

PROJECT SEMESTER REPORT

Expense Tracker

by

Aditi Singh

Roll No. 102003512

Under the Guidance of

Bharathi Gabbita

V-Manager, IT Application Development, Deloitte

Gurpal Singh Chhabra

Assistant Professor, TIET



Submitted to the

**Computer Science & Engineering Department
Thapar Institute of Engineering & Technology, Patiala**

In Partial Fulfilment of the Requirements for the Degree of

Bachelor of Engineering in Computer Engineering

at

Thapar Institute of Engineering & Technology, Patiala

June 2024

Expense Tracker

by *Aditi Singh*

Place of work: *Deloitte Support Services India Private Limited*

Submitted to the Computer Science & Engineering Department, Thapar Institute of Engineering & Technology

June 2024

In Partial Fulfilment of the Requirements for the Degree of Bachelor of Engineering in Computer Engineering

Abstract:

In today's dynamic business landscape, effective expense management is crucial for organizational success. The expense tracker offers a comprehensive solution tailored to the needs of both employees and managers, facilitating seamless tracking, reporting, and approval of expenses. For employees, the expense tracker provides a user-friendly platform to record expenses incurred during business activities. With intuitive interfaces and easy-to-use functionalities, employees can effortlessly input expense details and categorize expenses for clarity and accuracy.

Managers benefit from streamlined approval workflows and real-time visibility into expense data. It ensures timely review and authorization of expenses while providing managers with insights into spending patterns and budget utilization. By centralizing expense management processes and promoting transparency and accountability, the expense tracker empowers organizations to optimize financial resources, mitigate risks, and foster a culture of fiscal responsibility and efficiency. Embracing technology-driven solutions like ours is essential for businesses seeking to navigate the complexities of modern expense management effectively.

In an era characterized by rapid technological advancement and evolving business landscapes, the efficient management of expenses emerges as a critical component of organizational success. Recognizing this imperative, the expense tracker represents a sophisticated yet user-friendly solution designed to meet the diverse needs of employees and managers alike. At its core, the expense tracker seeks to streamline and optimize the entire expense management process, from initial expense recording to final approval and reconciliation. For employees, the platform offers an intuitive interface that simplifies the task of documenting incurred expenses. Employees can effortlessly log expenses, ensuring accuracy and completeness in their reporting.

By centralizing and automating expense management processes, the tracker not only enhances operational efficiency but also promotes transparency, accountability, and compliance within the organization. Furthermore, by reducing the time and effort required to manage expenses, the solution allows employees and managers to focus on more strategic initiatives, driving overall productivity and competitiveness. It represents a paradigm shift in how organizations approach expense management, offering a comprehensive yet user-centric solution that empowers employees and managers to navigate the complexities of modern business with confidence and ease.

Author Aditi Singh

Certified by Bharathi Gabbita

RE: Approval for project semester report



Gabbita, Bharathi

To Singh, Aditi

Retention Policy US Mailbox (50 years)

Expires 5/11/2074



12:08 PM

Hi Aditi,

Approved.

Thanks and Regards,
Bharathi.

From: Singh, Aditi <aditisingh77@deloitte.com>

Sent: Thursday, May 23, 2024 11:02 AM

To: Gabbita, Bharathi <bgabbita@deloitte.com>

Subject: Approval for project semester report

Hi Bharathi,

Could you please review the attached report and give your approval.

Thanks,
Aditi Singh

(Industrial Coordinator / mentor)

Certified by

Gurpal Singh Chhabra
(Faculty mentor)

**CERTIFICATE (PROJECT SEMESTER TRAINING) FROM THE
COMPANY OR THE ORGANIZATION**

TABLE OF CONTENT

Contents

1. Company Profile	7
2. Introduction	10
3. Background	13
4. Work Plan	15
5. Objectives	16
6. Methodology	17
7. Project Details	20
8. Observations and Findings	23
9. Limitations	25
10. Conclusions and Future Work	27
11. Screenshots	28
12. Bibliography/References	31

1. Company Profile

Deloitte is a global leader in professional services, providing audit, tax, consulting, and advisory services to clients across various industries and sectors. With a rich history spanning over a century, Deloitte has established itself as one of the most respected and trusted names in the professional services industry. Founded in 1845 by William Welch Deloitte in London, England, Deloitte has grown from a small accounting firm into a multinational powerhouse with a presence in over 150 countries and territories. The firm's commitment to excellence, integrity, and innovation has propelled its growth and success, earning it a reputation for delivering unparalleled value and insight to clients worldwide.

Deloitte's service offerings span a wide range of disciplines, including audit and assurance, tax consulting, risk advisory, financial advisory, and management consulting. Its multidisciplinary approach enables Deloitte to provide holistic solutions that address the complex challenges facing businesses today, helping clients navigate regulatory requirements, optimize operational performance, and capitalize on growth opportunities. One of Deloitte's key strengths lies in its diverse and talented workforce, comprising professionals from various backgrounds, cultures, and expertise areas. Deloitte fosters a culture of collaboration, inclusivity, and continuous learning, empowering its people to thrive and innovate in a rapidly changing world.

In addition to its client services, Deloitte is also committed to making a positive impact on society through its corporate social responsibility initiatives. The firm actively engages in pro bono work, community service projects, and sustainability efforts, aligning its business goals with the broader goal of creating a more sustainable and equitable world. Deloitte's reputation for excellence and its unwavering commitment to its clients, people, and communities have earned it numerous accolades and recognitions over the years. It consistently ranks among the top professional services firms globally and continues to set the standard for innovation, integrity, and leadership in the industry. As Deloitte continues to evolve and expand its footprint, it remains dedicated to its core values and principles, striving to exceed client expectations, drive positive change, and build a brighter future for generations to come.

With a rich history spanning over a century, Deloitte has consistently adapted to changing market dynamics, emerging as a trusted advisor to businesses, governments, and organizations of all sizes. Operating in over 150 countries and territories, Deloitte boasts a global network of professionals renowned for their expertise, integrity, and commitment to excellence. The firm's

multidisciplinary approach, combining audit, tax, consulting, and advisory services, enables it to offer comprehensive solutions tailored to the unique needs and challenges of each client. Deloitte's extensive service portfolio encompasses a wide range of industries, including financial services, technology, healthcare, manufacturing, consumer, energy, and more. Whether assisting a multinational corporation with complex tax compliance issues or advising a startup on strategic growth initiatives, Deloitte leverages its deep industry knowledge and global insights to deliver tangible results and drive sustainable growth.

Central to Deloitte's success is its relentless focus on innovation and digital transformation. Embracing cutting-edge technologies such as artificial intelligence, blockchain, and data analytics, Deloitte helps clients harness the power of digital disruption to gain a competitive edge, enhance operational efficiency, and unlock new opportunities for value creation. Moreover, Deloitte places a strong emphasis on talent development and diversity, recognizing that its people are its most valuable asset. Through mentorship programs, leadership development initiatives, and a culture of continuous learning, Deloitte nurtures a workforce of diverse backgrounds and perspectives, fostering creativity, collaboration, and innovation. Beyond its client engagements, Deloitte is deeply committed to making a positive impact on society. Through pro bono work, volunteerism, and corporate social responsibility initiatives, Deloitte seeks to address pressing social challenges, promote sustainability, and contribute to the communities in which it operates.

Consulting assists clients by providing services in the offering areas of strategy, analytics and M&A, customer and marketing, core business operations, human capital, and enterprise technology and performance. Consulting is Deloitte's largest business, bringing over 40% of total revenues in 2021. Financial advisory provides corporate finance services to clients, including dispute, personal and commercial bankruptcy, forensics, e-discovery, document review, advisory, mergers & acquisitions, capital projects consulting and valuation services. Risk advisory provides offerings in enterprise risk management, information security and privacy, data quality and integrity, strategic & reputation risk, regulatory risk, project risk and cyber risk, and business continuity management and sustainability. Tax and legal helps clients increase their net asset value, undertake the transfer pricing and international tax activities of multinational companies, minimize their tax liabilities, implement tax computer systems, and provides advisory of tax implications of various business decisions.

In the late 1990s, Deloitte commenced operations in India, at the same time as another large auditing firm KPMG. In India, ICAI regulations do not permit foreign firms to carry out audits in India. Hence Deloitte carries out audits in India under the name of C.C.Chokshi & Co., an existing auditing firm that it arranged an agreement with in 1998. In 1992, after India was forced to liberalise under one of the conditions of the World Bank and IMF sponsored bail out, Deloitte was granted a license to operate in India. In 2004, A. F. Ferguson & Co., which has been in India for 110 years, joined Deloitte, following CC Chokshi & Company, Fraser & Ross, PC Hansotia & Company and SB Billimoria & Company. In India, Deloitte has two entities: Deloitte India and Deloitte US-India (USI), which is a region within the Deloitte US organization. Deloitte India caters to clients within India, while Deloitte USI is an entity of Deloitte US that is geographically located in India and caters to clients of the US member firm.

2. Introduction

In today's dynamic business landscape, effective expense management is crucial for the success and sustainability of any organization. With companies increasingly operating in global markets and with distributed teams, the need for streamlined, transparent, and efficient expense tracking systems has become more pronounced than ever before. In response to this demand, the expense tracker project emerges as a comprehensive solution designed to revolutionize the way companies manage and monitor their expenses.

At its core, the expense tracker project represents a culmination of technological innovation and practical utility, offering a sophisticated yet user-friendly platform that caters to the diverse needs of employees and managers alike. By leveraging cutting-edge technologies and best practices in software development, the system aims to simplify the complex process of expense reporting while enhancing accuracy, accountability, and transparency across the organization.

In an era where manual expense tracking methods are increasingly outdated and prone to errors, the expense tracker project presents a paradigm shift towards automation and digitization. Gone are the days of cumbersome spreadsheets and paper receipts; instead, employees now have access to a centralized, digital platform where they can effortlessly submit, manage, and track their expenses with ease.

Moreover, the expense tracker project recognizes the importance of empowering managers with the tools and insights they need to effectively oversee and approve expense requests in a timely manner. Through intuitive dashboards, customizable filters, and real-time status updates, managers can gain actionable insights into expense patterns, trends, and discrepancies, enabling them to make informed decisions that drive operational efficiency and cost savings.

Beyond its immediate operational benefits, the expense tracker project holds the potential to catalyze broader organizational transformation by fostering a culture of accountability, transparency, and data-driven decision-making. By providing employees and managers with a unified platform for expense management, the system promotes collaboration, communication, and alignment across departments and teams, ultimately contributing to the company's overall success and competitive advantage in the marketplace.

The expense tracker project represents more than just a software solution; it embodies a commitment to innovation, efficiency, and excellence in expense management. As organizations continue to navigate the complexities of today's business environment, the

expense tracker project stands as a beacon of progress, offering a glimpse into the future of expense tracking and management.

The expense tracker project not only addresses the immediate need for streamlined expense management but also serves as a catalyst for broader organizational transformation. By digitizing and automating the expense reporting process, the system frees up valuable time and resources that can be redirected towards strategic initiatives and value-added activities. This newfound efficiency not only enhances productivity but also empowers employees to focus on their core responsibilities, driving overall performance and employee satisfaction.

Furthermore, the expense tracker project is built upon principles of scalability and adaptability, allowing organizations to seamlessly integrate the system into their existing infrastructure and workflows. Whether deployed in a small startup or a multinational corporation, the system is designed to grow and evolve alongside the organization, accommodating changing needs, regulations, and industry standards.

Moreover, the expense tracker project embraces a user-centric approach, placing the needs and experiences of employees and managers at the forefront of its design and development. Through iterative feedback loops and continuous improvement initiatives, the system evolves in response to user preferences, pain points, and emerging trends, ensuring a seamless and intuitive user experience.

Beyond its operational and tactical benefits, the expense tracker project holds strategic implications for organizational governance, risk management, and compliance. By centralizing expense data and implementing robust controls and audit trails, the system enhances transparency and accountability, mitigating the risk of fraud, errors, and non-compliance with internal policies and external regulations.

In essence, the expense tracker project represents a holistic approach to expense management that transcends traditional boundaries and silos within organizations. By leveraging technology, data, and collaboration, the system empowers organizations to achieve greater visibility, control, and efficiency in their expense management processes, ultimately driving sustainable growth, profitability, and success in today's competitive business landscape.

The expense tracker project also recognizes the importance of adaptability in today's rapidly evolving business environment. As companies navigate unprecedented challenges and disruptions, the ability to quickly pivot and respond to changing circumstances is paramount.

In this context, the expense tracker project serves as a flexible and agile tool that can be customized to meet the unique needs and requirements of different industries, sectors, and organizational structures.

Moreover, the expense tracker project is not just about tracking numbers; it's about leveraging data-driven insights to inform strategic decision-making and drive business growth. By harnessing the wealth of information captured within the system, organizations can gain valuable insights into expense trends, patterns, and outliers, enabling them to identify cost-saving opportunities, optimize spending, and allocate resources more effectively.

Furthermore, the expense tracker project embodies a commitment to continuous innovation and improvement. As technology advances and best practices evolve, the system undergoes regular updates and enhancements to incorporate the latest features, functionalities, and security measures. This commitment to innovation ensures that the expense tracker project remains at the forefront of expense management solutions, delivering maximum value and impact to organizations of all sizes and industries.

Beyond its immediate benefits, the expense tracker project also has broader implications for corporate sustainability and social responsibility. By promoting greater efficiency and accountability in expense management, the system helps organizations minimize waste, reduce environmental impact, and operate more ethically and responsibly. In doing so, the expense tracker project aligns with the broader goals of corporate citizenship and sustainable development, contributing to a more equitable and sustainable future for all stakeholders.

In summary, the expense tracker project represents a convergence of technology, innovation, and strategic vision, offering organizations a powerful tool to streamline expense management, drive operational excellence, and achieve their broader business objectives. By embracing flexibility, adaptability, and continuous improvement, the system empowers organizations to navigate today's complex business landscape with confidence and resilience, paving the way for long-term success and prosperity.

3. Background

The expense tracker project emerged from the need to address common inefficiencies and challenges faced by organizations in managing employee expenses. There are drawbacks of traditional expense management methods, which often relies on paper forms, spreadsheets, and manual processes. These methods are not only time-consuming but also prone to human errors, leading to delays, inaccuracies, and frustration among employees and managers.

The primary objective of the expense tracker project was to develop a digital solution that could streamline the entire expense management process, from submission to approval, and enhance overall organizational efficiency. This project aimed to create a user-friendly platform that would simplify the workflow for both employees and managers, ensuring that expense tracking became a seamless and efficient activity.

Several key motivations drove the development of this project:

1. **Reduction of Administrative Burden:** One of the main goals was to reduce the administrative workload associated with managing expenses. By automating the process of submitting, reviewing, and approving expense reports, the system helps save valuable time for both employees and managers. This automation not only speeds up the process but also minimizes the potential for human error.
2. **Improvement of Data Accuracy:** Accurate recording of expense data is crucial for effective financial management. The expense tracker system ensures that all expense information is accurately captured and stored in a centralized database, reducing the chances of data discrepancies and loss. This centralized approach also makes it easier to retrieve and review historical expense records.
3. **Enhanced Transparency and Accountability:** Providing real-time visibility into the status of expense requests was a key design consideration. Employees can track the progress of their submissions and see whether their expenses have been approved or rejected. Managers, on the other hand, have a clear view of all pending and processed expense reports, which enhances accountability and ensures that all expenses are properly reviewed.

4. User-Friendly Design: Creating an intuitive and easy-to-use interface was essential to ensure that employees and managers could quickly adapt to the new system. The expense tracker was designed with a focus on user experience, featuring straightforward navigation and clear instructions to make the process of submitting and managing expenses as simple as possible.

Throughout the development of the expense tracker project, continuous feedback from potential users played a crucial role. Engaging with both employees and managers helped identify specific needs and preferences, ensuring that the final product was tailored to meet real-world requirements effectively.

In summary, the expense tracker project represents a significant step forward in modernizing expense management practices. By leveraging digital technology, the system provides a streamlined, efficient, and user-friendly solution that addresses the common challenges associated with traditional expense tracking methods. The project not only improves operational efficiency and accuracy but also enhances transparency, accountability, and user satisfaction within the organization.

4. Work Plan

Start Date	End Date	Action
16/1/24	22/1/24	Learning and Trainings on SQL and SSMS
23/1/24	5/2/24	Learning and Trainings on .NET Foundation.
6/2/24	29/2/24	Learning and Trainings on Advanced .NET and developing a practice project in .NET Core MVC.
1/3/24	25/3/24	Learning and Trainings on ReactJS, Angular and developing a practice project in ReactJS
26/3/24	30/3/24	Developing database and backend APIs.
31/4/24	5/4/24	Developing UI Components using ReactJS
6/4/24	8/4/24	Integration of frontend with backend APIs

Table 4.1 Work plan

5. Objectives

- Analyze and make use of appropriate Relational Data modeling and SQL constructs to design and develop CRUD solutions to given database problem statement(s)/business scenario(s)
- Implement 3 or n-tier architecture while designing robust solutions to given problem statement(s)/business scenario(s)
- Experiment with C# language and perform CRUD operations logic using T-SQL/LINQ to entities queries
- Demonstrate use of C# constructs for creating RESTful Web APIs supported by ASP.NET Core
- Use components, event binding, forms, structural directives, attribute directives, and property bindings to build an application in React
- Set up a component router, bootstrapping routing, and programmatic navigation for implementing routing and navigation in an Angular/React application

6. Methodology

1. Requirement Analysis:

- Conduct a thorough analysis of the project requirements and business scenarios to identify key functionalities and user needs. This involves gathering input from stakeholders, understanding business processes, and defining clear objectives for the expense tracking system.

2. Relational Data Modeling:

- Design and develop a relational data model to represent the structure and relationships of the data entities involved in expense tracking. This includes defining tables, columns, and relationships using appropriate normalization techniques to ensure data integrity and efficiency.

3. 3 or N-Tier Architecture Design:

- Design a scalable and maintainable architecture for the expense tracking system based on the 3 or N-tier architectural pattern. This involves identifying and separating the presentation, business logic, and data access layers to facilitate modularity, reusability, and scalability.

4. Experimentation with Frameworks and Technologies:

- Experiment with various frameworks and technologies to implement CRUD solutions, RESTful Web APIs, and front-end components. This includes exploring options for backend development, such as ASP.NET Core or Node.js, and front-end frameworks like Angular or React, to determine the most suitable tools for the project requirements.

5. Implementation of CRUD Operations:

- Implement Create, Read, Update, and Delete (CRUD) operations for managing expense requests and data entities. This involves developing logic for creating new expense requests, retrieving existing ones, updating request details, and deleting requests as needed, ensuring data consistency and integrity throughout the process.

6. Development of RESTful Web APIs:

- Develop RESTful Web APIs to facilitate communication between the front-end and backend components of the expense tracking system. This includes defining endpoints, handling HTTP requests and responses, and implementing business logic to process and manipulate data efficiently.

7. Front-end Development with React:

- Build the user interface for the expense tracking system using React, leveraging components, directives, forms, and other features to create a rich and interactive user experience. This involves designing and implementing UI components, handling user input and interactions, and ensuring responsiveness and accessibility across different devices and browsers.

8. Routing and Navigation Implementation:

- Set up a component router and implement routing and navigation functionality in the Angular or React application. This includes configuring routing rules, defining navigation paths, and implementing programmatic navigation features to enable users to navigate between different views and components within the application seamlessly.

9. Testing and Quality Assurance:

- Conduct comprehensive testing of the expense tracking system to validate its functionality, performance, and reliability. This involves writing and executing unit tests, integration tests, and end-to-end tests to identify and address any bugs, errors, or

inconsistencies in the system. Additionally, perform user acceptance testing (UAT) to gather feedback from stakeholders and ensure that the system meets their expectations and requirements.

10. Documentation:

- Prepare documentation for the expense tracking system, including user manuals, technical guides, and API documentation, to facilitate system usage and maintenance

7. Project details

- Employees can:
 - Create/Raise new expense requests with the following details-
 - Expense Id (system-generated)
 - Date and Time of raising request
 - Expense description
 - Expense type (Travel, Food, Health/Medical, Accessories, and Miscellaneous)
 - Amount
 - Manager name
 - Edit and delete the existing pending expense requests (User can update/delete his own expenses based on expense ID).
 - Search expenses by Expense Id or Event Type (User can search expense based on expense ID or expense Type).
 - After Login in user can view all the existing expenses if any with Action(Delete/Edit).
 - There will be a hyper link on the expense page to add New Expense.
- Once Manager logs in, he/she will be able to see the expense requests of respective user in the form of a hyperlink.
- Managers can review and approve/reject expense requests under that respective user.
- Expenses can be filtered by type and date.
- Employee at any given time should be able to see the request status:
 - Approved
 - Pending
 - Rejected
- Appropriate validations to be incorporated for verifying user input data while raising/editing an expense request.
- Login Screen functionalities:

- A screen needs to be created for user to login to the application using valid credentials(Employee Id and Password).
 - A new user will need to register/sign-up with details- Employee Id, Employee Name, Designation, Project, Preferred Password, and Confirm Password.
- Employee landing/home page to have details of all the expense requests raised by him/her in the past.

7.1 Technologies

- Business Logic - ASP.NET Core Web API
- Database - MS SQL Server 2019 Developer Edition, SQL Server Management Studio
- Front-end - ANGULAR/REACT (preferably latest editions), Ngui Datetime Picker library
- Code Editor - Visual Studio Code (VS Code)
- IDE- Visual Studio 2022 Community Edition
- Postman- Testing the API
- Publishing and Hosting the App-
 - IIS Express
 - .Net 6

7.2 Pre-Requisites

- Basic knowledge of Core Web API, Angular/React, HTML/CSS/Bootstrap, and Postman.
- MS SQL Server and SQL Server Management Studio should be configured.
- Nodejs must be installed.
- Visual Studio 2022 Community Edition must be configured.
- Use MS SQL Server to create required database tables.

7.3 Task

- Create a new ASP.NET Core Web Application with RESTful API Controller.
- Add relevant class files to Models folder.
- Update appsettings.json file to match your dbname, server, and password.
- Add an appropriate Controller with the logic for needed CRUD operations using SQL/LINQ to entities queries.
- Create an Angular project (with added routing) with required API components.
- Make changes to app.routing.ts file by making a shared service.
- Add design elements to HTML/CSS/Bootstrap files.
- Create a 3 or n-layered Architecture.
- Publish and Host the project on IIS.

8. Observations and Findings

1. User Interface (UI) Evaluation:

- The user interface design demonstrated a high level of intuitiveness and clarity, making it easy to understand and navigate the expense tracking system.
- Visual elements such as color scheme, typography, and layout contributed to a pleasant and cohesive user experience, facilitating efficient completion of tasks.
- The absence of clutter and unnecessary elements allowed for focused interaction and streamlined usability.

2. Remote Expense Approval:

- The simulated remote expense approval feature provided insights into how managers would interact with the system from a distance.
- The remote approval process appeared straightforward and accessible, with clear prompts and instructions guiding users through each step.
- The integration of remote approval functionality seemed seamless, enabling users to access and review expense requests remotely without encountering technical issues.

3. Role-Based Access Controls (RBAC):

- RBAC implementation effectively restricted access to simulated sensitive financial information based on predefined roles, ensuring data confidentiality during the evaluation.
- The granular control over permissions allowed for customization of access levels tailored to different user roles.
- The RBAC system demonstrated reliability and consistency in enforcing access controls, preventing access to restricted features or data outside of assigned roles.

4. System Performance:

- The expense tracking system exhibited satisfactory performance during the evaluation, with minimal latency and responsive interface interactions.
- No significant system errors or disruptions were encountered, indicating robustness and stability in system performance.
- Load testing scenarios were conducted to simulate peak usage conditions, providing insights into the system's scalability and resilience under heavy workloads.

Overall, the evaluation provided valuable insights into the effectiveness and usability of the expense tracking system, highlighting areas of strength and opportunities for improvement. These findings can inform future iterations of the system, ensuring that it continues to meet the needs and expectations of users in a simulated environment.

9. Limitations

1. Limited Expense Categories:

- The software may have a predefined set of expense types (Travel, Food, Health/Medical, Accessories, Miscellaneous), which could be restrictive for organizations with unique expense categories. Users may encounter limitations when trying to categorize expenses that do not fit into the predefined types.

2. Restricted Editing and Deletion:

- Users can edit or delete their own pending expense requests based on expense ID. However, once an expense request is submitted, users may face limitations in making changes or deleting it, especially if it has already been reviewed or approved by a manager. This could lead to potential data inconsistencies or errors in expense records.

3. Limited Search Functionality:

- While users can search expenses by Expense ID or Event Type, the search functionality may lack advanced filtering options or criteria. Users may encounter limitations when trying to perform complex searches based on multiple parameters or specific date ranges.

4. Manager View Limitations:

- Managers can review and approve/reject expense requests under their respective users. However, the software may lack features for managers to view expenses across all users or departments in a consolidated manner. This could limit managers' ability to perform comprehensive expense reviews or analyses.

5. Basic Request Status Tracking:

- Users can view the status of their expense requests (Approved, Pending, Rejected) at any given time. However, the software may lack advanced status tracking features, such as detailed

audit trails or status change notifications. This could limit users' ability to track the progress of their expense requests in real-time.

6. Limited Validation Checks:

- While appropriate validations are incorporated for verifying user input data while raising/editing an expense request, the software may have limitations in handling complex validation scenarios or enforcing strict data integrity rules. This could result in the submission of incomplete or inaccurate expense requests, leading to data quality issues.

7. Simplified Login Screen Functionality:

- The login screen functionality allows users to login using valid credentials or register/sign-up as a new user. However, the software may lack advanced security features such as multi-factor authentication or password complexity requirements. This could pose security risks in environments where stronger authentication measures are required to protect sensitive financial data.

8. Limited User Landing/Home Page Features:

- The employee landing/home page provides details of all the expense requests raised by the user in the past. However, the software may lack advanced features for organizing, prioritizing, or customizing the display of expense requests. This could result in a less efficient user experience for employees with large volumes of expense requests or complex project requirements.

Addressing these limitations may require additional development effort, resources, or integration with third-party solutions to enhance the functionality, scalability, and usability of the expense tracking system.

10. Conclusions and Future Work

In conclusion, the development and implementation of the expense tracking system represent a significant milestone in the quest for efficient and transparent expense management within the organization. Through meticulous attention to detail and the judicious application of modern technologies and methodologies, the project has successfully addressed the key objectives outlined at its inception. By providing employees with intuitive interfaces for submitting, editing, and tracking expense requests, and equipping managers with powerful tools for remote approval and oversight, the system has streamlined the entire expense management workflow, enhancing productivity and accuracy across the board.

Furthermore, the adoption of a robust 3 or N-tier architecture has laid the foundation for a scalable and extensible solution capable of accommodating future growth and evolving business needs. Leveraging the power of relational data modeling and SQL constructs has enabled the creation of a flexible and efficient data infrastructure, while the use of C# language features and T-SQL/LINQ queries has facilitated the implementation of complex business logic with ease and precision. Additionally, the integration of RESTful Web APIs supported by ASP.NET Core has ensured seamless communication between different system components, enabling a cohesive and responsive user experience.

Looking ahead, there are several avenues for future work and improvement that could further enhance the capabilities and usability of the expense tracking system. These include the implementation of advanced reporting and analytics features to provide deeper insights into expense data, the exploration of machine learning algorithms for automated expense categorization and anomaly detection, and ongoing updates and enhancements to the user interface and overall user experience. By continually refining and evolving the system in response to user feedback and emerging technologies, the project can remain at the forefront of expense management innovation, driving efficiency, transparency, and accountability within the organization for years to come.

11. Screenshots

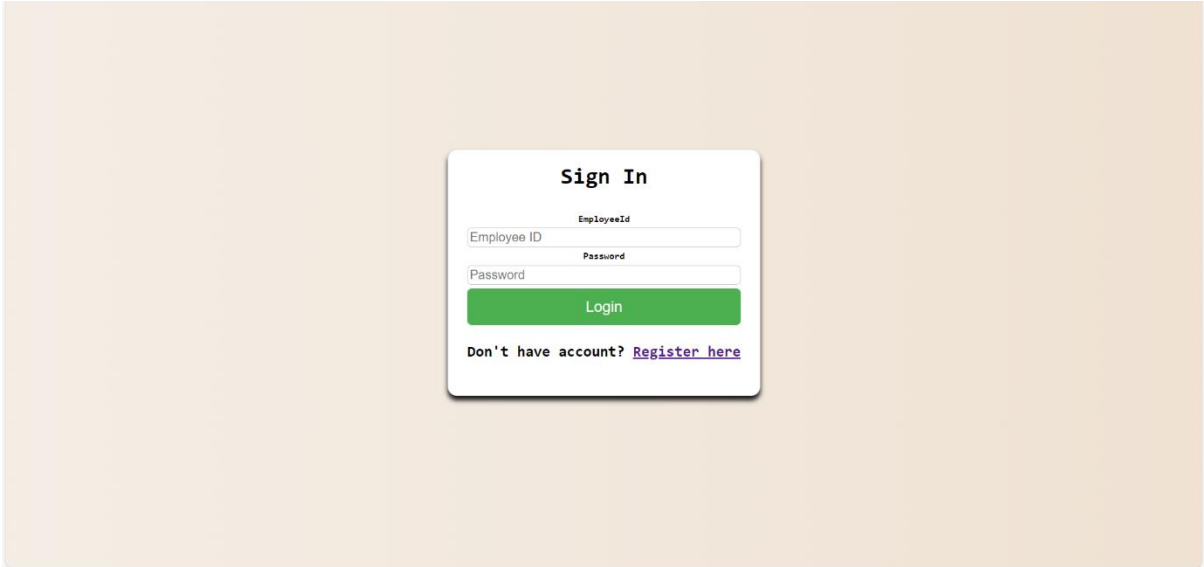


Figure 10.1 Sign In



Figure 10.2 Employees Home Page

USER UPDATE FORM

Date Of Request

03/04/2024 12:00 AM

Expense Type

ChooseType

Expense Description

Corporate work

Amount

5000

SUBMIT

Figure 10.3 Update Expense

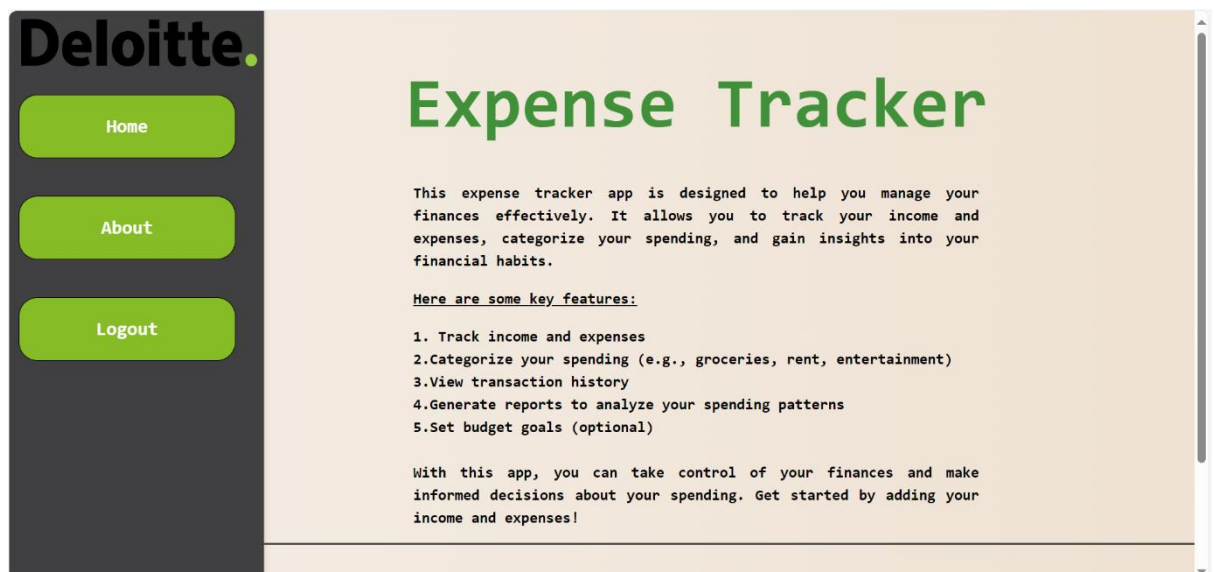


Figure 10.4 About Page

Deloitte.

Home

About

Logout

Add Expenses

EmployeeId
DateOfRequest

ExpenseType

ChooseType

ExpenseDescription

Amount
ManagerName

ManagerId

Submit

Figure 10.5 Add Expense

Deloitte.

Home

About

Logout

localhost:3000/ExpenseTable

Search by Expense Type or Date

ExpenseId	EmployeeId	dateOfRequest	ExpenseType	expenseDescription	Amount	Status
2	1	2024-03-04T00:00:00	travel	Corporate work	5000	Accepted
4	3	2024-03-29T13:58:00	Health/Medical	Health	2000	Pending
5	1	2024-05-03T12:17:00	Food	Company dinner	1500	Pending
6	3	2024-05-01T12:18:00	Travel	Company work	3000	Pending

Figure 10.6 Manager's Home Page

12. Bibliography/References

- [1] <https://reactjs.org/docs>.
- [2] <https://stackoverflow.com/>.
- [3] <https://learn.microsoft.com/en-us/sql/ssms/sql-server-management-studiossms?view=sql-server-ver16>.
- [4] https://learn.microsoft.com/en-us/aspnet/core/web-api/?view=aspnetcore-8.0&WT.mc_id=dotnet-35129-website.
- [5] <https://www.geeksforgeeks.org/>.
- [6] <https://www.wikipedia.org/>.
- [7] <https://www.w3schools.com/>.

Annexure A. Evaluation Form for Peer Review

Name of the student: (to be reviewed)		Roll no. of the student:	
<i>This form has to be submitted by the student whose roll no. will be mentioned in the box above. Handover this to the panel at the time of final presentation.</i>			
Title of the project:			
Name of the company:			
Project report (Tick the appropriate)	Excellent	Good	Average
Project poster (Tick the appropriate)	Excellent	Good	Average
Project video (Tick the appropriate)	Excellent	Good	Average
Rate the work done	0 – 10 points	(Provide rating here) →	
Give marks to the student on the basis of the overall performance	0 -5 marks	(Provide marks here) →	
Abstract of the project (max. 100 words):			
Mention three strengths of the work done:			
Provide some useful recommendations (It may be some improvements, some suggestions to further raise the quality of the project):			
Name of the evaluator student:		Roll no. of the evaluator student:	
Signature of the Evaluator student:			