧૦/૨૦૨૫	25000	0
૧૦	૦૧/૧૧/૨૦૨૫ થી ૦૬/૧૧/૨૦૨૫	25000	0

Figure 15PFF: Sample Input for calculating Monthly average Pensionable Salary

		250000		
૬	૦૧/૧૦/૨૦૨૫ થી ૩૧/૧૦/૨૦૨૫	25000	-	
૧૦	૦૧/૧૧/૨૦૨૫ થી ૦૬/૧૧/૨૦૨૫	25000	-	
કુલ પગાર :		250000		
સરવાળો દશ માસ :		250,000		
માસિક સરેરાશ પેન્શનપાત્ર પગાર :		25000 × 50% = 12,500		
છેલ્લા આર.ઓ.પી.ની ચકાસણી એલ.એફ.કચેરીએ કરેલ છે અને ત્યાર પછીના વાર્ષિક ઇજાફા તથા બઢતી વગેરે અન્વયે નિયત ચુકવવામાં આવેલ પગાર મેં ચકાસણી કરેલ છે અને તે બરાબર જણાયેલ છે, તે મુજબ પેન્શનપાત્ર પગાર ગણતરીમાં લીધેલ છે.				

Figure 16PFF: Final result of calculations

રૂપ. મૃત્યુ-સહ-નિવૃત્તિ ગ્રેચ્યુએટી / સેવા ગ્રેચ્યુએટી :

૧. મૃત્યુ-સહ-નિવૃત્તિ-ગ્રેચ્યુટાઈ (ગુરુસેવા (પેન્શન) નિયમોના નિયમ-૮૧) (૧) (એ)

निवृत्ति समये : [(छल्लो पगार + मॉंधवारी) × पेन्शनपात्र नोकरी वर्ष(महत्तम 33 वर्ष)] / 2 =

$$(25000 + 8500) \times 19 / 2 =$$

= 318,250 /-

Figure 17PFF: Based on the above calculations further section is filled

२५. सेवा ग्रेज्युएटी:

૧૦ વર્ષ કરતા ઓછી પેન્શનપાત્ર નોકરીના કિરસામા સેવા ગ્રેજ્યુટી(ગુ.મુ.સેવા(પેન્શન)) નિયમોના નિયમ-૮૦)

$$(છેલ્લો પગાર + મૌંઘવારી) \times પૂરી કરેલી નોકરીના વર્ષ = (25000 + 8500) \times 31 = રૂ. 519,250$$

૨૭. પેન્શનની રકમનું મુડીકૃત (ગુ.મુ.સેવા(પેન્શન) નિયમોના નિયમ - ૧૦૦) પેન્શનના મુડીકૃત રૂપાંતર માટે નજીકની ઉમરના આધારે એક રૂપિયાની રૂપાંતર કરેલ રકમ માટે મુડીકૃત રકમ :

(As per Goverment Resolution Finance Department No. PGR-1009-5-Pay Cell (M) dated 13th April, 2009)

ઉંમર	દર	ઉંમર	દર	ઉંમર	દર	ઉંમર	દર
૨૦	૮.૯૮૮	૨૧	૮.૯૮૭	૨૨	૮.૯૮૬	૨૩	૮.૯૮૫
૨૪	૮.૯૮૪	૨૫	૮.૯૮૩	૨૬	૮.૯૮૨	૨૭	૮.૯૮૦
૨૮	૮.૯૯૮	૨૮	૮.૯૯૬	૩૦	૮.૯૯૩	૩૧	૮.૯૬૬
૩૨	૮.૯૬૪	૩૩	૮.૯૫૬	૩૪	૮.૯૫૨	૩૫	૮.૯૪૫
૩૬	૮.૯૩૬	૩૯	૮.૯૨૬	૪૧	૮.૯૧૬	૪૬	૮.૯૦૩

Figure 18PFF: Using the previously calculated details, calculating સેવા ગ્રેજ્યુએટી

	95	4.649	99	4.883	96
	60	8.692	69	8.599	

نکٹی থਾਂਲ ਪੇਨਸ਼ਨ \times 40% = ਰੁਪਾਂਤਰ ਪੇਨਸ਼ਨ = 4,000/-

$$\text{रुपांतर पेन्शन भाग} \times \text{रुपांतर दर} \times १२ = ५,००० \times ६.९६६ \times १२ = ५५०,९४०/-$$

Mr. Chotai Sharanam હોદ્દો	સરદાર પટેલ યુનિવર્સિટી, વલ્લભ વિધાનગર સત્રાંતે વચ્ચનિવૃત્તિ
અંગારની અંગત નિશાની	તારીખ: 8/12/2025
Mole on the Neck	ઉચ્ચાઈ
	5" - 7"
	સંયુક્ત ફોટો

Figure 19PFF: Examples of reusable fields

Instead of focusing on the negative aspect of the form, let's highlight the benefits of using the application. One of the main advantages of using this application is the ability to save time and effort by reusing previously entered information. This not only reduces the risk of errors but also makes the process more efficient and less tedious.

Figure 20PFF: Example of Reusable Content in the Application



Figure 21PFF: Version - 2 (Under Development)

In the image above, you can see the current development progress, which requires users to be logged in to access the features.

Since I am utilizing various features of GitHub, I can track and analyze my project progress through the GitHub Insights dashboard. This provides valuable information on the number of lines of code written, commits made, pull requests completed, and other key metrics. The insights allow me to monitor the project's progress, identify areas that require improvement, and optimize my workflow.

In the image below, you can see a snapshot of my GitHub Insights dashboard, where I am tracking the progress of my project. The dashboard displays the number of lines of code written, commits made, and pull requests completed, among other things. This information helps me to identify any bottlenecks in the development process and optimize my workflow for better productivity. The insights provide a valuable overview of the project's status and help me to stay on track with my goals.

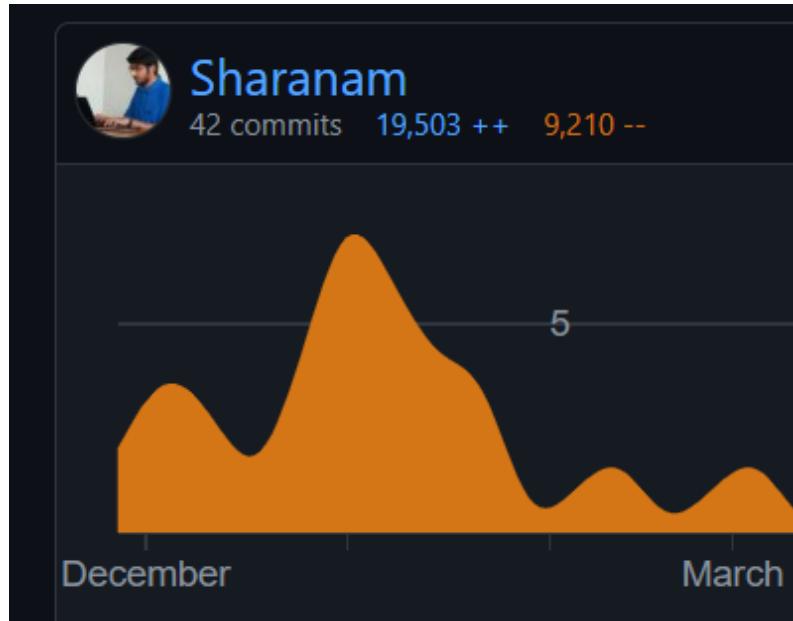


Figure 22PFF: Lines of code (github insights)

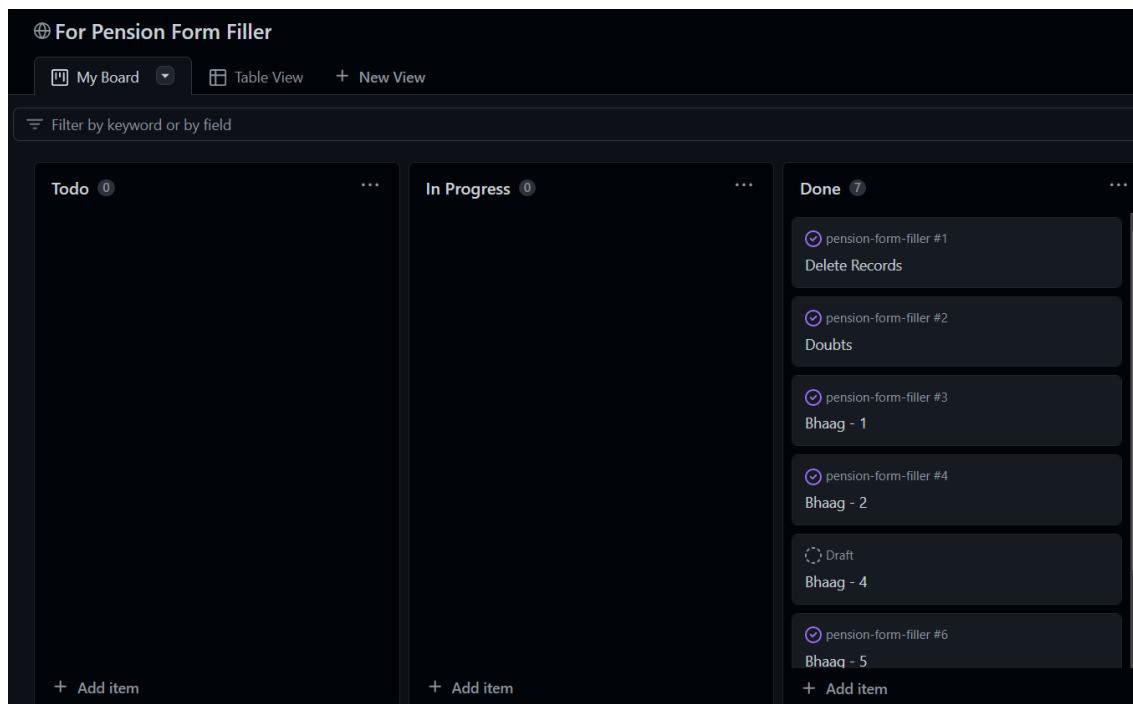


Figure 23PFF: Github Project

As a factory function for generating basic employee structure, I have designed a JavaScript object with over 160 fields to cover a wide range of employee information.

```
235 |   bhaag4_5: "",  
236 |   bhaag4_vidhva: "",  
237 |   bhaag4_aparinit: "",  
238 |   bh4_2_kram: "",  
239 |   bh4_sahmatti: "",  
240 | };  
241 }  
242
```

Figure 24PFF: Factory Function

```

16 // method 1 starts
17 /*
18 let years = y2 - y1;
19 let months = m2 - m1;
20 let days = d2 - d1;
21 if (days < 0) {
22     months--;
23     let daysInPrevMonth = new Date(y2, m2, 0).getDate();
24     days += daysInPrevMonth + 1;
25 }
26 if (months < 0) {
27     years--;
28     months += 12;
29 }
30 return make([years, months, days]);
31 */
32 // method 1 ends
33
34 // method 2 starts
35 /*
36 let diff = new Date(y2, m2 - 1, d2).getTime() - new Date(y1, m1 - 1, d1).getTime();
37 days = Math.floor(diff / (1000 * 60 * 60 * 24));
38 months = Math.floor(days / 30);
39 years = Math.floor(months / 12);
40 days = days % 30;
41 months = months % 12;
42 return make([years, months, days]);
43 */
44 // method 2 ends
45
46 // method 3 starts
47 let startDate = new Date(y1, m1 - 1, d1);
48 let endDate = new Date(y2, m2 - 1, d2);

```

Figure 25PFF: Calendar Utils

As I was on a learning journey and wanted to challenge myself, I opted not to use popular libraries for my project. As a result, I wrote my own calendar utility, which has various functions such as calculating the difference between dates, summing up the dates, and deducting days from given parameters. While libraries like moment.js could have simplified this process, I wanted to create fully customized functions that catered to my specific needs.

```
JS auth.js
JS workspace.js
> commonElements
< globalState
  JS data.js
< interface
  > partialInterface
  > recordManager
  ⚡ InputInterface.svelte
  ⚡ PrintableUnit.svelte
< sections
  > Bhaag-1
  > Bhaag-2
  > Bhaag-3
  > Bhaag-4
  > Bhaag-5
  > PramaanPatro
  ⚡ PensionCase.svelte
  ⚡ TableOfContents.svelte
< tools
  JS ageCalculator.js
  JS arrayOfFifteen.js
  JS constantValues.js
  JS dateString.js
  JS exportFiles.js
  JS fileHandle.js
  JS initialRecord.js
  JS nivrutiKaranNirdharak.js
  JS splitter.js
```

Figure 26PFF: File Structure

I ensured that the file structure was well-formed, making it easy for any future developer to navigate and understand the codebase. By using a consistent naming convention and organizing files into logical directories, anyone can quickly find what they are looking for.

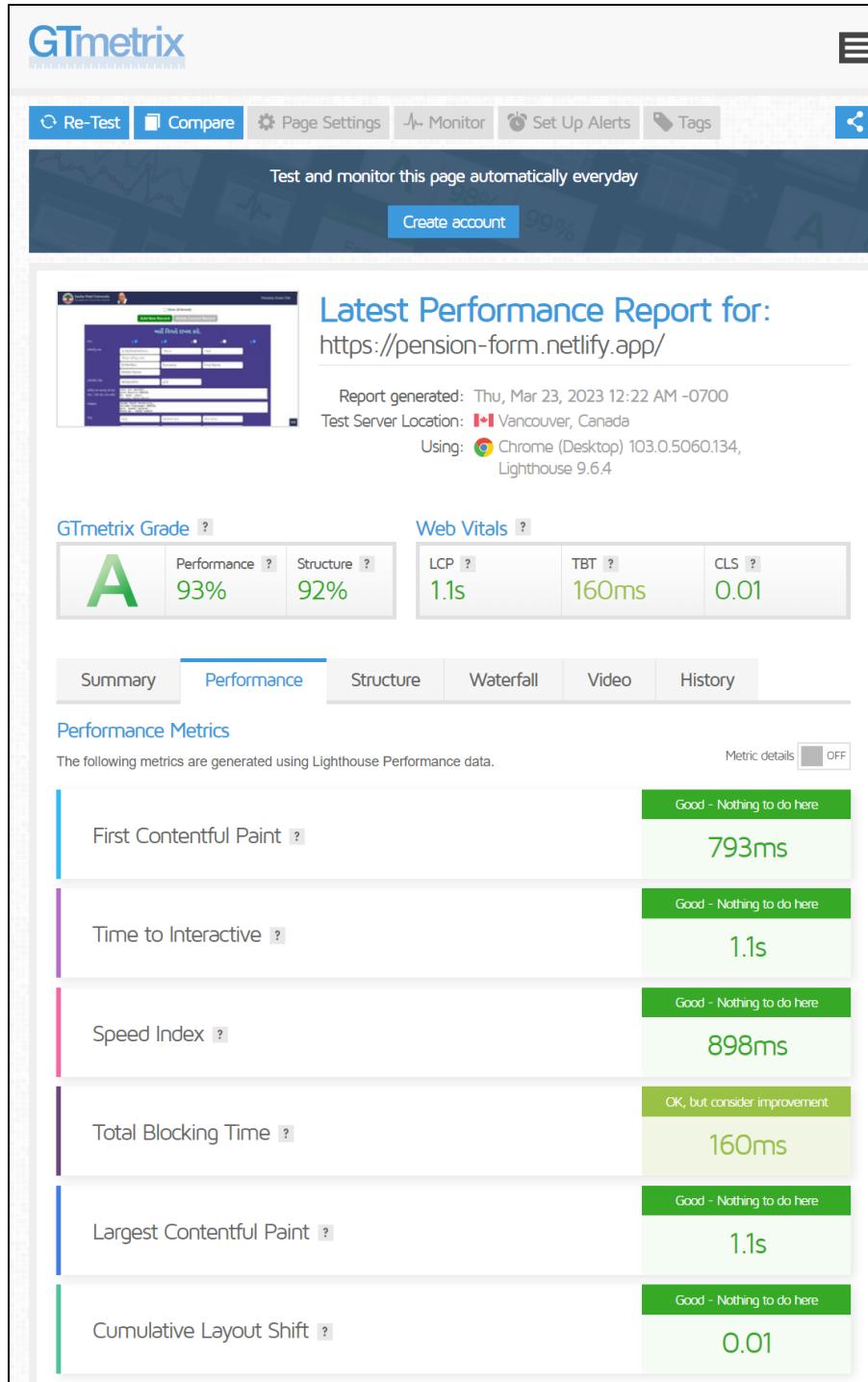


Figure 27PFF: Performance Report

As previously mentioned, this application was developed using the lightweight framework Svelte.js and does not require a server to operate. As a result, the majority of its work is rendering the user interface. During development, I ensured that the application's visual effects did not impede its performance or visual quality. As a result, users can expect a smooth and visually appealing experience while using the application.

User Manual

A user manual is a crucial component of any application as it helps the users to understand the application's features and functionalities in detail.

Pension Form Filler

Table of Contents

- 1. Introduction
- 2. Filling out the pension form for the first time
 - 2.1 Steps to get started
- 3. Printing out the forms
 - 3.1 Steps to print out the filled forms
 - 3.1.1 Configuration of print-dialog-box
- 4. Open existing 'RECORDS' file
 - 4.1 The meaning of opening a file
 - 4.2 Steps to open an existing file
 - 4.3 Append rows from an existing file
- 5. Reset the workspace
 - 5.1 Why to reset the workspace?
 - 5.2 Steps to reset the workspace
- 6. Export data to CSV
 - 6.1 What is CSV?
 - 6.2 Steps to export data to CSV
- 7. Manage records in the workspace
 - 7.1 Add and remove records
 - 7.2 Navigate between records
- 8. Miscellaneous features
 - 8.1 Change the size of the fonts

Instruction Manual

1. Introduction

This is a user manual for the pension-form-filler. This manual will guide you through the process of filling out the pension form.

2. Filling out the pension form for the first time

2.1. Steps to get started:

1. In the Pension Form Filler interface/website, fill in the details in an input field
2. Click the **Save records to JSON file** button in the top right corner of the page to save the records to a JSON file on your computer. This file can be used to fill out the form again.

NOTE: However, the file is JSON, the extension is **.pension.records** and it is not easy to read out. If you want to manipulate the file manually, you will need to use an enhanced text editor.

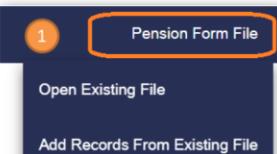


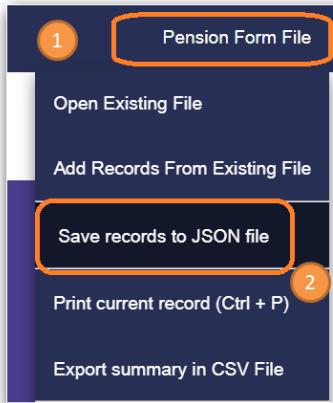
Figure 28PFF: User manual

2. Filling out the pension form for the first time

2.1. Steps to get started:

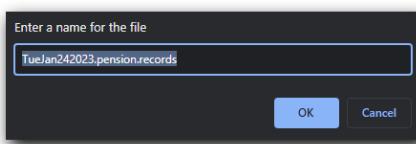
1. In the Pension Form Filler interface/website, fill in the details in an input field
2. Click the **Save records to JSON file** button in the top right corner of the page to save the records to a JSON file on your computer. This file can be used to fill out the form again.

NOTE: However, the file is JSON, the extension is **.pension.records** and it is not easy to read out. If you want to manipulate the file manually, you will need to use an enhanced text editor.



3. You will be asked to name the file. Which should be appropriate according to the data being filled.

By default, it will be current date followed by the file-extension. (i.e., '.pension.records')



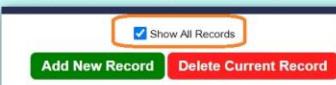
3. Printing out the forms

3.1. Steps to print out the filled forms:

- As you enter data, the forms will be ready to print. You can print them by clicking on the "Print Record" button in the upper right corner of the page or by using the hotkey (Ctrl + P).



NOTE: You can toggle between 'single record' and 'all records' using this checkbox:

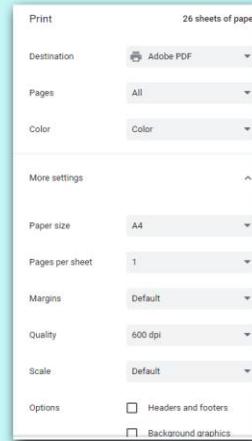


- You will need to take care of the printing dialog box provided by the web client, on which you will be able to set the orientation, the paper size, etc.

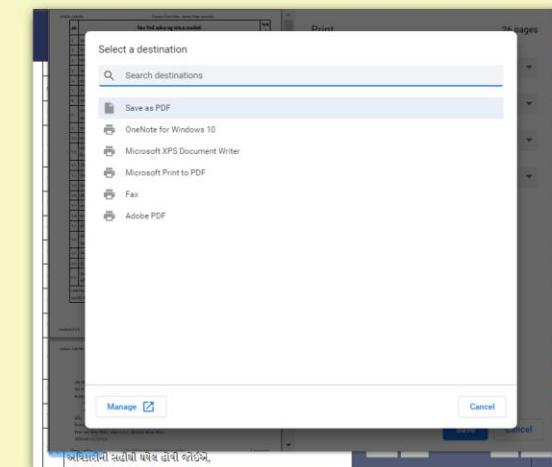
Configuration of print-dialog-box

The settings should look something like this:

- Margins: default
- Scale: default
- Paper size: A4
- Orientation: Portrait



NOTE: The print destination should be set to 'Save as PDF' if you do not want to print the form.



- Click on the "Print" button to end the process. The form will be printed out.

4. Open existing 'RECORDS' file

4.1. What do you mean by 'opening a RECORDS file'?

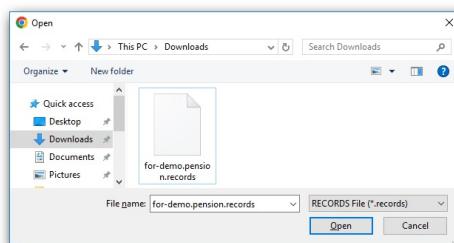
Once you save your data as a JSON file using the steps outlined in the ['steps-to-get-started' section](#), you'll be able to easily access and continue your work on any computer or tablet, as the file is portable.

4.2. Steps to open an existing file

1. Click the **Open Existing File** button in the top right corner of the page to get a dialog box from where you can select a file.

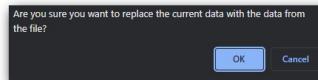


2. Select file using that dialog box.



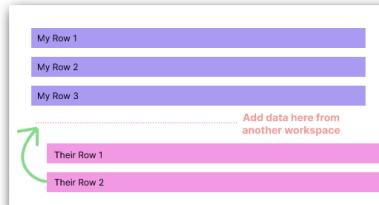
At this point, you will be asked whether to remove the current data, if any exists, and place the incoming data from the file.

If you deny to replace the data, your current data will remain intact and incoming file will simply be rejected. But if you allow to replace the data, your current unsaved data will be removed permanently.



4.3. Append rows from an existing file

1. As discussed in the previous section, you can open an existing file. But you can also append rows from an existing file.



2. To do so, click the **Append Record from Existing File** button in the top right corner of the page to get a dialog box from where you can select a file.



3. Select file using that dialog box. Unlike the previous section, you will not be asked to replace the data. Rather, the incoming data will be appended to the existing data. As shown below:

Current workspace (with 2 records/rows)				
#	அறியறீ நாம்	அறையினி எடுத்து	பிரதிவிளை மான	பிரதிவிளை நாளை
1	Shri (Atak) (Naam) (Pita)	Designation - X	விஜயகு பெ-மன	
2	Test		விஜயகு பெ-மன	

After adding data: Current workspace (with 2 former records + 2 incoming records)

#	அறியறீ நாம்	அறையினி எடுத்து	பிரதிவிளை மான	பிரதிவிளை நாளை
1	Shri (Atak) (Naam) (Pita)	Designation - X	விஜயகு பெ-மன	
2	Test		விஜயகு பெ-மன	
3	பி. கோவார் அப்பாவுக்கு கொண்டு	Professor	விஜயகு பெ-மன	12/1/2023
4	demo	demo	விஜயகு பெ-மன	

5. Reset the workspace

5.1. Why would you want to reset the workspace?

If you want to start afresh, you can reset the workspace. This will remove all the data from the workspace and you will be able to start from scratch.

NOTE: This action cannot be undone. So, make sure you have saved your data before proceeding.

This action will not delete the file from your computer. It will only remove the data from the workspace.

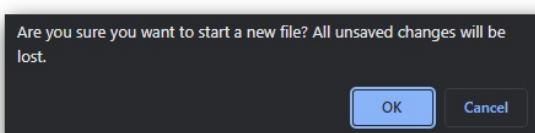
This feature is added because the data will be kept in the [localStorage](#) of your browser. Which means, if you close the browser, the data will not be lost; you can simply open the browser again and continue your work. But if you want to start afresh, you can reset the workspace.

5.2. Steps to reset the workspace

1. Click the **New File** button in the top right corner of the page



2. You will be asked to confirm the action. Click **OK** to confirm.



6. Export data to CSV (Comma Separated Values)

6.1. What is CSV?

CSV is a file format that stores tabular data (numbers and text) in plain text. Each line of the file is a data record. Each record consists of one or more fields, separated by commas. The use of the comma as a field separator is the source of the name for this file format.

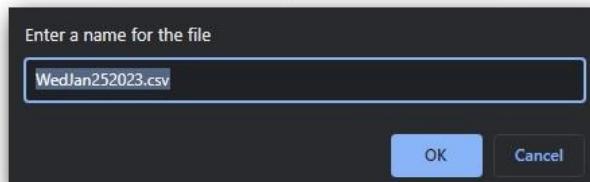
In very simple words, you can open this file in MS Office Excel.

6.2. Steps to export data to CSV

1. Click the **Export Summary in CSV File** button in the top right corner of the page.



2. In the dialog box, type the name of the file and click **Ok**.



7. Manage records in the workspace

7.1. Add and remove records

You can add or delete one record at a time by clicking the respective buttons in the top section of the page.

Add New Record		Delete Current Record		
ક્રમાંક	કર્મચારીનું નામ	કર્મચારીનો હોલોડે	નિવૃત્તિનો પ્રકાર	નિવૃત્તિની તારીખ
1	Y	W	વધનિવૃત્ત પોન્શન	11/11/2011
2	X	Z	વધનિવૃત્ત પોન્શન	

7.2. Navigate between records

As shown in the image above, you can navigate between records by clicking on any row in the table. You can use the **<** and **>** buttons at the bottom-right of the page to navigate between records.



8. Miscellaneous features

8.1. Change the size of the fonts

You can change the font-size of the page by dragging the slider at the bottom-right of the page.



NOTE: This is not recommended to be changed at all.

Phase – II: Internship at Investis Digital

How did my internship get started?

In February 2023, I embarked on a new chapter in my career as a Trainee Engineer at Investis Digital. Joining a cohort of twenty-seven other trainees from diverse academic backgrounds, I was thrilled to have the opportunity to make an impact in the industry as a developer.

The company's vision was clear: to provide us with extensive training over the course of six months, equipping us with the skills and expertise necessary to become full-fledged employees.

During our first week, as new trainee engineers at Investis Digital, we participated in several induction sessions. The heads of various departments along with their respective teams provided us with valuable insights into the company's operations and processes. We also completed some legal procedures as part of the onboarding process.

In addition to the induction sessions, we also received online training on GDPR and ISMS, which is mandatory for all employees at Investis Digital. The training was available on the North Pass, which is the Investis Digital Academy Portal. Upon completion of the training, we had to pass a quiz to demonstrate our understanding of the concepts. This step was crucial as failing the quiz meant retaking the course until we passed it. These trainings helped us to understand the importance of data privacy and security and provided us with a solid foundation for our future work at Investis Digital.

What is the core business of Investis Digital and how they use technology to help their clients build deeper connections with their audiences?

Investis Digital is a leader in the digital communications and marketing space with over two decades of experience. The company has established a reputation for delivering exceptional sector knowledge, investing in cutting-edge technologies, and building strong relationships with over 1600 global companies, including some of the world's largest and most recognizable brands like Rolls-Royce, Vodafone, and Fruit of the Loom.

Investis Digital's Connected Content™ approach is a proprietary process that leverages strategic and engaging content, intelligent digital experiences, and performance marketing to help clients connect with their target audience and achieve their business goals. Through this approach, the company creates compelling brand stories that resonate with audiences at the right time, in the right place, with the right message.

Investis Digital also offers intelligent website design and development services that are deployed rapidly and strategically measured. These services are underpinned by the company's secure Connect.ID technology, ensuring clients' digital footprint and brand reputation is safe and protected by their dedicated team of 500 digital experts across 9 global offices. Additionally, Investis Digital provides performance marketing solutions that help clients find and engage the audiences that matter most, ultimately amplifying their brand across all touchpoints.

Overall, Investis Digital's unique blend of expertise, technology, and 24/7 service allows clients to trust that their digital presence is secure, protected, and optimized for success.

Investis Digital Academy

February 7, 2023

This document certifies that

Sharanam Chotai

Has successfully completed the credential for

Information Security User Awareness Training

Xavier Sahaya

Issuer

Figure 29ID: Investis_Digital_Academy - Information Security User Awareness Training Certificate

Investis Digital Academy

This document certifies that

Sharanam Chotai

Has successfully completed the credential for

GDPR awareness training program

Xavier Sahaya

Issuer

Figure 30ID: Investis_Digital_Academy-GDPR awareness training program Certificate

How the bootcamp would help me in my role/project?

After completing the onboarding and induction sessions, Investis Digital brought in an experienced professional, Mr. Abhishek Poojara, to conduct a comprehensive workshop on Advanced Web Structure & Semantics. This workshop/bootcamp spanned over 65 hours and covered a wide range of topics, including web technologies, HTML/CSS, JavaScript, jQuery, DBMS, design principles, and GitHub basics. Although we had been taught these topics in college, the bootcamp was a great refresher and helped bring everyone onto the same page at the beginning of our internship.

In addition to providing a refresher on fundamental skills and concepts, the bootcamp also offered us an opportunity to learn new skills and stay current with the latest trends and best practices in the industry. Mr. Poojara shared his vast industry experience and real-world insights, which helped us gain a better understanding of how these concepts are applied in practice. We also had hands-on coding exercises that challenged us to apply what we had learned and pushed us to think creatively and problem-solve.

Furthermore, the bootcamp provided an excellent opportunity for us to connect and collaborate with our fellow interns. As we worked together on coding exercises, we got to know each other better and built relationships that extended beyond the classroom. These connections and collaborations have continued to be a valuable resource throughout our internship, as we continue to work together and learn from each other.

Interns often do not have the opportunity to participate in bootcamps, especially in smaller or start-up-like organizations. Bootcamps are a valuable experience that allows individuals to learn new skills and refresh existing ones, ultimately enhancing their ability to contribute to the organization.

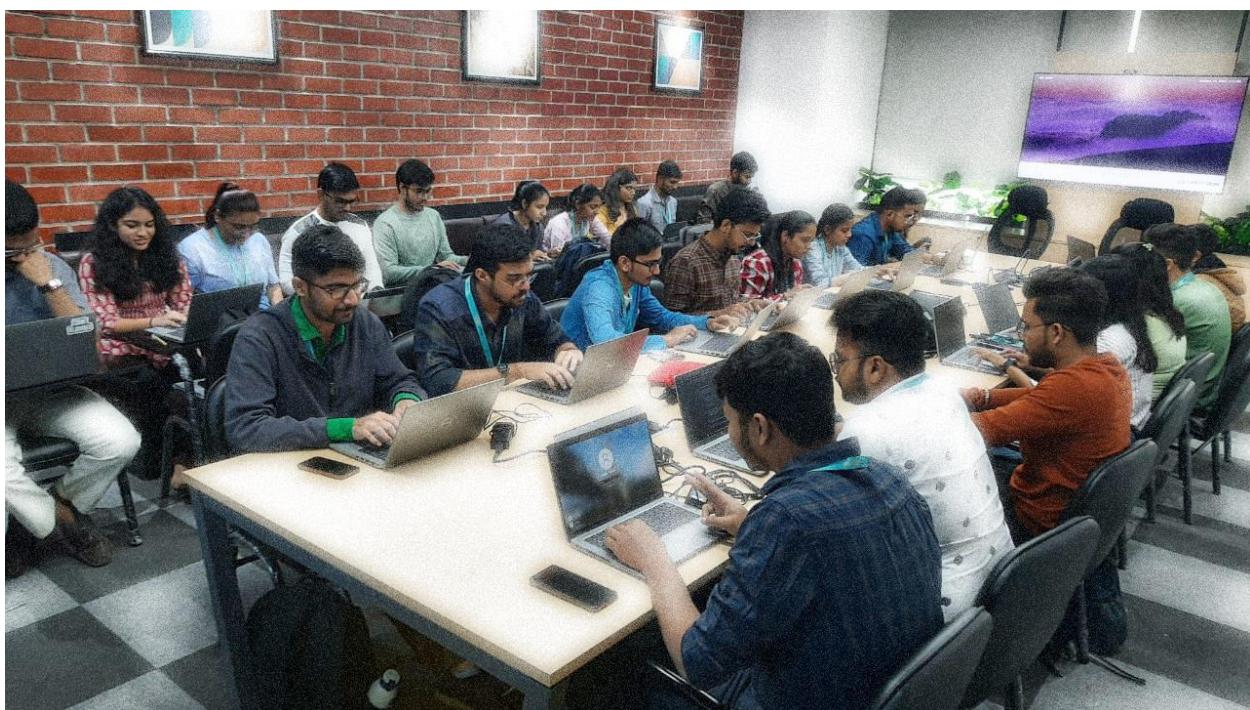


Figure 31ID: New Joinee in Bootcamp

Summary of the concepts that I practised and learned during the workshop

As stated earlier, the bootcamp began with an in-depth study of HTML, which included topics such as typography, tables, lists, iframes, links, and forms. We learned how to use these elements to structure and present content in a clear and organized manner on a web page.

The screenshot displays a collection of HTML form elements:

- Enabled Form:** Contains a "First Name" input field with placeholder "Enter first name", three radio buttons for gender (Male, Female, None of them), and a checkbox for accepting an agreement.
- File Input:** A "Choose Files" input field showing "No file chosen" and a "Select files" button.
- Button Types:** Three buttons labeled "I am input:button", "I am submit button", and "I am the contentful button of HTML".
- Date Input:** An "mm/dd/yyyy" input field with a calendar icon.
- Address Input:** An "enter your address here" input field with a map pin icon.
- Login Form:** Labeled "My Login", it includes "Username" and "password" inputs, and a "Sign in" button.
- Links:** Two blue links: "Investis Digital" and "Investis Digital (but in new tab)". Below them is a blue link: "Just email me, by clicking on this link here".
- LISTING:** A blue section containing two lists:
 1. Unordered List
 - o Teams
 - o Whatsapp
 2. Ordered List
 - 1. T

Figure 32ID: Practice of various HTML elements

The typography session focused on the importance of font size, color, and style in creating an aesthetically pleasing and readable web page. We learned how to use CSS to style text elements and create visually appealing headings, paragraphs, and lists.

Tables were another important element covered in the bootcamp. We learned how to create tables using HTML tags and how to use CSS to style table elements, such as borders and

backgrounds. We also learned how to create responsive tables that adjust to different screen sizes using media queries.

In addition, we studied iframes, which are used to embed external content such as videos or maps into a web page. We learned how to use iframes to display external content and how to customize their size and position on the page.

We were introduced to various CSS concepts and techniques. One of the exercises we undertook was aimed at honing our skills in creating layouts using CSS without the use of flexbox. We were tasked with recreating layouts that were originally created using flexbox, but we had to achieve the same effect without the use of flexbox.

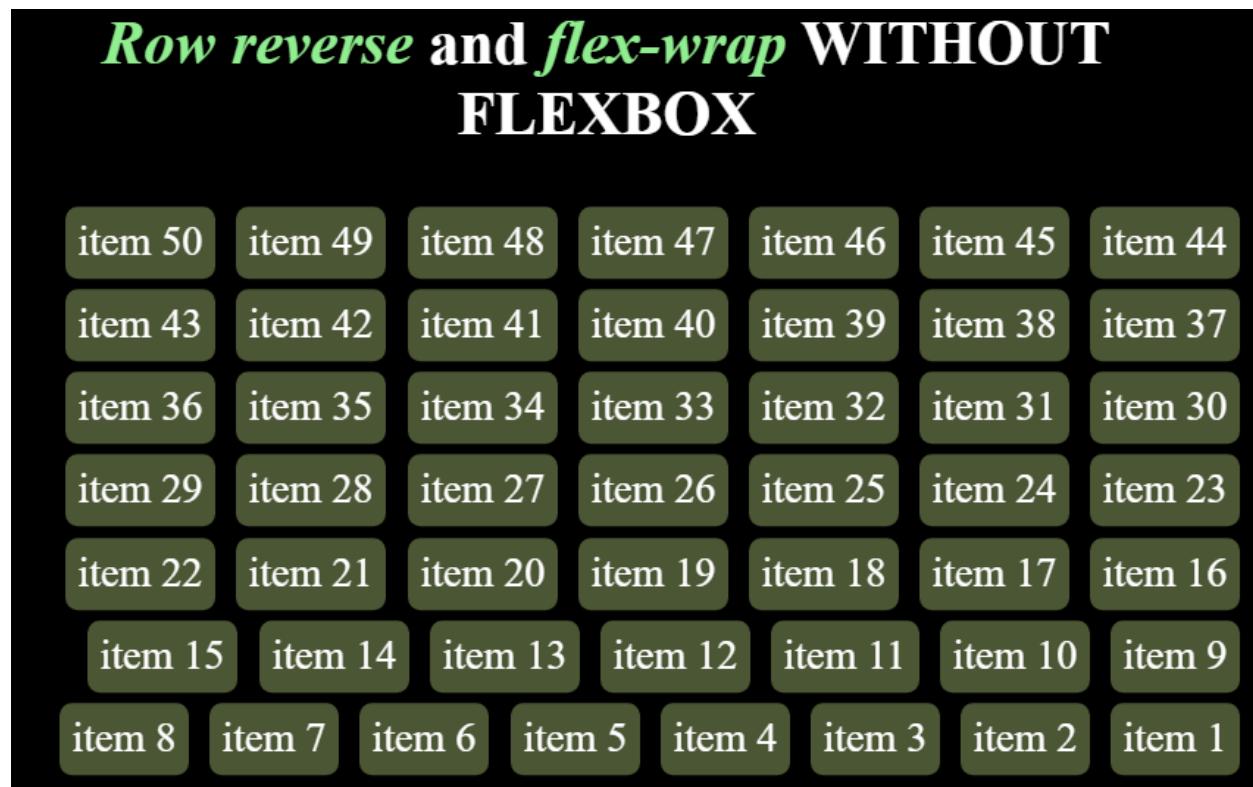


Figure 33 ID: CSS tricks

This exercise was particularly challenging, as flexbox is a commonly used CSS property that allows for easy creation of flexible and responsive layouts. However, by not using flexbox, we were forced to think creatively and use other CSS properties and techniques to achieve the desired layout.

We also delved into more advanced topics such as hover effects, and position relative and absolute in CSS. As an exercise, I created my business card using a hover effect that would fade out the background and display the content clearly on mouse hover.

Following our practice with HTML and CSS, we were introduced to Bootstrap, a widely-used framework for building responsive web pages. We learned how to use pre-made classes in Bootstrap to create layouts and styles quickly and efficiently. We started by creating a basic

webpage that included a header and a carousel in the hero section using Bootstrap's pre-defined classes.



Figure 34ID: My business card using position property of the CSS, with animation on mouse-hover

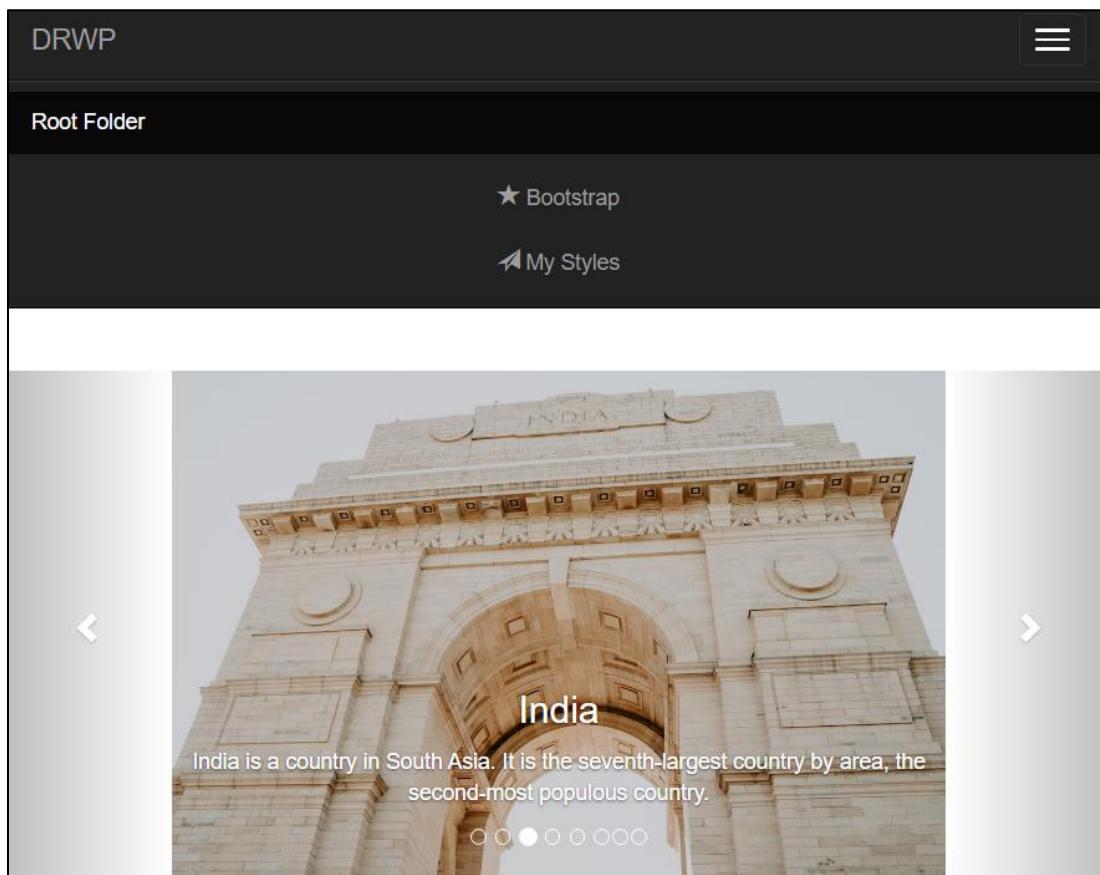


Figure 35ID: Carousel with slider using bootstrap and jquery.

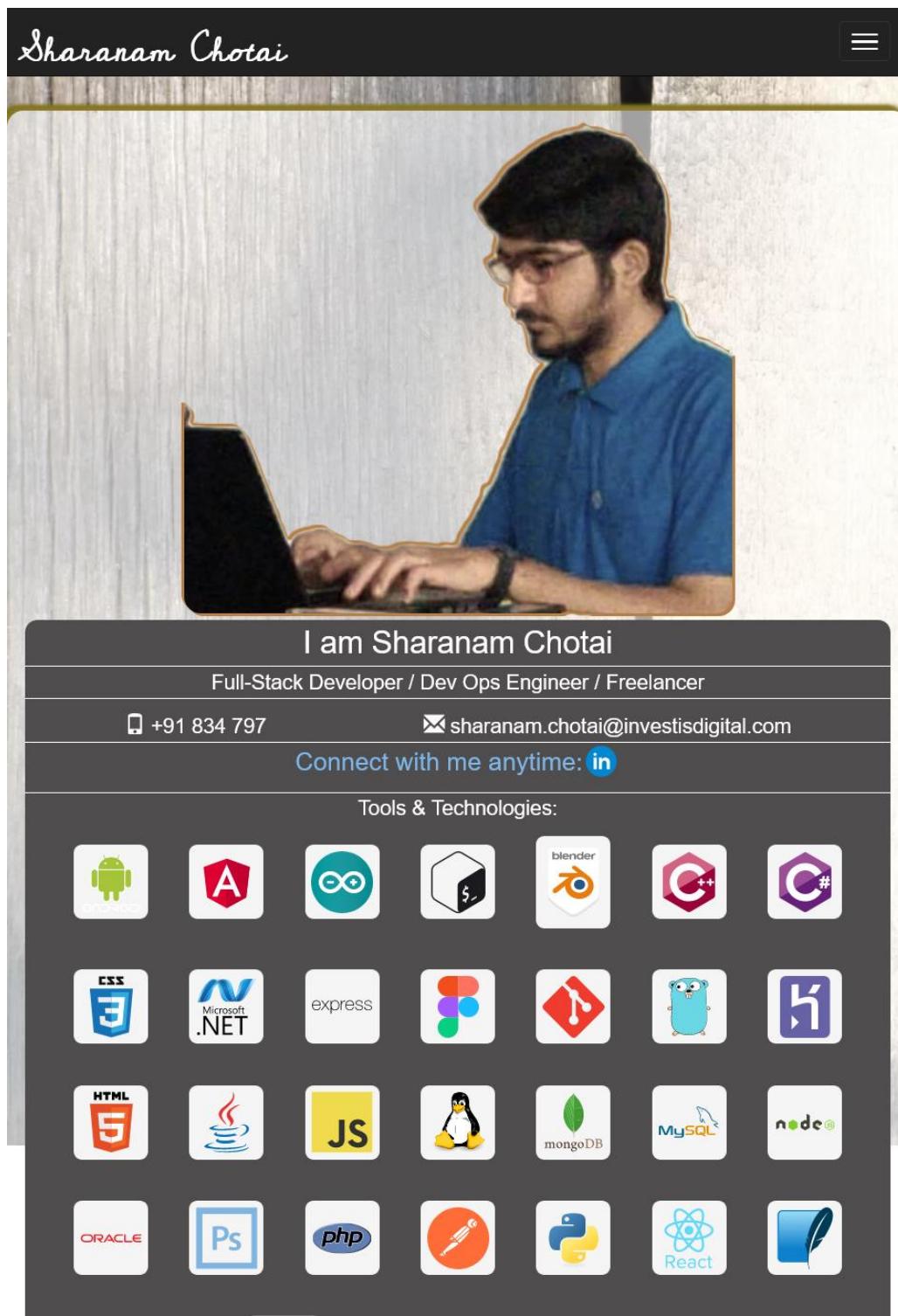


Figure 36ID: Personal Portfolio using bootstrap, jquery and custom CSS

As we have covered a wide range of topics, including jQuery, we have been assigned a task to put our skills to the test. Each of us has been asked to create our own portfolio webpage or website to showcase our knowledge and understanding. Our submissions will be evaluated based on the demonstration of our skills and abilities in web development.

For my portfolio, I opted for a vintage wooden theme and incorporated the technologies that I am proficient in. I also included details about my previous projects and a contact form that utilized jQuery for validation.

The image shows a mobile contact form titled "Confabulate" on a website with a wooden background. The form consists of several input fields:

- First Name:** An input field with a person icon and the placeholder "Enter first name here..".
- Last Name:** An input field with a person icon and the placeholder "Enter last name here..".
- E - mail ID:** An input field with an envelope icon and the placeholder "Enter email id here...".
- Phone Number:** An input field with a phone icon and the placeholder "+91 Enter contact number here...".
- Gender:** A dropdown menu showing "Male" with icons for male and female.

A blue "Submit" button is located at the bottom of the form.

Figure 37ID: Contact form in personal portfolio, validations using jquery

Sharanam Chotai



My Project

BCA-Web-App-Dev-Exercise

[View Source](#)

City-Bus-Live-Status

[View Source](#)

Educational-journey

[View Source](#)

Figure 38ID: My Project's section in the personal portfolio

Technical-Training-Session-Keepings

[View Source](#)

Tic-Tac-Toe-VueJS

[View Source](#)

TYBCA-AI-Exercises

[View Source](#)

Experience

ReactJS Intern

I got to work on ReactJS, for the company which was making templates for their clients. So that the actual website will not take much longer.

VueJS Developer

The project was of the admission portal for BSc Students.

Software Programmer

After the 3rd sem of MCA, I worked on a project for SP University.

Trainee Engineer

In Investis Digital, My designation is Trainee Engineer.

Figure 39ID: Experience section in my personal portfolio

After completing the previous topic of the curriculum, we moved on to learning about DBMS and SQL. While I will not go into detail about all the topics we covered, the outcome of this section of the curriculum was a comprehensive understanding of database management systems and the SQL language.

Here are some finalized database schemas that were provided to test our knowledge after the mentor completed the explanation.

Hotel Management

Entities and Attributes

Table Name	Columns
Staff	StaffID, Name, Address, Phone, Salary, Position
Room	RoomID, RoomType, RoomPrice, RoomStatus
Customer	CustomerID, Name, Address, Phone, Email, Passport
Booking	BookingID, CustomerID, RoomID, CheckIn, CheckOut, TotalPrice
Payment	PaymentID, BookingID, PaymentMethod, PaymentDate, Amount

Figure 40ID: Finalized Database schema for the Hotel Management Application

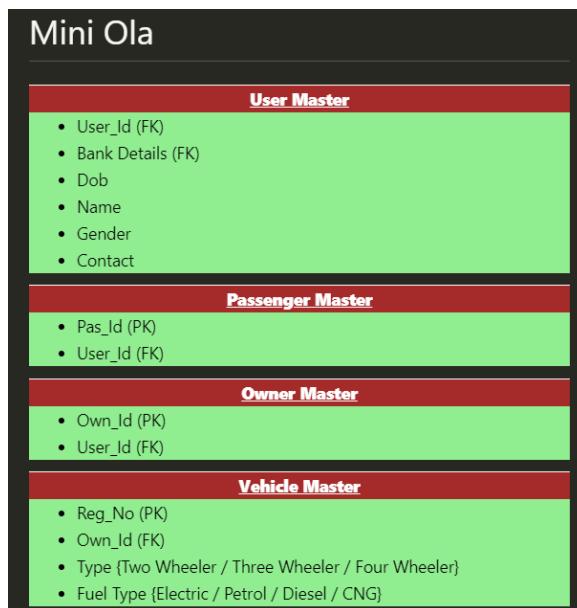


Figure 41ID: Finalized DB Schema for Application like Ola, normalized upto 3NF



Figure 42ID: DB Schema of Mini Ola contd...

Based on our performance and results, the mentor evaluated our scores. After this, we progressed to the next portion of the curriculum which focused on Design Principles. Here, we learned about the Model-View-Controller (MVC) architecture and its implementation in web development.

Next, we delved into one of the most popular version control systems: Git. During this section of the curriculum, we learned how to use Git for version control and collaborative development. We also practiced uploading our work to a GitHub repository.

The image below displays the total number of lines of code that comprised my assignment:

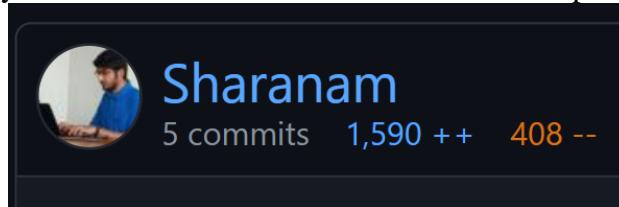


Figure 43ID: Git commits of practiced code during the workshop.

On the day of the workshop's conclusion, Mr. Abhishek Poojara announced that I was the Best student of the batch and awarded me with an Amazon gift voucher. Additionally, Mr. Pallav Mamtora gifted me a precious antique coin from his personal collection, which I deeply appreciate. [5]

What measures is Investis Digital taking to ensure that new employees fit seamlessly into their workplace culture, and what initiatives are being implemented to support this goal?

In addition to the induction sessions and technical workshops, we are also receiving weekly soft skills sessions every Wednesday from February to April.

These sessions cover a variety of topics related to soft skills, including professional attire, workplace etiquette, email and virtual communication, time and stress management, body language, listening skills, team building, presentation skills and public speaking, rethinking communication, communication styles test, and more.

Investis values its employees' well-being and recognizes the importance of maintaining a healthy work-life balance. To support this, the company offers various recreational activities within its premises, such as billiards or pool table, table tennis, chess, puzzles, exercise bicycle and carrom board, for its employees to unwind and recharge.

When and how were the project assignments given to us during our internship?

Previously, as mentioned, our performance during the workshop was evaluated and based on our scores, the senior members at Investis Digital determined which department we would be assigned to.

I was assigned to the Tools and Feed department at the company, and under the guidance of Mr. Zeelani Shaikh, we were given the opportunity to choose a technology and one of the available project domains to work on. My colleagues, Vaibhav Patel, Deep Patel, and I were all experienced with MERN stack, so we decided to work together on a project. And hence, we chose to work on the same project domain.

Our assigned project domain is the development of a leave management application, which aims to provide a platform for employees to submit their leave requests to their managers. The managers can then review and respond to the leave requests by either approving or rejecting them. Additionally, the application enables employees to track their remaining leave balance throughout the year and allows them to schedule their calendar with official and personal holidays.

The company is currently relying on a third-party platform to manage employee leaves. However, if we successfully develop this leave management application, it has the potential to be implemented within the organization as a replacement for the third-party platform. If the application performs well and meets the requirements of the company, there is a possibility of offering this solution to the clients of the company as well.

What are the technologies and libraries that we depend on for our project?

Since we decided to use MERN as our tech stack, we used NPM [6] to initialize the project repository. And we added tailwind CSS [7] into the project. Initially, we planned to work on a single project, but we also wanted to learn how to create a boilerplate, so we worked on our own approaches to develop the project. Our mentor allowed us to do this because our academic background and previous experience with the technology varied, and he believed that the company would benefit from having three different projects to choose from. By combining the best features of each project, we could create the best possible outcome. Therefore, although I am the primary contributor to my codebase, the progress of the project was discussed as a team, consisting of three of us and our mentors, during meetings and feature discussions.

In the frontend, I utilized several npm packages to enhance the user interface and handle requests from the backend. For handling requests, I added the axios [8] library. To incorporate icons into the application, I used react-icons [9]. Additionally, I utilized react-router-dom [10] to manage routing within the application.

When we were tasked with importing data from an MS Office Excel file into the database, I used the xlsx [11] package from npm. This package provided an easy way to read data from Excel files and seed it into our database.

As part of our dashboard features, we were required to display charts to visualize data. To accomplish this, I installed the recharts [12] package from npm, which allowed me to easily create charts with customizable options. To show the organizational hierarchy of employees, I utilized the react-organizational-chart [13] package. These packages were instrumental in improving the user experience and making our application more functional.

In the backend, we used various npm packages to enhance the security and functionality of our application. We utilized body-parser [14] to parse the incoming request body, express-mongo-sanitize [15] to prevent NoSQL injection attacks, hpp [16] to prevent HTTP parameter pollution attacks, jsonwebtoken [17] to handle user authentication and authorization, mongoose [18] to interact with the MongoDB database, morgan [19] to log HTTP requests, and xss-clean [20] to prevent Cross-Site Scripting (XSS) attacks. These packages helped us to build a secure and reliable backend for our leave management application.

I used the "concurrently" [21] package in the parent directory to run both the frontend and backend scripts simultaneously.

How can we create visual representations of this application for different user roles?

UML diagrams are used to represent the application visually and use case diagram [4] is one of the important diagrams in UML.

The use case diagram below represents the most fundamental functionality of the leave management application. The diagram showcases the actors of the system and their actions. The user actor is the main actor in the system and can perform actions such as logging in, signing up, resetting the password, viewing authorized historical data, and editing their profile. The mail sender actor sends a token to the user if they forget their password.

The admin, super admin, and employees are actors that are all pointed to the user actor because they are users of the system with distinct roles and privileges. The super admin actor can assign roles to other users, but not to himself.

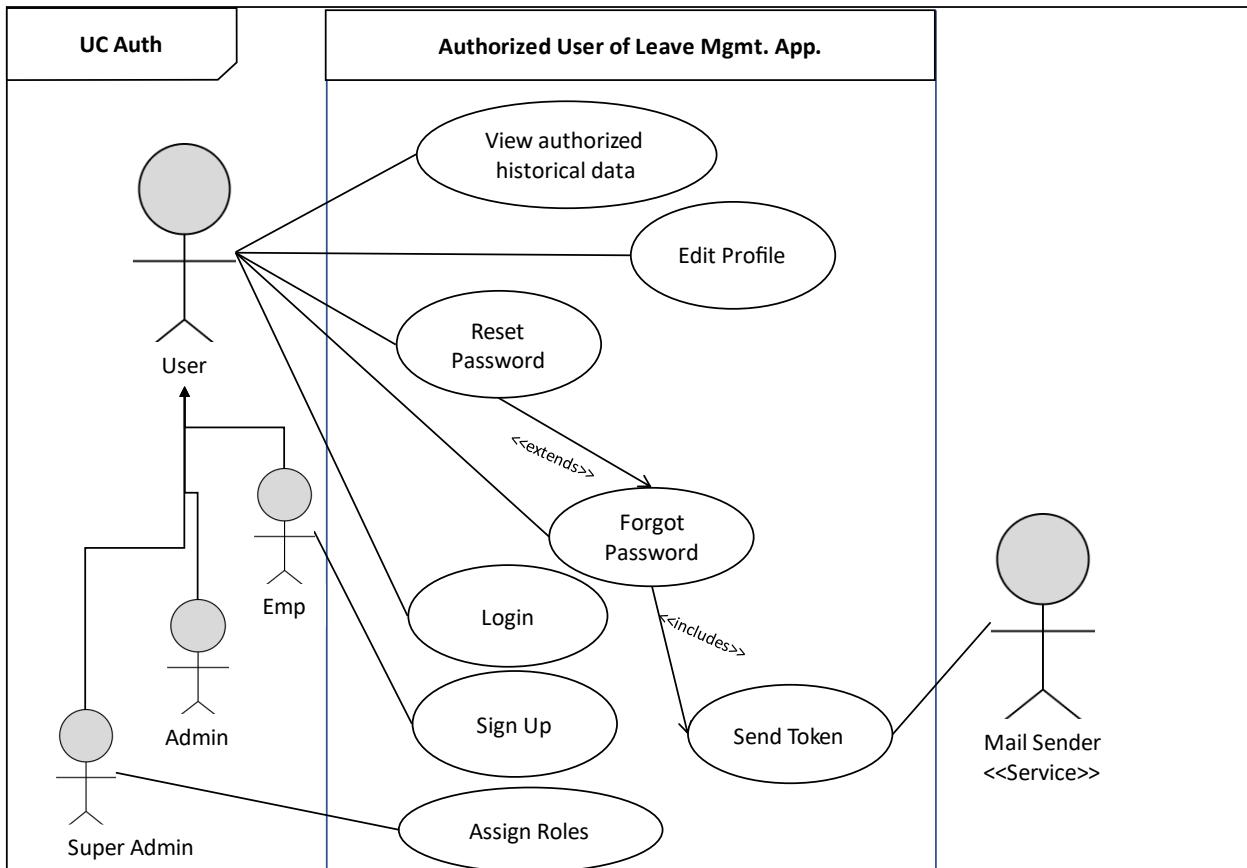


Figure 44ID: UC Authentication and Authorization

This use case diagram serves as a reference to understand the basic functionality of the leave management application.

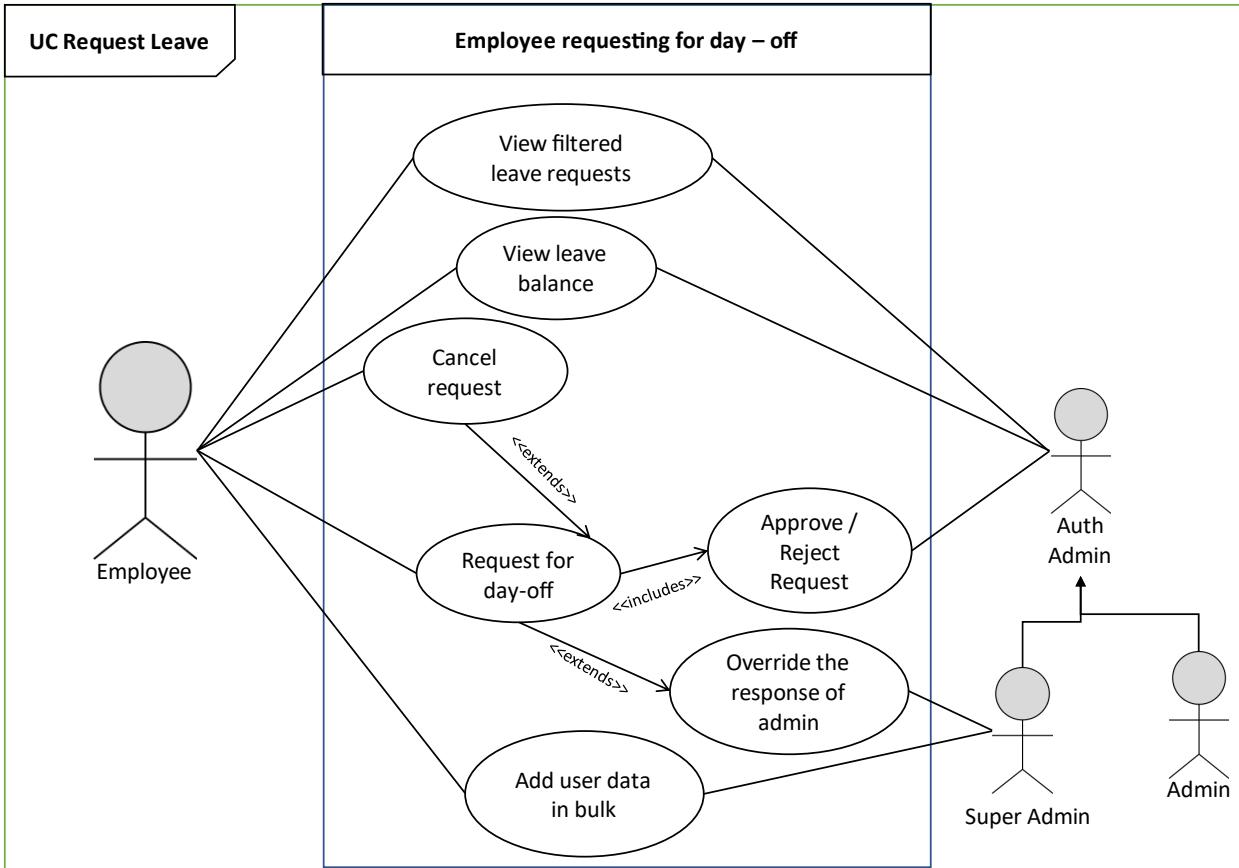


Figure 45ID: UC Requesting Leave

The use case diagram above depicts the main functionalities of our application. It begins with the employee requesting a day-off, and the request is sent to an authorized admin, who can either be the employee's responsible manager or a super admin. The admin is responsible for either approving or rejecting the request. If approved, the employee's request is granted, and if rejected, the employee can request a review by a super admin, who has the power to override the previous decision.

Employees have the option to cancel their requests if the request has not been addressed by any authorized admin yet. Once canceled, the request cannot be further entertained by either the admin or super admin. Admins and employees can view the remaining leave balance and filter out leave requests if necessary. Our application provides this feature to help employees manage their leave requests efficiently.

In addition, the super admin has the ability to bulk-insert new users into the system or database using an Excel file. This feature allows the super-admin to add multiple new users to the system simultaneously, which saves time and effort.

Overall, this use case diagram provides a clear understanding of the system's essential functionalities and how they interact with each other.

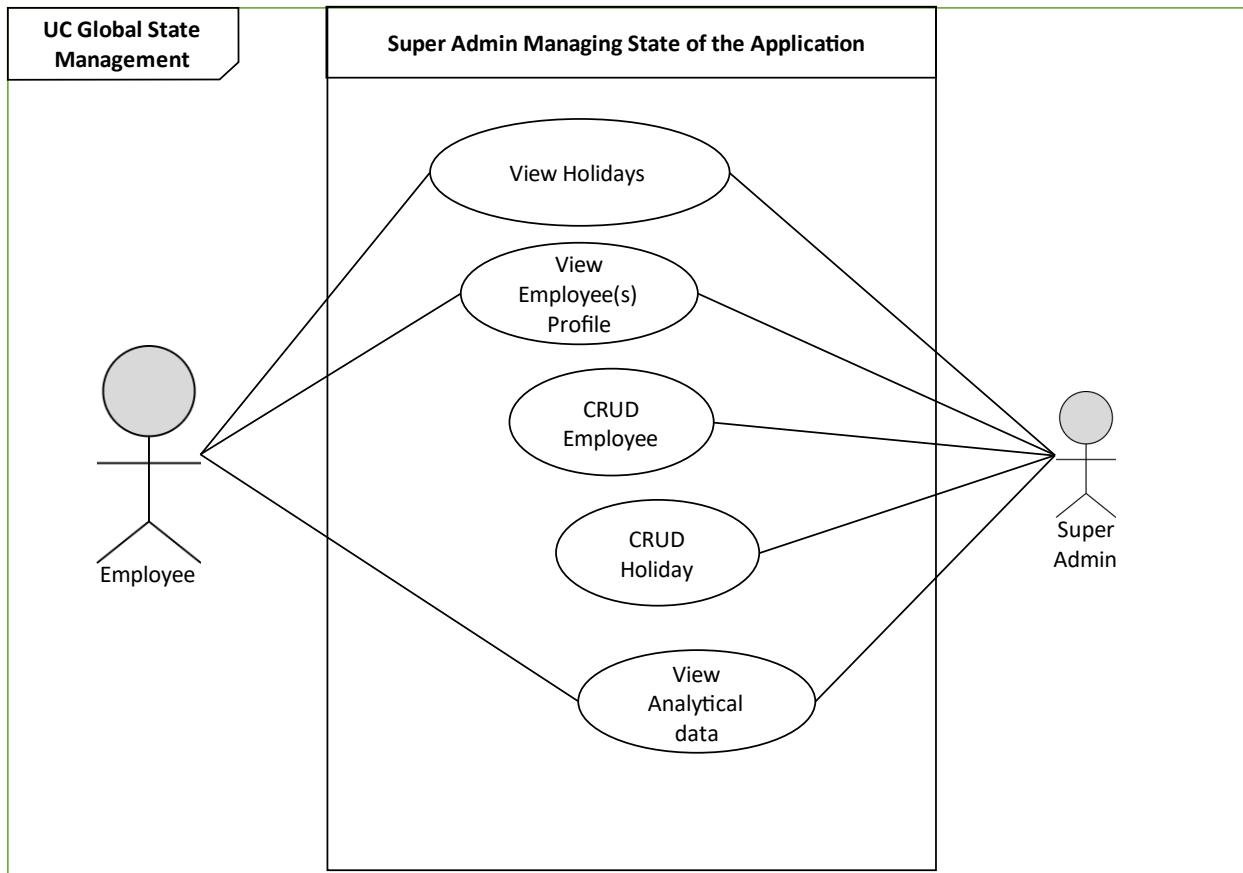


Figure 46ID: UC Global State Management

The above diagram represents additional features that were not part of the initial design. These new features are mostly targeted towards the super admin, who now has the ability to perform CRUD operations on the official holiday list and individual employee data. The super admin can also view analytical data in the form of charts and tables for various factors. Additionally, employees can view their own profiles, as well as holidays and analytical data.

As these features were not part of the original design, a separate diagram was created to clearly represent the new functionalities. The diagram shows how the super admin has been given more control over the system and can perform various operations to manage holidays and employee data.

Overall, the diagram provides a clear overview of the additional features added to the application.

How did we determine the structure of our database for the leave management application?

An ER diagram is a graphical representation of entities and their relationships to each other. In the case of our application, the ER diagram shows the relationship between the different entities that are present in the system. The entities in our application include users, employees, managers, super admin, leaves and holidays. Here, the user entity is the parent entity for the admins, employees, and super admin.

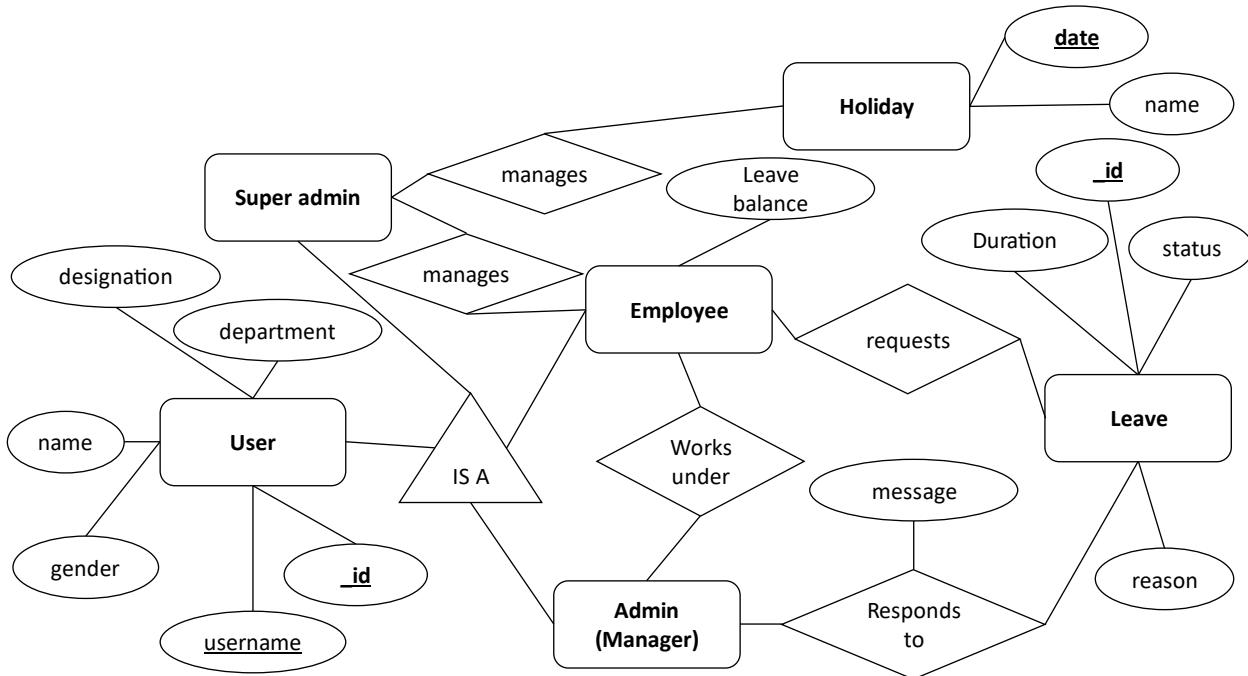


Figure 47ID: ER Diagram for LMA

Based on the ER diagram, I created three collections in Mongoose to represent the entities and their relationships. The first collection is "holidays," which has fields for the holiday name, date, number of days, and whether it is optional. The second collection is "leaves," which has fields for the employee ID, leave type, start date, end date, note, number of working days, leave status, half-day status, half-day type, and manager comment. The third collection is "users," which has fields for the user's username, password, first name, last name, email, contact number, employee ID, designation, department, manager ID, leave balance, role, gender, and whether the user has unread notifications. For all three collections, I added validation rules for required fields, unique fields, default values, and references to other collections where applicable.

Data Dictionary for 'Holidays' Collection

Field Name	Data Type	Validation	Reference	Required	Unique	Default	Description
_id	ObjectId	-	-	Yes	Yes	-	Unique identifier of holiday
name	String	Required, Trim	-	Yes	No	-	Name of holiday
date	Date	Required, Unique	-	Yes	Yes	-	Date of holiday
noOfDays	Number	Required, Min: 1	-	Yes	No	-	Number of days for the holiday
isOptional	Boolean	Default: False	-	No	No	FALSE	Indicates if the holiday is optional or not

Data Dictionary for 'Leaves' Collection

Field Name	Data Type	Validation	Reference	Required	Unique	Default	Description
_id	ObjectId	-	-	Yes	Yes	-	Unique identifier of leave
empId	ObjectId	Reference: "User"	User	Yes	No	-	Employee ID associated with the leave
leaveType	String	Required, Trim, Enum: [typeOfLeaves]	-	Yes	No	-	Type of leave
from	Date	Required	-	Yes	No	-	Start date of leave
to	Date	Required	-	Yes	No	-	End date of leave
note	String	Required, Trim	-	Yes	No	-	Note about the leave
workingDays	Number	Required	-	Yes	No	-	Number of working days for the leave
status	String	Enum: ["P", "A", "R", "C"], Default: "P"	-	No	No	P	Status of the leave request: "P" for Pending, "A" for Approved, "R" for Rejected, and "C" for Cancelled
isHalfDay	Boolean	Default: False	-	No	No	FALSE	Indicates if the leave is for half day or not
halfDayType	String	Enum: ["F", "S"]	-	No	No	-	If the leave is for half day, specifies which half of the day. "F" for First half and "S" for Second half
managerComment	String	Trim, Default: ""	-	No	No	""	Manager's comment on the leave

Data Dictionary for 'Users' Collection

Field Name	Data Type	Validation	Reference	Required	Unique	Default	Description
username	String	minlength: 3		TRUE	TRUE		Username of the user. It must be unique and have at least 3 characters.
password	String	minlength: 10		TRUE			Password of the user. It must have at least 10 characters.
firstName	String	minlength: 2		TRUE			First name of the user. It must have at least 2 characters.
lastName	String	minlength: 2		TRUE			Last name of the user. It must have at least 2 characters.
email	String	validator: isValidEmail		TRUE	TRUE		Email address of the user. It must be unique and valid.
contactNumber	String	minlength: 3		TRUE			Contact number of the user. It must have at least 3 characters.
employeeID	String	minlength: 3		TRUE	TRUE		Employee ID of the user. It must be unique and have at least 3 characters.
designation	String						Designation of the user.
department	String						Department of the user.
managerId	ObjectId	ref: "User"	User				Manager of the user. It is a reference to another user.
leaveBalance	Number	default: maxLeaveBalance				12	Leave balance of the user. It is initialized to the maximum leave balance.
role	String	enum: ["a", "s", "e"]		TRUE	"e"		Role of the user. It must be one of "a" (admin), "s" (super-admin), or "e" (employee).
gender	String	enum: ["m", "f", "o"]		TRUE	"o"		Gender of the user. It must be one of "m" (male), "f" (female), or "o" (other).
gotUpdate	Boolean	default: false				FALSE	A flag that indicates whether the user has unread notifications.

Figure 48ID: Data dictionary for LMA

Screenshots and explanations

The screenshot shows the landing page of a Leave Management System. At the top, there is a dark blue header bar with the text "Leave Management System" on the left and "Login" and "Register" on the right. Below the header, there is a large blue banner with the text "Effortlessly manage employee leaves with our innovative leave management system". Underneath the banner, the page is titled "NoticeBoard" and contains a section titled "Holiday List". This section is presented as a table with the following data:

Date	Day	Name	No of Days
26 January, 2023	Thursday	Republic Day	1
8 March, 2023	Wednesday	Holi	1
7 April, 2023	Friday	Good Friday	1
21 April, 2023	Friday	Eid-al-Fitr	1 (Optional)
26 April, 2023	Wednesday	Deepanand	1
15 August, 2023	Tuesday	Independence Day	1
30 August, 2023	Wednesday	Rakshabandhan	1
7 September, 2023	Thursday	Janmashtami	1 (Optional)
19 September, 2023	Tuesday	Ganesh Chaturthi	1 (Optional)
24 October, 2023	Tuesday	Dussehra	1
13 November, 2023	Monday	Diwali (New Year)	1
14 November, 2023	Tuesday	Diwali (Bhai Dooj)	1
25 December, 2023	Monday	Christmas	1

At the bottom of the page, there is a small footer with the text "©Sharanam Chotai | March 2023".

Figure 49ID: Landing page of LMA

The landing page of the application has a basic design that displays the noticeboard, if any, and holidays. However, due to time constraints, our team decided to prioritize the development of the major features of the application. In the future, we can enhance the landing page by incorporating the following:

- A more modern and visually appealing design
- A section that displays the user's upcoming tasks or events
- Integration with a calendar API to display important dates and events
- Personalization options that allow users to customize the landing page based on their preferences
- Integration with social media platforms to display the latest posts or updates from the company's social media accounts
- A search bar that allows users to quickly search for information or navigate to a specific page within the application.

Login Form



Have an account?

Username / Email Id / Employee Id *

Password *

Remember me [Forgot Password](#)

Get In

Don't have an account? [Register](#)

Figure 50ID: Login Page of LMA

The login form provided is the sole means of access for all types of users. Upon logging in, the system will determine the user's role and direct them to their designated dashboard. This process is known as authorization and is automatic, meaning the user has no control over which dashboard they are directed to.

As shown in the figures below, all the fields in the application are properly validated.

Login Form



Have an account?

User not found

Username / Email Id / Employee Id * MG21040

Password *

Remember me [Forgot Password](#)

Get In

Don't have an account? [Register](#)

Figure 51ID: Validation example in Login page

Username / Email Id / Employee Id *

Password *

! Please fill out this field.

Figure 52ID: Example of required input fields

Registration Form



Hello!! Welcome to our website :)

Please fill in the following details to register for our Leave Management System:

Personal Details:

First Name *	Last Name *	Gender male
Email *	Contact Number *	

Account Details:

Username *	Password *	Confirm Password *
------------	------------	--------------------

Work Details:

Employee ID *	Designation	Department
Manager Name / Email / Employee ID		

By registering for our Leave Management System, you agree to abide by the company's policies and guidelines related to leave management.

Get Started

Have an account already? [Login](#)

Figure 53ID: Sign up Form for LMA

Forgot Password



Want to get the recovery link?

Username / Email Id / Employee Id *

Get an Email

Wait, I remember my password now!  [Login](#)

Figure 54ID: Forgot password page of LMA

```
Email sent to gen@gmail.com successfully
Subject: Request for password reset
Message: Click on the link below to reset your password:

<a style="color: #fff; background-color: #007bff; border-color: #007bff; padding: .375rem .75rem; font-size: 1rem; line-height: 1.5; border-radius: .25rem; text-decoration: none;" href="http://localhost:3000/resetPassword?token=eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJpZCI6IjY0MTk3NzFhYTczNGZlMGY1YmYwYTA0NSIsImhlhdCI6MTY4MjU2MDkwOCwiZXhwIjoxNjg5MzA4fQ.fTfnDBRGmmAinFjgYCDDL8MtBsuNXIlKvTqjcBicK0o&id=6419771aa734fe0f5bf0a045">Reset Password</a>
```

Figure 55ID: Sample Email being sent to the user (in console)

Reset Password



Want to reset your password?

user-id *
 6419771aa734fe0f5bf0a045

Token *
 eyJhbGciOiJIUzI1NilsInR5cCI6IkpXVCJ9.eyJpZCI6IjY0MTk3NzFhYT

Password *

Confirm Password *

Reset Password

Wait, I remember my password now!  **Login**

Figure 56ID: Reset Password Page with provided token and user id

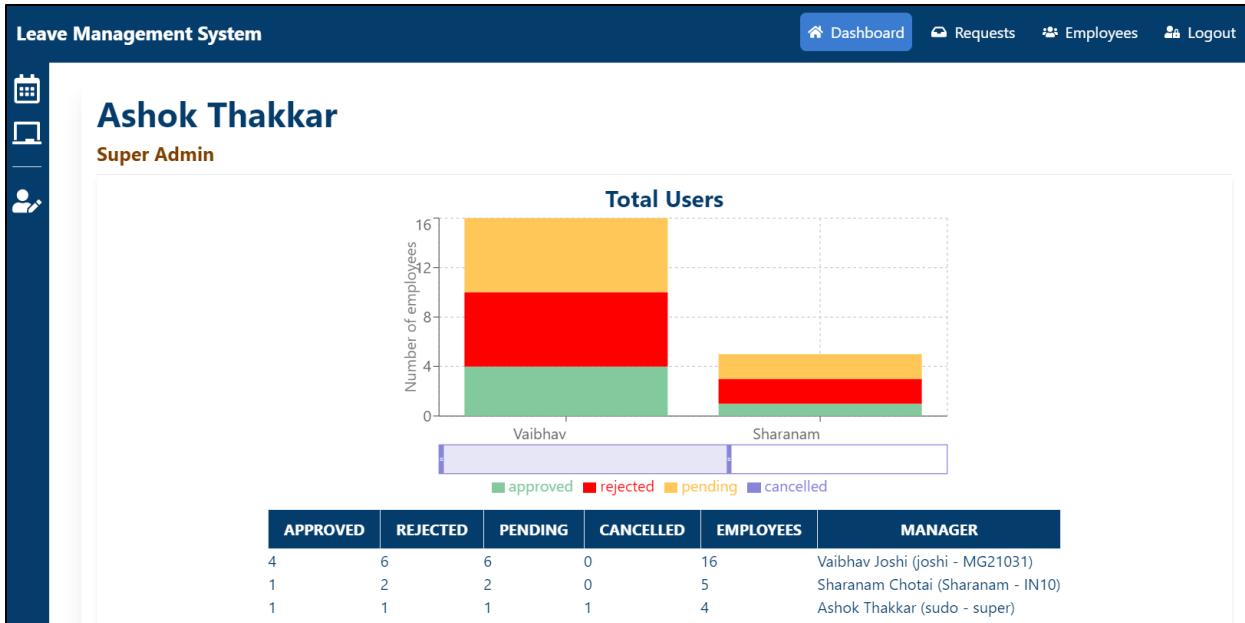


Figure 57ID: Super admin dashboard

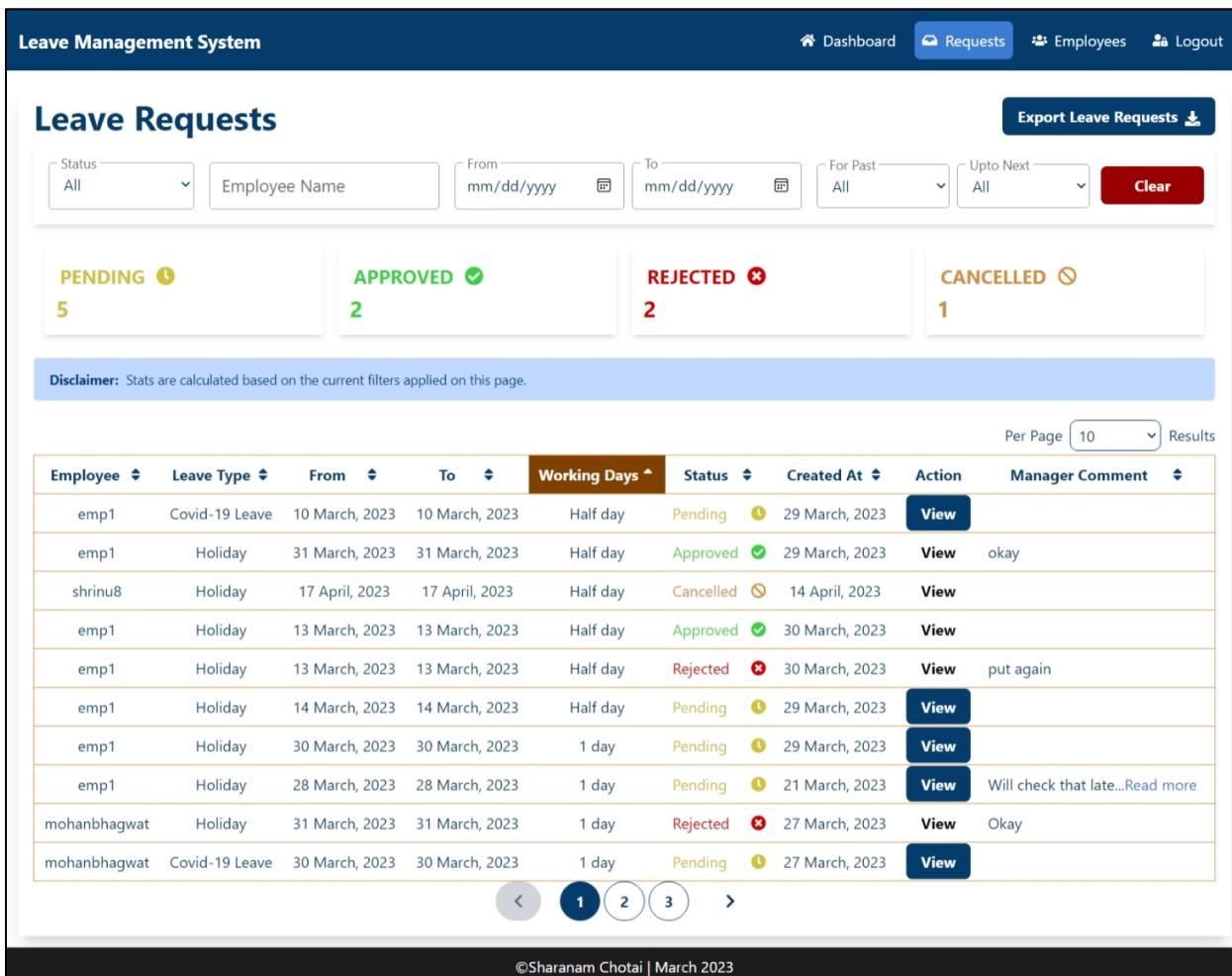


Figure 58ID: Super admin's view for leave requests

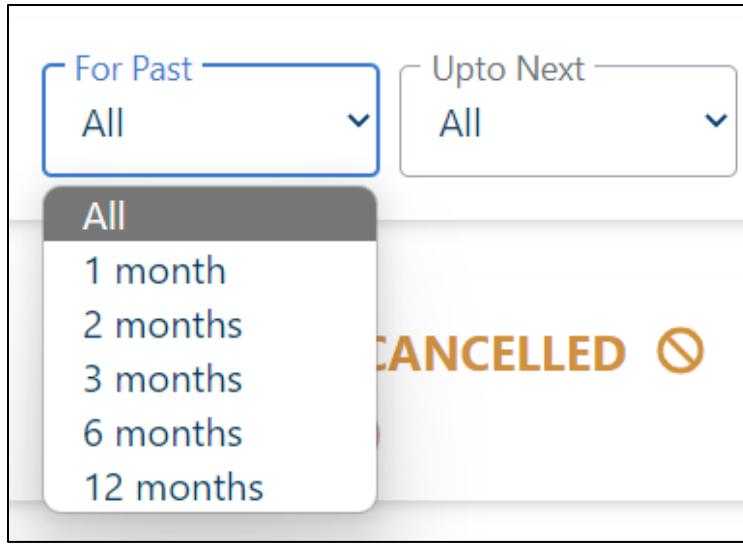


Figure 59ID: Super admin is applying filters on leave requests (To fetch data of specific period)

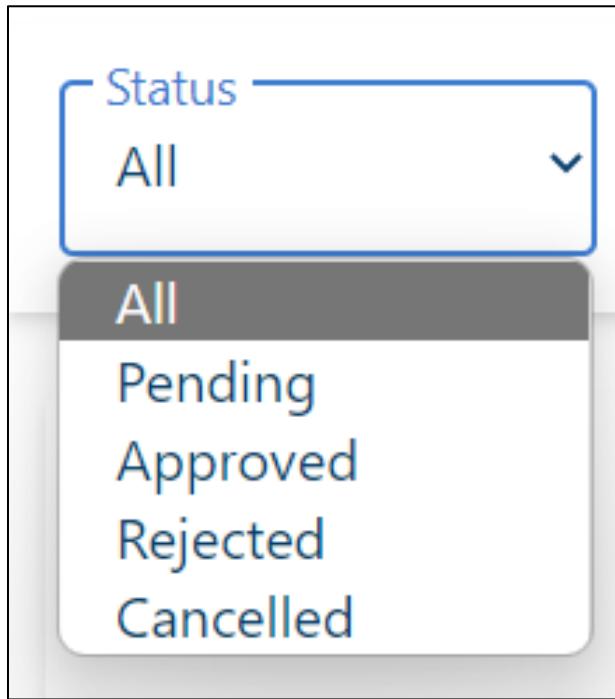


Figure 60ID: Filtering out the leave requests having specific status

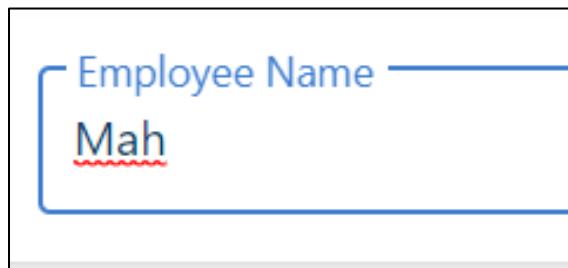


Figure 61ID: super admin searching for the leave requests of specific employee

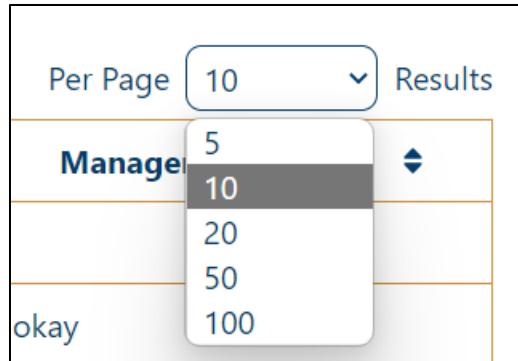


Figure 62ID: Super admin deciding how many records should be visible on single page



Figure 63ID: Custom pagination component to change the page of records

```
localhost:3000/superAdmin/leaveRequests?status=P&empId=&empName=Mah&from=2023-03-27&
```

Figure 64ID: URL with search params

These search params in URL makes it easier for users to bookmark their filters and makes it better in terms of user experience.

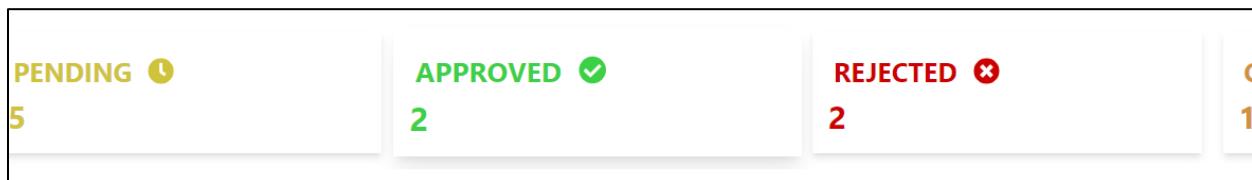


Figure 65ID: custom stats for viewing the countings of the records

The stats in the application are designed to provide accurate and detailed information on the status of leave requests. These statistics are generated based on the current status of leave requests.

Leave Request from Raghav

Name:	Raghav Joshi (emp1)
Leave Type:	Covid-19 Leave
From:	10 March, 2023
To:	10 March, 2023
Working Days:	Second Half
Note:	Test 29 3
Status:	Pending
Manager Comment:	<div style="border: 1px solid #ccc; padding: 5px; width: 150px;"> Enter your comment I can write anything in this textarea to pass my msg </div>
Applied On:	29 March, 2023
Leave Balance:	35

Approve
Save Comment
Reject

Go Back

Figure 66ID: Super admin viewing the pending leave request from an employee

Leave Request from Raghav

Name:	Raghav Joshi (emp1)
Leave Type:	Holiday
From:	31 March, 2023
To:	31 March, 2023
Working Days:	Second Half
Note:	Deal
Status:	Approved
Manager Comment:	<div style="border: 1px solid #ccc; padding: 5px; width: 150px;"> Enter your comment okay </div>
Applied On:	29 March, 2023
Leave Balance:	35

Save Comment
Reject

Go Back

Figure 67ID: Super admin viewing the already approved leave request from an employee

Leave Request from Raghav

Name:	Raghav Joshi (emp1)
Leave Type:	Holiday
From:	13 March, 2023
To:	13 March, 2023
Working Days:	Second Half
Note:	just
Status:	Rejected 
Manager Comment:	<div style="border: 1px solid #ccc; padding: 5px;"><p>Enter your comment put again</p></div>
Applied On:	30 March, 2023
Leave Balance:	35
Approve Save Comment	
← Go Back	

Figure 68ID: Super admin is viewing already rejected leave request from an employee

Leave Request from test

Name:	test case (shrinu8)
Leave Type:	Holiday
From:	17 April, 2023
To:	17 April, 2023
Working Days:	First Half
Note:	Testing again at night
Status:	Cancelled 
Manager Comment:	
Applied On:	14 April, 2023
Leave Balance:	28

 **Go Back**

Figure 69ID: Super admin is viewing the canceled leave request from an employee



Figure 70ID: Super admin can export the leave requests from LMA

By clicking this button user can download the excel file containing all the records (leave requests from all the employees and managers)

C5	A	B	C	D	E	F	G	H	I	J	K	L
1	Employee ID	Employee Username	Employee Name	Leave Type	Applied On	Leave Start Date	Leave End Date	Half Day Leave	Leave Reason	Leave Status	Manager Comment	Working Days
2	emp1	emp1	Raghav Joshi	Holiday	3/29/2023	3/14/2023		TRUE	asd	Pending		1

Figure 71ID: Super admin is viewing the exported data into MS Office Excel

Currently, this exported data can be taken as an input for payroll systems where the leaves of the employees will be considered and based on it the salary slip will be generated.

Leave Management System

Dashboard Requests Employees Logout

Manage Employees

Add Employees

[View Tree](#)

<p>Employee: test case (shrinu8)</p> <p>Designation: Chief Engg</p> <p>Department: IT (Employee)</p> <p>Leave Balance: 28</p> <p>Manager sudo</p>	<p>Employee: Vaibhav Joshi (joshi)</p> <p>Designation: Flutter Developer Super Admin</p> <p>Department: MCA (Super Admin)</p> <p>Leave Balance: 30</p> <p>Manager Sharanam</p>	<p>Employee: New Gen2 (newgen3)</p> <p>Designation: N/A</p> <p>Department: N/A (Employee)</p> <p>Leave Balance: 28</p> <p>Manager joshi</p>
--	---	--

Figure 72ID: Super admin viewing all the employees in the organization

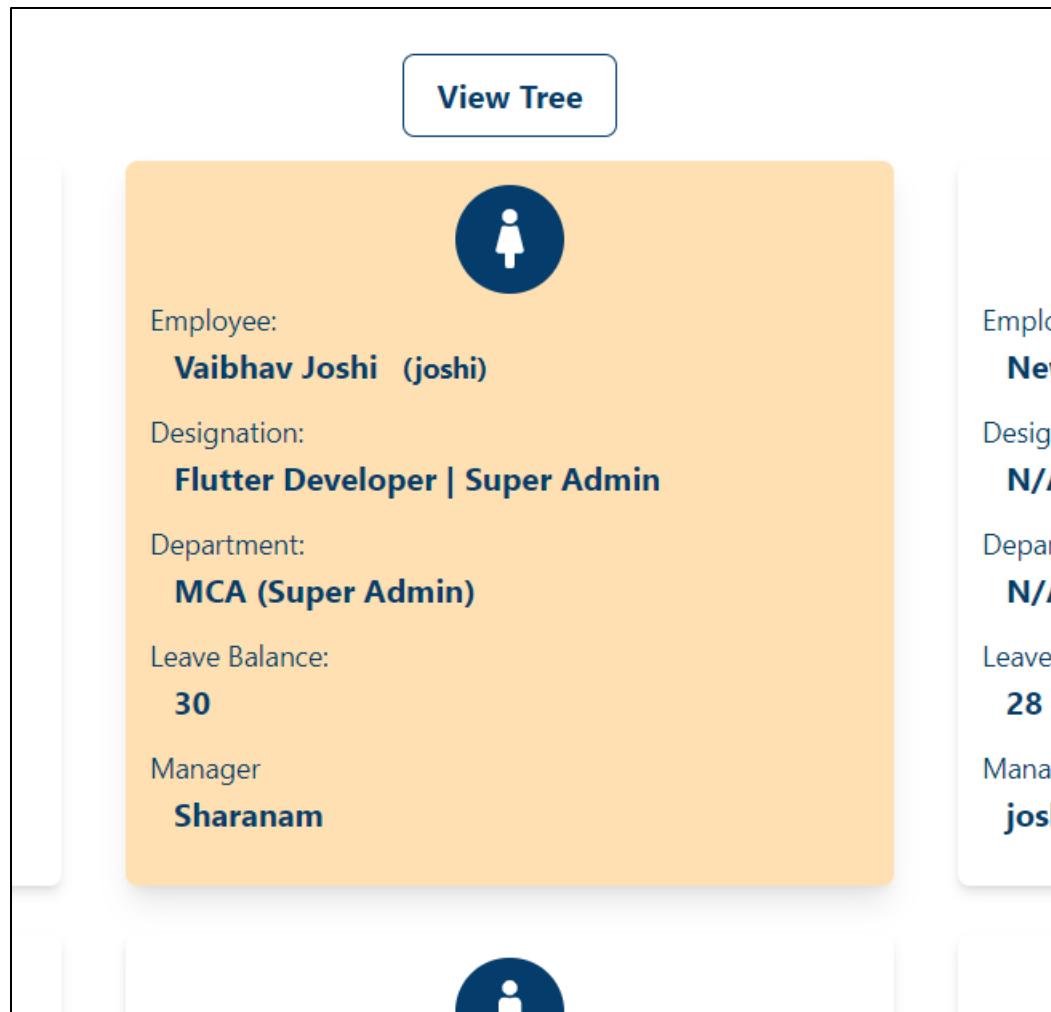


Figure 73ID: Employee Card; Super admin can click and view each employee's data (This is hover effect on card)

Leave Management System

Manage Employees

Add Employees X

Edit Employee Info

Edit and click on save to update the employee's information

First Name Vaibhavi	Last Name Joshi	Username joshi
Contact Number 2341234	Gender Female	Email pj@gmail.com
Employee ID MG21031	Designation Flutter Developer Super Adr	Department MCA
Leave Balance 30	Role Admin	Manager Sharanam

Save **Cancel**

Employee: 

Figure 74ID: Super admin managing specific employee's data in database

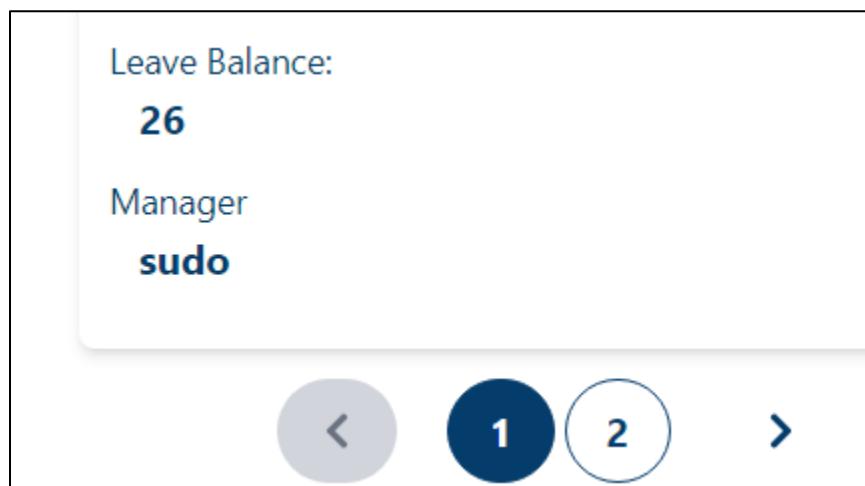


Figure 75ID: Super admin is having pagination to see all the employees

Add Employees

Figure 76ID: Add employee button for super admin

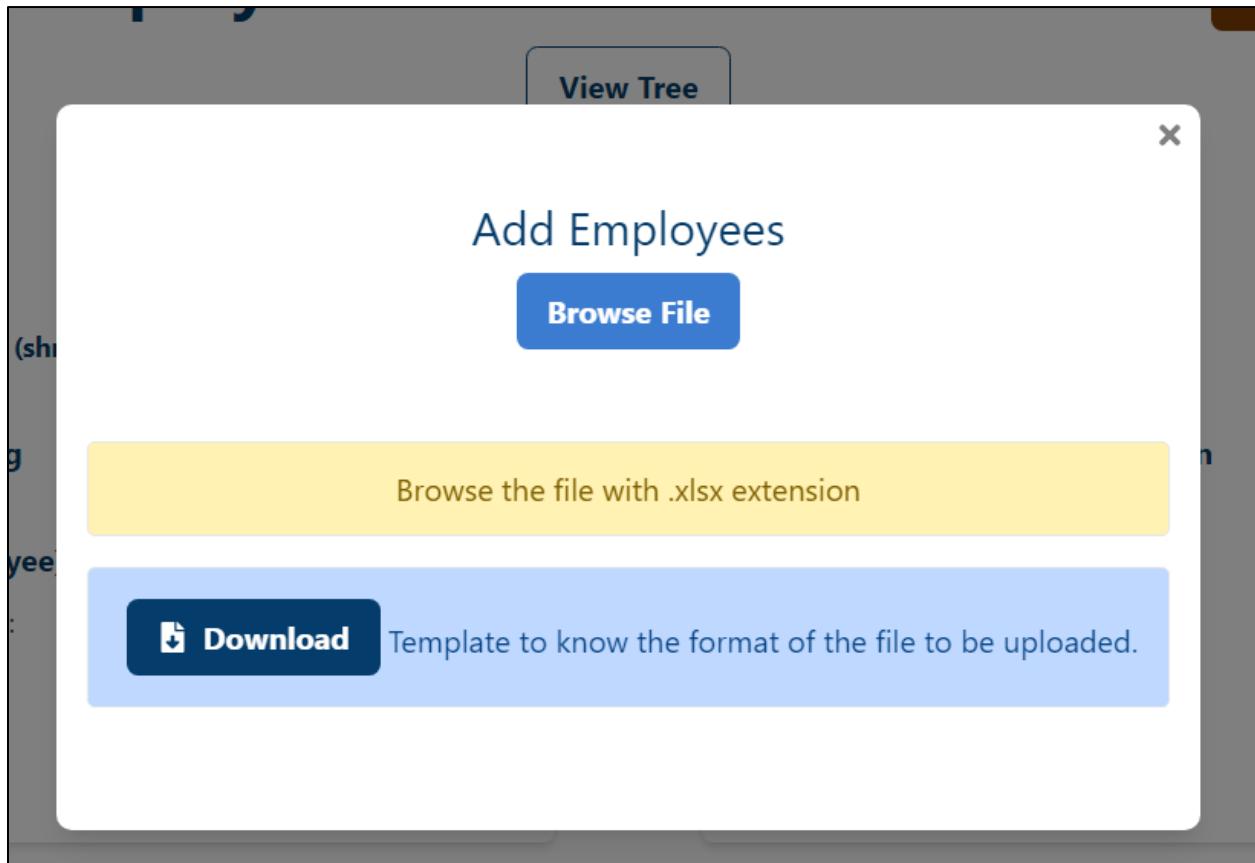


Figure 77ID: Super admin viewing the modal for adding employees

Downloads



sampleEmployees.xlsx
[Open file](#)

Figure 78ID: Super admin downloaded the template file

1R x 13C Sr. No.

	A	B	C	D	E	F	G
1	Sr. No.	username	password	firstName	lastName	email	contactNumber
2	1	employee1	Password(John		Doe	emp@1234567890	
3							

Figure 79ID: Super admin inserting employee's data into MS Office Excel

Add Employees

Click on Start Adding Employees to add the employees

Employee ID	Employee Username	Employee Name	Leave Type	Applied On	Leave Start Date	Leave End Date	Half Day Leave	Leave Reason	Leave Status	Manager Comment	Working Days
emp1	emp1	Raghav Joshi	Holiday	3/29/2023	3/14/2023	3/14/2023	TRUE	asd	Pending		1
emp1	emp1	Raghav Joshi	Covid-19 Leave	3/29/2023	3/10/2023	3/10/2023	TRUE	Test 29 3	Pending		1
emp1	emp1	Raghav Joshi	Holiday	3/29/2023	3/31/2023	3/31/2023	TRUE	Deal	Approved	okay	1
emp1	emp1	Raghav Joshi	Holiday	3/30/2023	3/13/2023	3/13/2023	TRUE	just	Rejected	put again	1
emp1	emp1	Raghav Joshi	Holiday	3/30/2023	3/13/2023	3/13/2023	TRUE	again	Approved		1

Figure 80ID: Super admin uploading the inserted data in MS Excel

0 out of 1 employee(s) added successfully. 1 employee(s) failed to be added.

Sr. No.	username	employeeID	message
1	employee123	IN1010	Manager not found

Figure 81ID: Super admin getting response from the server while adding new employees

Add Employees

Browse File

1 out of 1 employee(s) added successfully. 0 employee(s) failed to be added.

Download Template to know the format of the file to be uploaded.

Figure 82ID: Super admin getting success message from the server while adding new employees

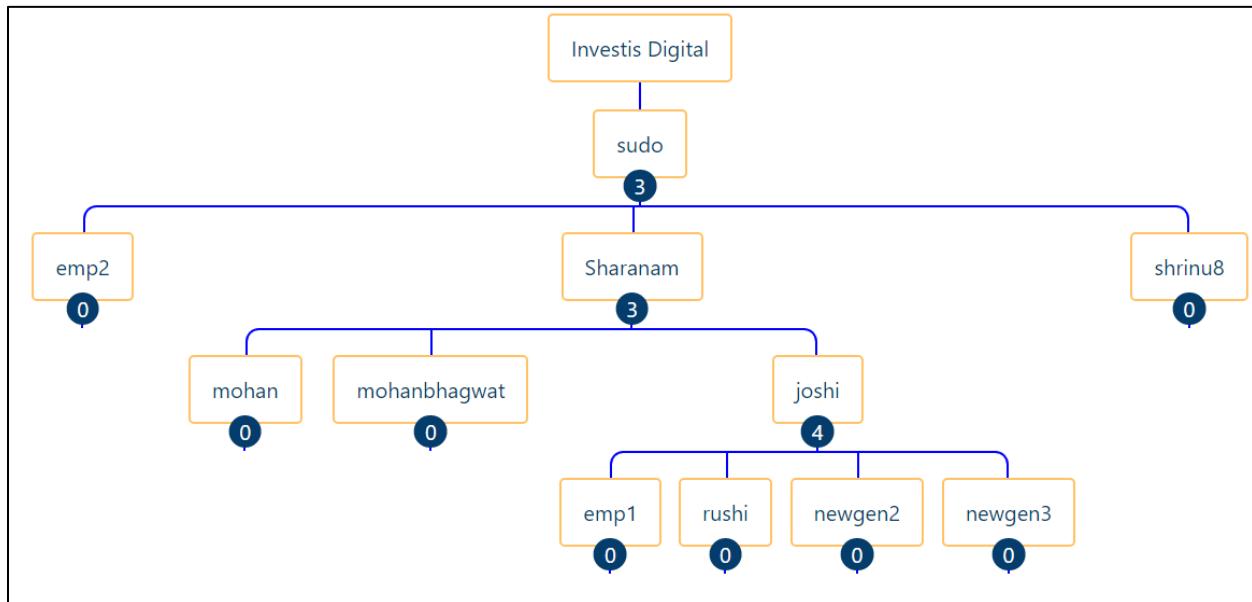


Figure 83ID: Super admin viewing the organization chart of the employees

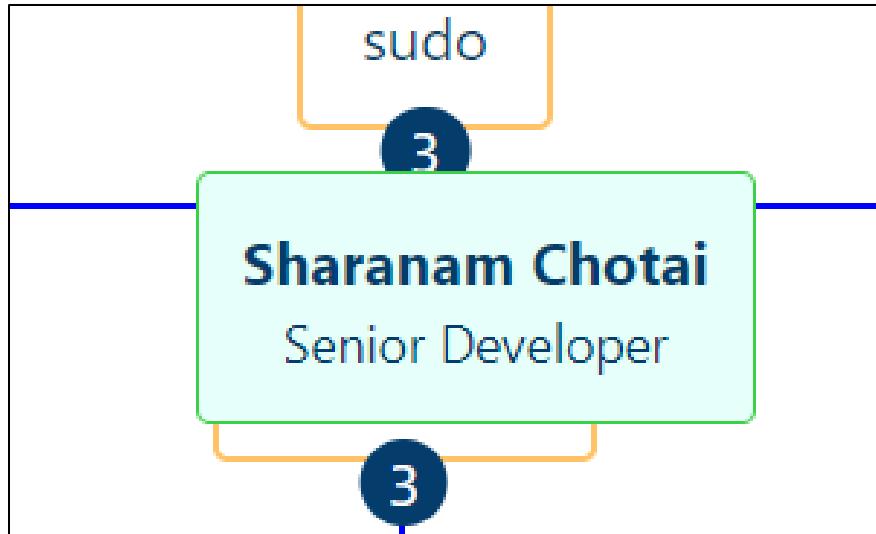


Figure 84ID: Hover effect on each employee

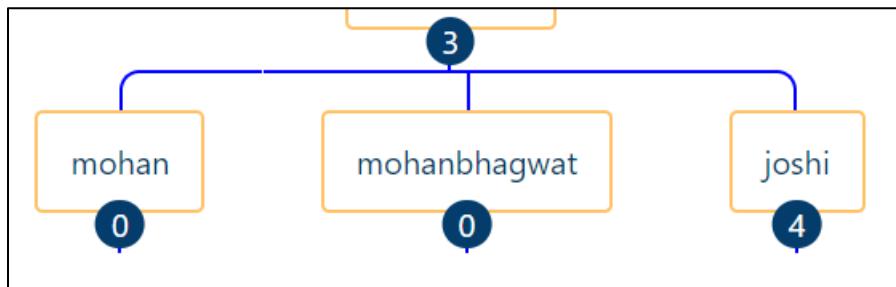


Figure 85ID: Hierarchical tree is collapsible to view larger data at once

The tree above consists node which represents an employee of an organization and by clicking on the number below that employee expands or collapses its sub-tree.

This view has not been fully completed yet at the front-side but is supposed to be completed by the end of this month, i.e., April 2023.

Leave Management System

Manage Holidays

Official Holidays will be given to all employees

Year: 2023 Month: All

Date	Day	Name	No of Days
26 January, 2023	Thursday	Republic Day	1
8 March, 2023	Wednesday	Holi	1
7 April, 2023	Friday	Good Friday	1
21 April, 2023	Friday	Eid-al-Fitr	1 (Optional)
26 April, 2023	Wednesday	Deepanand	1
15 August, 2023	Tuesday	Independence Day	1
30 August, 2023	Wednesday	Rakshabandhan	1
7 September, 2023	Thursday	Janmashtami	1 (Optional)
19 September, 2023	Tuesday	Ganesh Chaturthi	1 (Optional)
24 October, 2023	Tuesday	Dussehra	1
13 November, 2023	Monday	Diwali (New Year)	1
14 November, 2023	Tuesday	Diwali (Bhai Dooj)	1
25 December, 2023	Monday	Christmas	1

©Sharanam Chotai | March 2023

Figure 86ID: Super admin manages official holidays

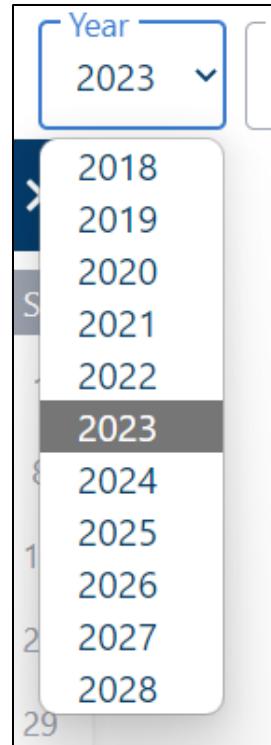


Figure 87ID: Super admin filtering out the holidays (5 years back and 5 years forth)

A screenshot of a holiday management application. At the top, there are two dropdown menus: "Year" set to 2023 and "Month" set to July. Below these, a calendar for July 2023 is displayed, showing days from 25 to 31. A large button below the calendar says "No holidays found". To the right of the calendar is a list of months: All, January, February, March, April, May, June, July (which is highlighted with a dark grey background), August, September, October, November, and December.

Figure 88ID: Super admin can instantly view the calendar based on the selected month

20 January, 2023	Thursday	Republic Day	
8 March, 2023	Wednesday	Holi	1
7 April, 2023	Friday	Good Friday	1
21 April, 2023	Friday	Eid-al-Fitr	1 (Optional)
26 April, 2023	Wednesday	Deepanand	1
15 August, 2023	Tuesday	Independence Day	1
30 August, 2023	Wednesday	Rakshabandhan	1
7 September, 2023	Thursday	Janmashtami	1 (Optional)

Figure 89ID: Rows of the holiday table are clickable

Edit Holiday

Name

Is Optional

Date

No. of Days

Figure 90ID: Super admin can perform Update or Delete operation by selecting the specific holiday

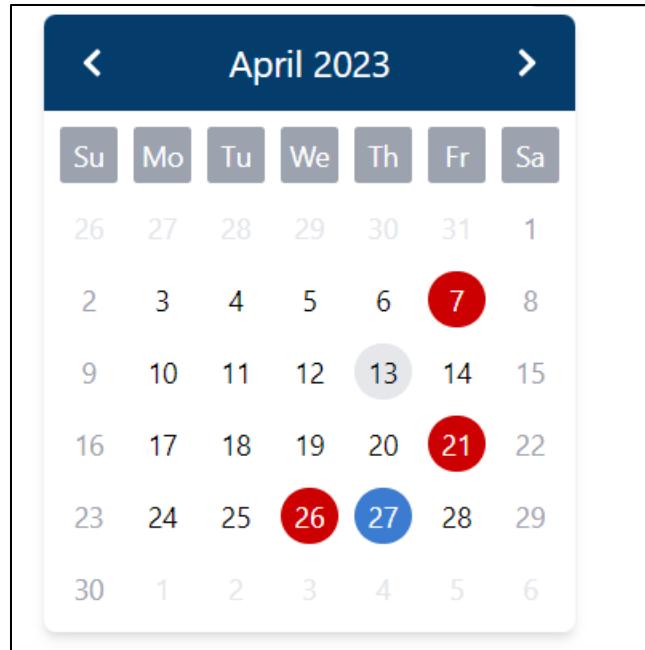


Figure 91ID: Custom calendar component made using ReactJS

Holidays will be given to all employees

Add new holiday

Name

Is Optional —
No

Date
04/13/2023

No of days
1

Add

Figure 92ID: Super admin adding new holiday into the database

Leave Management System
≡

Profile



Hello Ashok Thakkar!!

You can edit your profile details here:

Personal Details:

First Name * —

Last Name * —

Gender —

Email Address * —

Contact Number —

Account Details:

Username * —

New Password —

Work Details:

Designation —

Department —

Leave Balance —

Manager —

Update Profile

➡ Seems Good Already

©Sharanam Chotai | March 2023

Figure 93ID: User of the LMA can update their profile

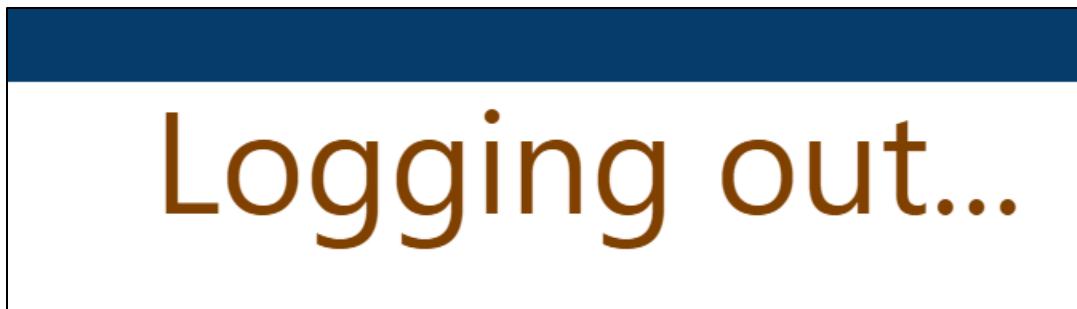


Figure 94ID: Log out screen

A screenshot of the Leave Management System (LMS) dashboard. The top navigation bar is dark blue with the text "Leave Management System" on the left and a close button "X" on the right. Below the navigation bar, there are four main menu items: "Dashboard" (with a house icon), "Request Leave" (with a clipboard icon), "Requests" (with an envelope icon), and "Logout" (with a user icon). A green banner at the top displays the text "26 days available". Below the banner, a yellow box contains the heading "Next Approved Leaves" and a list: "Official Independence Day" followed by "15 Aug, 2023 (1 day)". To the right of this list are two small grey buttons with arrows pointing left and right respectively.

Figure 95ID: Responsiveness of the LMA

Leave Management System

Sharanam Chotai
Senior Developer

My Leave Balance
26 days available

Next Approved Leaves
Official Rakshabandhan
30 Aug, 2023 (1 day)

Incoming Leave Requests from your employees : 2

#Holiday	Description	Date	Status
Mohan Bhagwat (mohanbhagwat)	Testing ad...Read more	24 Mar, 2023 to 28 Mar, 2023 (3 working days)	Approve Reject
Mohan Bhagwat (mohanbhagwat)	Sum of the...Read more	30 Mar, 2023 (1 working day)	Approve Reject

My Leaves

Date	Description	Status
17 Apr, 2023 to 18 Apr, 2023	Holiday (2 days) Going to h...Read more	Approved ✓
16 Mar, 2023 to 21 Mar, 2023	Covid-19 Leave (4 days) ABC	Rejected ✗

©Sharanam Chotai | March 2023

Figure 96ID: Manager's dashboard in LMA

Here, the user can see the remaining leave balance, official holidays and approved leave requests on the front. If admin needs to respond to leave requests from their employees, then they can see the notifications directly on their dashboard.

Below that the admin can see their own leave requests' history.

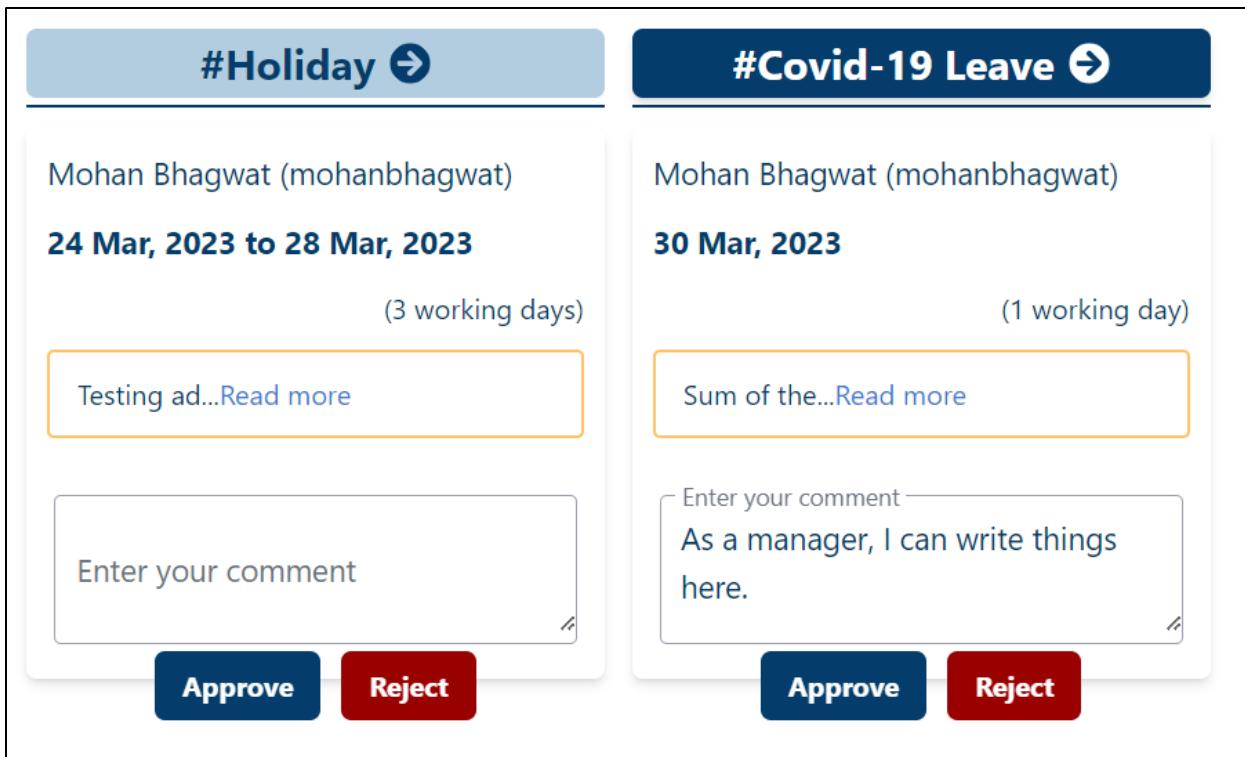


Figure 97ID: Compact Leave cards on manager's dashboard

PENDING	APPROVED	REJECTED	CANCELLED
0	0	5	0

Leave Requests

Filter by:

Status: All

Employee Name: [Input Field]

From: mm/dd/yyyy To: mm/dd/yyyy

Clear

Sort By: Created At

Disclaimer: Stats are calculated based on the current filters applied on this page.

Per Page: 5 Results

Employee	Note	From	Status	Action
Raghav Joshi (emp1)	Holiday I wanted to give you...Read more	16 March, 2023 To: 20 March, 2023 (3 working days)	Rejected	✖ View
Raghav Joshi (emp1)	Holiday Can't wait to come b...Read more	21 March, 2023 To: 22 March, 2023 (2 working days)	Rejected	✖ View
Raghav Joshi (emp1)	Maternity Leave Test Note Text here	24 March, 2023 To: 27 March, 2023 (2 working days)	Rejected	✖ View
Raghav Joshi (emp1)	Paternity Leave XYZ reason	5 April, 2023 To: 6 April, 2023 (2 working days)	Rejected	✖ View
Raghav Joshi (emp1)	Holiday Test Note Text here	17 March, 2023 To: 21 March, 2023 (3 working days)	Rejected	✖ View

©Sharanam Chotai | March 2023

Figure 98ID: Dedicated page for admin to view leave requests from the employees

Filter by:

Status

All

Employee Name

From mm/dd/yyyy To mm/dd/yyyy

Clear

This screenshot shows the filter interface for leave requests. It includes a dropdown for 'Status' set to 'All', an input field for 'Employee Name', and two date range inputs ('From' and 'To') each with a calendar icon. A prominent red 'Clear' button is at the bottom.

Figure 99ID: Available filter options for the admin on leave requests' page

Sort By

Created At

To

From

Status

Created At

Leave Type

Employee ID

Working Days

Manager Comment

This screenshot shows the 'Sort By' dropdown menu. 'Created At' is selected and highlighted with a dark grey background. Other options include 'To', 'From', 'Status', 'Leave Type', 'Employee ID', 'Working Days', and 'Manager Comment'. A small downward arrow icon is located to the right of the dropdown.

Figure 100ID: Available sorting options for the admin on leave requests' page

Leave Request from Raghav

Name:	Raghav Joshi (emp1)
Leave Type:	Holiday
From:	11 April, 2023
To:	18 April, 2023
Working Days:	6 working days
Note:	I want to take a leave for personal function
Status:	Pending ⏱
Manager Comment:	<div style="border: 1px solid #ccc; padding: 5px; width: 100%;"> Enter your comment </div>
Applied On:	23 March, 2023
Leave Balance:	35
Approve Reject	
⬅ Go Back	

Figure 101ID: Admin (Manager) viewing the Leave Card

Status:	Rejected ✘
Manager Comment:	put again
Applied On:	30 March, 2023
Leave Balance:	35
⬅ Go Back	

Figure 102ID: Admin viewing already responded leave's leave-card

Request Time Off

Employee can apply for maximum 20 days of leave at once. Your current leave balance is **30 days**.

From *
mm/dd/yyyy

To *
mm/dd/yyyy

I want to apply for a half day leave

Note *

Leave Type

Holiday

Amount of leave to be deducted: **0 day**

Send Request

Go Back to Dashboard

Figure 103ID: All the employees and managers can request time off

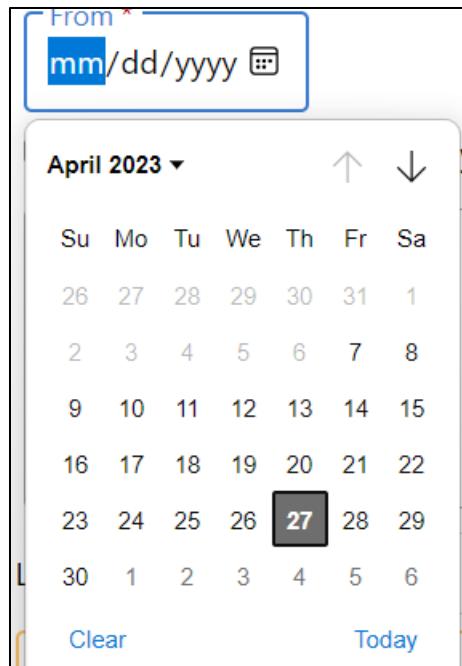


Figure 104ID: From date to request for a leave

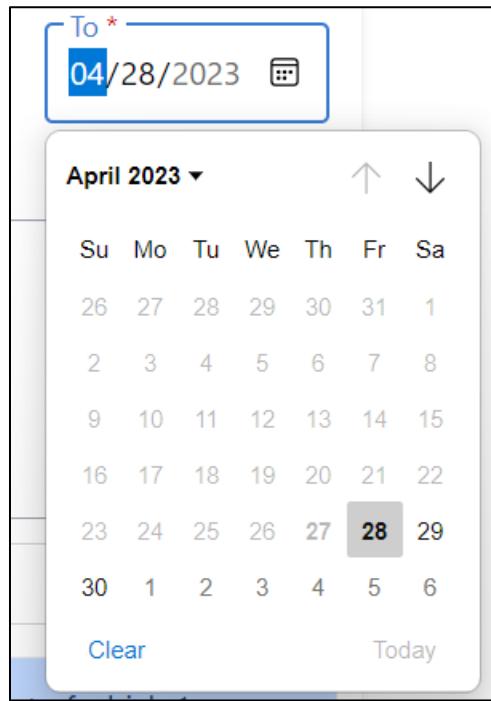


Figure 105ID: To date to request for a leave

The interesting thing in these date pickers are the limitations which I have implemented. User is restricted to select valid period only. Which includes the maximum possible days the employee is allowed to request for.

Request Time Off

Employee can apply for maximum 20 days of leave at once. Your current leave balance is **30 days**.

From * -

04/28/2023 

To * -

05/02/2023 

I want to apply for a half day leave

Note *

Leave Type

Holiday

You are applying for a leave of total 5 days out of which 3 working days are there between 2023-04-28 and 2023-05-02.

Amount of leave to be deducted: **3 days**

Send Request

Figure 106ID: Total working days being calculated by the system

From * 04/28/2023

To * 04/28/2023

I want to apply for a half day leave

First Half

Note *
This is to inform you that I will

Leave Type Holiday

You are applying for a leave of total 1 day out of which 1 working day is there between 2023-04-28 and 2023-04-28.

Amount of leave to be deducted: **0.5 day**

Figure 107ID: Employee Can apply for the half day

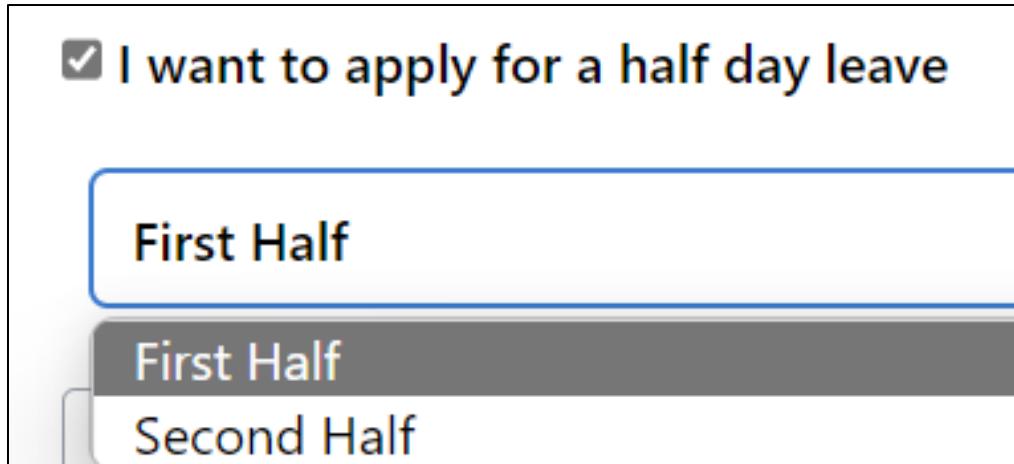


Figure 108ID: Type of half day

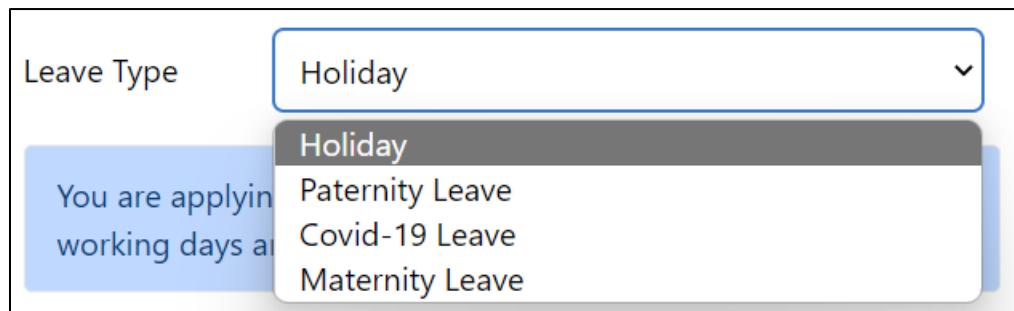


Figure 109ID: Type of leaves

My Leaves		
Date	Description	Status
28 Apr, 2023	Holiday (Half day) This is to... Read more	Cancel

Figure 110ID: Employee viewing their applied leaves

My Leaves		
Date	Description	Status
28 Apr, 2023	Holiday (Half day) This is to... Read more	Cancelled

Figure 111ID: Employee cancelled their own leave request

Employee can reapply only if the leave request for the same day has been either rejected or canceled. Only employee can cancel their own request and admin or super admin can reject the request. In case the employee applies for a leave by mistake, then this feature will be useful to them.

From *
04/28/2023

To *
04/28/2023

I want to apply for a half day leave

Note *
I know I am re-applying on the leave once again but this is for testing. LOL

Leave Type

You have already applied for leave on the given date from 28/4/2023 to 28/4/2023, which is of 1 working days and of type 'Holiday'. Please select a different date.

Amount of leave to be deducted: **1 day**

Figure 112ID: Employee reapplying for leave on the day they applied already

The validation in this image shows that if the user has already applied for the leave and for that same day anywhere it collides within the calendar, then you are not allowed to request and you must change the from/to date.

Note *

Now this is to demonstrate the starting or ending date == holiday or weekend

Leave Type Holiday ▼

Please provide alternative dates as one or more of the given dates fall on a holiday and are therefore unavailable.

Amount of leave to be deducted: **0 day**

Figure 113ID: Employee applying for the leave on holiday

Date	Description	Status
28 Apr, 2023	Holiday (Half day) This is to... Read more	Cancelled
28 Apr, 2023	Holiday (1 day) Again	Cancel

Figure 114ID: Employee reapplying for leave after cancelling first request

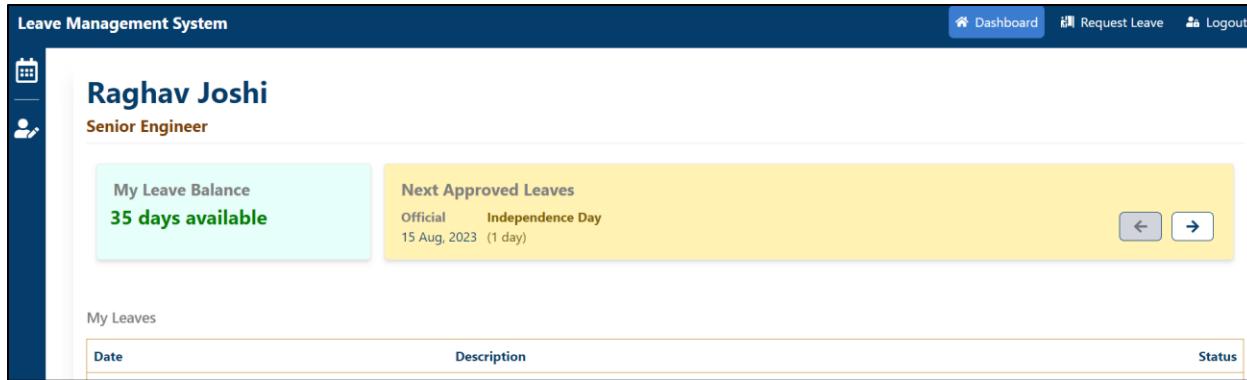


Figure 115ID: Employee's Dashboard

The image above displays the basic employee dashboard, which provides all the essential information that an employee needs to access.

As previously instructed, we were advised to avoid using libraries and encouraged to create our own custom components and utilities whenever possible. In accordance with this guidance, I have developed several components that are displayed in image below. These components were created in-house and are not reliant on any external libraries or resources.

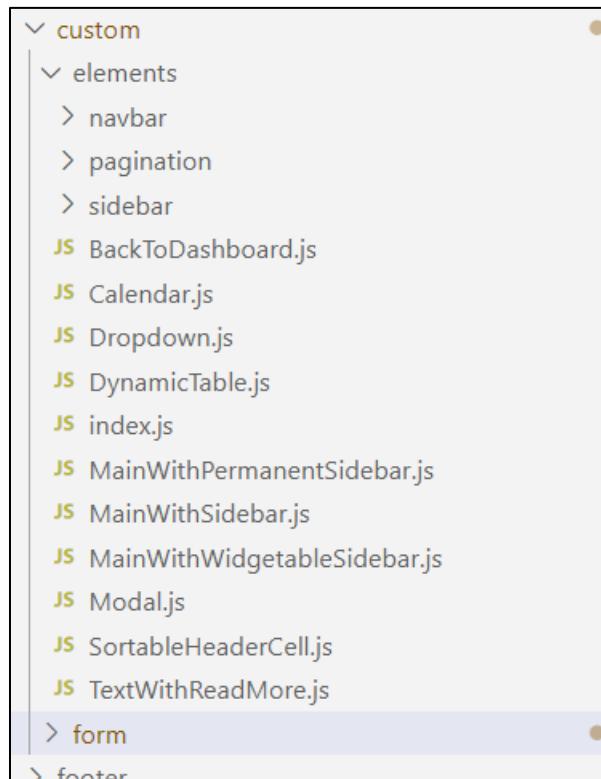


Figure 116ID: Custom elements in react.js

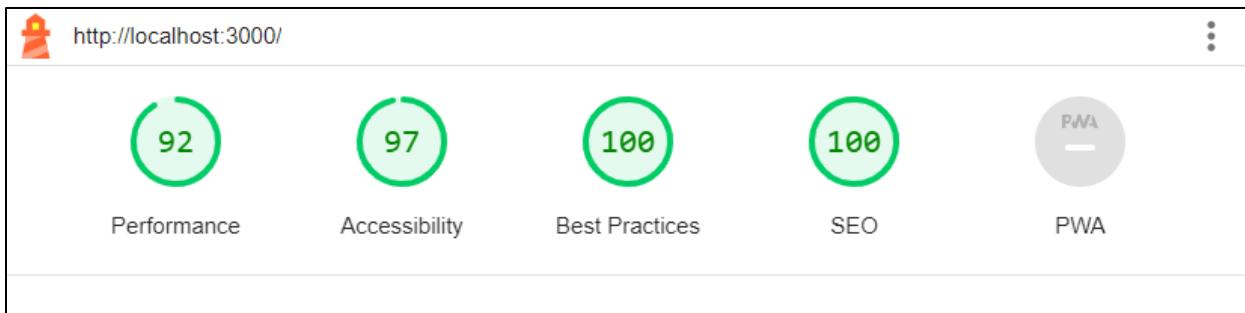


Figure 117ID: Lighthouse report of LMA Landing Page

The above image displays the Lighthouse result of my web application, which is a built-in feature of the Chrome browser. Lighthouse provides valuable insights into the performance, accessibility, and best practices of web applications. By analyzing the Lighthouse report, developers can identify areas for improvement and optimize their web applications for better performance and user experience.

How do our RESTful API endpoints look like?

Here are the endpoints of my RESTful APIs:

Routes for employee's module:

Route	Description	Access Level	Roles
POST api/employee/leave	Request time off	Private	Employee, Admin
GET api/employee/myLeaves	Get all leaves of the employee	Private	Employee, Admin
DELETE api/employee/leave	Cancel leave request	Private	Employee, Admin
GET api/employee/associatedLeaves	Get all associated leaves of the employee	Private	Employee, Admin
GET api/employee/markUpdateAsRead	Mark update as read	Private	Employee, Admin

Note: Because all the managers are also considered to be an employee while requesting for the leave, but since they are having more privileges than the normal employees, they are being called an admin.

Routes for admin's module:

Method	Endpoint	Description	Access	Role	Query Parameters
GET	api/admin/leaves	Get all leaves	Private	Admin	status, empld, empName, from, to, sortBy, sortDir
GET	api/admin/leave/:id	Get leave by id	Private	Admin	
POST	api/admin/leave/:id	Respond to leave request	Private	Admin	

Routes for auth's module:

HTTP Method	Endpoint	Description	Access Control
POST	/api/auth/register	Register user	Public
POST	/api/auth/login	Login user and return JWT token	Public
POST	/api/auth/forgotPassword	Send email to reset password	Public
POST	/api/auth/resetPassword	Reset password (token is required)	Public

Routes for holiday's module:

Method	Route	Description	Access	Roles	Request Body/Query Params
POST	/api/holiday/add	Add holiday	Private	Super Admin	name, date, noOfDays, isOptional
POST	/api/holiday/addMany	Add many holidays	Private	Super Admin	N/A
GET	/api/holiday/get	Get all holidays	Public	N/A	N/A
PUT	/api/holiday/update/:id	Update holiday	Private	Super Admin	name, date, noOfDays, isOptional
DELETE	/api/holiday/delete/:id	Delete holiday	Private	Super Admin	N/A

Routes for information's module:

Method	Endpoint	Description	Access
GET	/api/info/leaves/types	Get all types of leaves	Public
GET	/api/info/getWorkingDaysBetween	Get number of working days between two given dates	Public

Routes for profile's module:

HTTP Method	Route	Description	Access Level	Role
GET	/api/profile	Get current user's profile	Private	Any
GET	/api/profile/:id	Get user's profile by id	Private	Admin
PUT	/api/profile	Update user's profile	Private	Any

Routes for super admin's module:

HTTP Method	Route	Description
GET	/api/superAdmin/employees	Get all employees
GET	/api/superAdmin/employee/:id	Get employee by id
PUT	/api/superAdmin/employee	Update employee
DELETE	/api/superAdmin/employee/:id	Delete employee
POST	/api/superAdmin/employee	Add employee
POST	/api/superAdmin/employees	Add employees
GET	/api/superAdmin/leaves	Get all leaves
GET	/api/superAdmin/leave/:id	Get leave by id
POST	/api/superAdmin/overrideApproval/:id	Override approval
GET	/api/superAdmin/sampleEmployees	Get sample employees
GET	/api/superAdmin/analyticalData	Get analytical data to be displayed on dashboard
GET	/api/superAdmin/employeeTree	Get employee tree

What security measures I have taken to ensure the safety of my application?

To ensure the safety of the application, the following security measures have been implemented:

- CORS middleware has been enabled to restrict cross-origin requests
- Data sanitization has been implemented using the "express-mongo-sanitize" package to prevent no-SQL injections
- The application is protected against XSS attacks using the "xss-clean" package
- HTTP parameter pollution has been prevented using the "hpp" package
- Environment variables are loaded from the ".env" file using the "dotenv" package
- In production environment, the application is served as a static folder with the help of the "express.static" method
- Morgan middleware is used in development environment to log the requests
- The application uses the "body-parser" middleware to parse incoming request bodies
- The MongoDB connection is established using the "mongoose" package with strictQuery set to false
- The routes are defined using the "express.Router" object to handle various API endpoints
- Access to static files is restricted to only valid file names with the help of a regular expression check
- Authorization has been ensured using JWT (JSON Web Tokens). The backend generates a token upon user authentication, which is then passed along with each subsequent request from the client. The server validates the token and authorizes the user accordingly.

Overall, these measures provide a robust defense against various types of security threats such as cross-site scripting, SQL injection, and HTTP parameter pollution attacks. Additionally, the application is built with modern best practices in mind and is thoroughly tested to ensure the security of user data.

How can we enhance this application in the future?

→ Potential Ways to Improve an Application:

- Customizable Color Themes: Provide a feature for users to select their preferred color themes to enhance their user experience. Users can choose from a limited color set or create their own theme from a full-color palette.
- Calendar Access for Employees: Extend the calendar feature to all employees instead of restricting it to only super admins.
- Implement Caching: Add caching to improve the application's performance by storing frequently accessed data in memory or on disk, reducing the need for frequent database queries.
- Enhance Security: Add extra security features such as two-factor authentication, using secure HTTP, and regularly reviewing and updating security policies and procedures.
- Support for Multiple Languages: To make the application more accessible and user-friendly, add support for multiple languages depending on the target audience.
- Integrate with Third-Party APIs: By integrating with third-party APIs, additional functionality and features can be provided to users, such as payment gateways, social media platforms, and other services.
- Automated Testing: Implement automated testing to identify and fix bugs and errors in the application code, ensuring that the application is stable and reliable.
- Data Analytics: Implement data analytics to collect and analyze user data to gain insights into user behavior and preferences. These insights can help improve the application's user experience and inform future development decisions.

By incorporating some or all of these features, the application can be improved, providing a better user experience, enhanced functionality, improved performance, and increased security.

Conclusion

In conclusion, both the Pension Form Filler for University and Leave Management Application for Company projects are essential tools that address the needs of their respective users. The Pension Form Filler for University provides an automated solution for university employees to fill out their pension forms accurately and efficiently. The application simplifies the otherwise complicated process and saves time for both employees and university officials.

Similarly, the Leave Management Application for Company streamlines the leave application and approval process for employees and managers. The application provides a user-friendly interface for employees to request leave and managers to approve or reject them, resulting in a more organized and efficient leave management process.

Overall, both projects demonstrate the importance of leveraging technology to automate and streamline processes in different organizations. These applications help save time, reduce errors, and increase productivity, ultimately improving the user experience and contributing to the success of the organizations they serve. The experience gained during these projects has provided valuable insights into the field of software engineering and the challenges involved in developing real-world applications. The projects allowed me to gain practical experience in a variety of software development skills, including GUI design and development, web development, and agile development methodologies. The knowledge gained from these projects will be beneficial in my future pursuits in the field of software engineering.

Bibliography and References

- [1] Svelte, "Svelte • Cybernetically enhanced web apps," [Online]. Available: <https://svelte.dev/>. [Accessed 20 April 2023].
- [2] Investis Digital, "Investis Digital | Trusted Digital Communications and Marketing Company," Investis Digital Pvt Ltd, [Online]. Available: <https://www.investisdigital.com/>. [Accessed 20 April 2023].
- [3] Sardar Patel University, Vallabh Vidhyanagar, "M.C.A. (Master of Computer Application)(Two Year) - Sardar Patel University," Sardar Patel University, [Online]. Available: https://www.spuvvn.edu/students_corner/syllabi/mca_2_year/. [Accessed 20 April 2023].
- [4] Javatpoint, "UML USE CASE DIAGRAM - Javatpoint," Javatpoint, [Online]. Available: <https://www.javatpoint.com/uml-use-case-diagram>.
- [5] SharanamChotai, *Linkedin post: expressing gratitude*, Vadodara: Sharanam Chotai, 2023.
- [6] NPM, "NPM," NPM, [Online]. Available: <https://www.npmjs.com/>. [Accessed 20 April 2023].
- [7] Tailwind css, "Tailwind CSS : Rapidly build modern websites without ever leaving your HTML.,," [Online]. Available: <https://tailwindcss.com/>.
- [8] AXIOS HTTP, "Getting Started | Axios Docs," [Online]. Available: <https://axios-http.com/docs/intro>.
- [9] React icons, "React icons," [Online]. Available: <https://react-icons.github.io/react-icons/>.
- [10] React router , "React router dom," [Online]. Available: <https://reactrouter.com/en/main>.
- [11] X .| NPM, "XLSX - NPM," github.com/SheetJS/sheetjs, [Online]. Available: <https://www.npmjs.com/package/xlsx>.
- [12] Recharts, "Recharts," Recharts Group, [Online]. Available: <https://recharts.org/en-US/>.
- [13] daniel-hauser, "react-organizational-chart | NPM," [Online]. Available: <https://www.npmjs.com/package/react-organizational-chart>.
- [14] e. js, "body-parser | npm," [Online]. Available: <https://www.npmjs.com/package/body-parser>.
- [15] fiznool, "express-mongo-sanitize | npm," [Online]. Available: <https://www.npmjs.com/package/express-mongo-sanitize>.
- [16] analog-nico, "hpp - npm," [Online]. Available: <https://www.npmjs.com/package/hpp>.
- [17] auth0, "jsonwebtoken - npm," [Online]. Available: <https://www.npmjs.com/package/jsonwebtoken>.
- [18] mongoose, "Mongo ODM," [Online]. Available: <https://mongoosejs.com/>.
- [19] E. js, "morgan - npm," [Online]. Available: <https://www.npmjs.com/package/morgan>.
- [20] jsonmaur, "xss-clean - npm," [Online]. Available: <https://www.npmjs.com/package/xss-clean>.
- [21] open-cli-tools, "concurrently - npm," open-cli-tools, [Online]. Available: <https://www.npmjs.com/package/concurrently>.

- [22] Wikipedia, "Bootstrap Frontend Framework," [Online]. Available: [https://en.wikipedia.org/wiki/Bootstrap_\(front-end_framework\)](https://en.wikipedia.org/wiki/Bootstrap_(front-end_framework)).
- [23] Wikipedia, "General Data Protection Regulation - Wikipedia," [Online]. Available: https://en.wikipedia.org/wiki/General_Data_Protection_Regulation.
- [24] T. target, "What is non-disclosure agreement (NDA)? | Definition from TechTarget," [Online]. Available: <https://www.techtarget.com/whatis/definition/non-disclosure-agreement>.

Appendix – I: Glossary of Difficult Words

Difficult Word	Description
MERN stack	Combination of technologies which consists of Mongo Db, Express JS, React JS, Node Js.
jQuery	Opensource JavaScript framework designed to simplify HTML DOM tree traversal and manipulation, event handling, CSS animation, and Ajax
LMA	Leave Management Application, name of the Project
Boot camp	Boot camp training is a way to train developers and other technical professionals to acquire deep skills in new technologies in a short period of time.
Bootstrap	Free and open-source CSS framework directed at responsive, mobile-first front-end web development. [22]
GDPR	The General Data Protection Regulation is a Regulation in EU law on data protection and privacy in the EU and the European Economic Area. [23]
ISMS (Information Security Management System)	Information security management defines and manages controls that an organization needs to implement to ensure that it is sensibly protecting the confidentiality, availability, and integrity of assets from threats and vulnerabilities.
PFF	Pension form filler, name of the project.
ID	Investis Digital Pvt Ltd.
NDA	A non-disclosure agreement (NDA), also known as a confidentiality agreement, is a legally binding contract in which one party agrees to give a second party confidential information about its business or products and the second party agrees not to share this information with anyone else for a specified period. [24]
NPM	Default package manager for the JavaScript runtime environment Node.js
UC	Use Case Diagram
ERD	ER Diagram
Situational debugging	In a project when developer A is seeking for someone else to help him out because he cannot understand why something is malfunctioning and developer B finds it easy to resolve, it is called situational debugging for developer A.
CSV	Comma Separated Values
IDE	Integrated Development Environment
JSON	JavaScript Object Notation
CSS	Cascading Style Sheet
Ctrl	Control Key on the keyboard
JWT	JSON Web Token
SQL	Structured Query Language (mostly used in relational databases)
HTTP	Hypertext Transfer Protocol
HPP	HTTP Parameter Pollution
XSS	Cross Site Scripting
Env	Environment

Difficult Word	Description
CORS	Cross-Origin Resource Sharing
UML	Unified Modelling Language
XLSX	Extension of files made using MS Office Excel
Flexbox	Flexible Box Layout
Voucher	a piece of paper that you can use instead of money to pay for all or part of something
Carousel	Sliders, galleries, or slideshows
MVC	Model-View-Controller, it is a pattern in software design
CRUD	It refers to the four necessary functions to implement a persistent storage application: create, read, update and delete.