A MINI PROJECT-I REPORT
ON

Collaborative Investment Platform

SUBMITTED TOWARDS THE
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(Third Year Computer Engineering)

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CERTIFICATE

This is to certify that the Mini Project-I Entitled

Collaborative Investment Platform

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Abstract

The **Collaborative Investment Platform** project aims to create an innovative social media platform tailored specifically for stock market enthusiasts. The platform integrates social networking features with advanced analytical tools to offer a centralized hub for discussing market trends, sharing insights, and performing detailed stock analyses. With the ever-growing number of individuals and institutions engaging with the stock market, this platform addresses the gap in current solutions by providing both community interaction and real-time data analysis.

The motivation for this project stems from the need for a specialized platform where traders and investors can seamlessly connect, share ideas, and utilize powerful tools to make informed decisions. Existing platforms either lack social interaction or fail to provide comprehensive stock analysis tools. Our solution bridges this gap, combining a dynamic user-friendly interface with real-time stock data integration, dynamic charting capabilities, and a secure user authentication system.

The outcome of this project is a fully functional, scalable, and intuitive platform where users can create profiles, post updates, follow others, and engage in meaningful discussions. With real-time market data, interactive charts supporting multiple timeframes, and seamless navigation, the platform empowers users to make better investment decisions. Additionally, the incorporation of tools like TradingView widgets and Redux-based state management ensures robust performance and enhanced user experience.

Innovative features include a responsive design built with Tailwind CSS, real-time updates for stock trends, and sector-based stock categorization for personalized insights. By combining social media functionalities with technical stock analysis tools, the platform not only supports experienced traders but also educates and assists new investors, fostering a collaborative and inclusive stock market community. This project contributes to the evolving landscape of financial technology by introducing a platform that encourages learning, networking, and data-driven decision-making.

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Chapter 1

Introduction

1.1 Project Idea

The project involves developing a social media platform dedicated to stock market enthusiasts. The platform provides users with the ability to:

- Post and view market-related updates and insights on a centralized home screen.

- Share thoughts, analyses, and opinions about market trends and individual stocks.

- Use a chart analysis tool to explore and study stock performance over various timeframes.

- Follow other users to build a network for exchanging ideas and strategies related to the stock market.

1.2 Motivation of the Project

The motivation for this project arises from the need for a specialized platform that combines community interaction with tools for analyzing stock market data.

- To provide a centralized space where users can discuss and share their stock market insights.

- To integrate analytical tools with social interaction, enabling users to analyze stock charts directly within the platform.

- To build a community for stock market enthusiasts to connect, learn, and share strategies for better decision-making.

- To support new investors by offering a platform where they can engage with experienced individuals and access useful market insights.

Chapter 2

Literature Survey

2.1 Related Work Done

Numerous studies and platforms have explored the integration of social networking and financial analytics, laying the groundwork for the development of a collaborative investment platform.

- A study by Lee et al. (2020) focused on the implementation of machine learning techniques to analyze stock trends on social media platforms. The paper highlighted the potential of combining social sentiment analysis with market performance to make informed trading decisions.[1]

- Gupta and Sharma (2019) presented a stock market application with basic interactive features, such as chart visualization and historical data analysis. However, the lack of a strong community engagement feature limited its appeal to active traders.[2]

- In a related effort, Johnson et al. (2021) developed a platform for financial education, targeting novice investors. The study emphasized the need for community-driven insights but lacked real-time stock data integration, reducing its effectiveness for active market participants.[3]

- A notable contribution by Tanaka et al. (2018) focused on leveraging interactive stock charting tools to support portfolio management. While the tool provided advanced analytics, the absence of a collaborative environment for discussions made it less attractive to social media enthusiasts.[4]

These referred papers collectively emphasize the need for a unified platform that merges real-time stock market data, interactive tools, and community

engagement, which is the core objective of the Collaborative Investment Platform.

2.2   Limitation of Existing Systems

Existing systems designed for stock market enthusiasts exhibit the following limitations:

1. **Lack of Community Engagement**: Most platforms either focus on financial analytics or social networking, failing to combine both effectively to foster collaborative discussions.

2. **Absence of Real-time Data Integration**: Many applications provide static or delayed data, which is insufficient for real-time decision-making.

3. **Limited Interactive Features**: Existing systems often lack dynamic charting tools and user-friendly interfaces, reducing their effectiveness for in-depth market analysis.

4. **No Tailored Content for Novices**: Beginners face a steep learning curve, as most platforms lack tailored guidance or community support for new investors.

5. **Security Concerns**: Insufficient attention to secure authentication and data privacy in many platforms raises trust issues among users.

Addressing these limitations, the Collaborative Investment Platform aims to deliver a comprehensive solution by integrating robust analytical tools, real-time market data, and a strong community engagement framework within a secure, user-friendly environment.

Chapter 3

Problem Definition and Scope

3.1 Need of the Project

The **Collaborative Investment Platform** project is designed to address the growing need for a specialized social platform that caters specifically to stock market enthusiasts. With an increasing number of individuals and institutions engaging with the stock market online, there is a significant need for:

1. A space for users to share stock market insights and discussions.

2. Access to live, real-time stock data and analytics.

3. A user-friendly platform that allows both novice and experienced traders to interact, share, and learn.

4. Integration of dynamic stock charts and market trends for informed decision-making.

This project aims to fill this gap by providing an integrated platform that brings together social media features and stock market analytics.[2]
—

3.2 Problem Statement and Objectives of the Project

The primary problem the **Collaborative Investment Platform** project addresses is the lack of a social platform tailored specifically to stock market enthusiasts. Current platforms do not provide real-time stock data, comprehensive stock analysis tools, or a community environment for stock discussions.

3.2.1 Objectives of the Project

The objectives of the project are as follows:

1. To develop a web platform where users can post, view, and share stock market-related thoughts, insights, and predictions.

2. To integrate live stock market data for real-time analysis and decision-making.

3. To provide interactive charts for stock trend analysis.

4. To create a user-friendly interface that enables easy navigation and quick access to market data.

5. To implement a secure authentication system for user management and privacy.

6. To incorporate a social aspect by allowing users to follow others and interact via comments or likes.

—

3.3 Scope of the Project

The scope of the **Collaborative Investment Platform** project includes the following features:

1. **What the product will do:**

   (a) Allow users to create profiles, post updates, and follow other users.
   (b) Display live stock data from multiple stock exchanges.
   (c) Provide interactive charts for stock analysis with multiple timeframes.

(d) Support a real-time feed for stock market-related discussions and interactions.

(e) Enable secure login and user authentication via JWT tokens.

2. **What the product will not do:**

(a) The platform will not provide real-time trading functionality (buying or selling stocks).

(b) It will not offer professional financial advisory or automated trading services.

(c) The platform will not focus on cryptocurrency analysis, although it could be a future enhancement.

—

3.4 Expected Outcomes

The expected outcomes of the **Collaborative Investment Platform** project include:

1. A fully functional platform where users can post stock-related content and interact with other stock market enthusiasts.

2. Real-time integration of live market data from major stock exchanges.

3. A seamless user experience with an intuitive interface for posting and interacting.

4. A comprehensive analytics module with dynamic stock charts and multi-timeframe analysis.

5. A secure user authentication system that ensures data privacy and security.

These outcomes will provide a valuable tool for stock market enthusiasts, allowing them to stay informed, share insights, and engage with a like-minded community. [2][3] —

3.5 Applications

The **Collaborative Investment Platform** platform has a variety of potential applications:

1. **Social Networking for Stock Enthusiasts**: It serves as a hub for users to interact, share knowledge, and discuss stock market trends.

2. **Educational Tool for Traders**: New and experienced traders can use the platform to learn from others' insights, discuss strategies, and analyze stock market data.

3. **Stock Market Analysis**: The platform can be used as a tool for performing in-depth stock analysis through real-time data and dynamic charts.

4. **Community Building**: Traders and investors can form communities, follow others, and track market discussions, helping to grow their network and stay informed.

These applications ensure that **Collaborative Investment Platform** meets the needs of its target audience and supports both individual traders and communities within the stock market ecosystem.[2] [3]

Chapter 4

System Requirement Specification

4.1 Hardware and Database Requirement

Hardware Requirement:

Sr. No.	Parameter	Specification	Justification
1	CPU Speed	2 GHz	To ensure smooth processing of the platform's backend logic and real-time data integration.
2	RAM	4 GB	To handle multiple concurrent users and facilitate efficient rendering of dynamic stock charts and data updates.

Table 4.1: Hardware Requirement

Database Information:

1. **Database Software Used:** The platform utilizes **MongoDB**, a NoSQL database, for storing user profiles, posts, and real-time stock market data. MongoDB is chosen for its flexibility in handling hierarchical data and scalability, which suits the requirements of a dynamic social platform.

2. **Database Schema with Attributes and Data Types:** The database schema includes the following key collections:

- **Users**
  - `userID (String)`: Unique identifier for each user.
  - `name (String)`: User's full name.
  - `email (String)`: User's email for authentication.
  - `password (String)`: Encrypted password for secure login.
- **Posts**
  - `postID (String)`: Unique identifier for each post.
  - `userID (String)`: Identifier for the user who created the post.
  - `content (String)`: The textual content of the post.
  - `timestamp (Date)`: The date and time of post creation.
  - `likes (Number)`: Count of likes received.
- **Wishlist**
  - `_id (ObjectId)`: Unique identifier for each wishlist entry.
  - `userId (ObjectId)`: Identifier linking the wishlist to a user.
  - `stocks (Array)`: Array containing stocks associated with the wishlist.
  - `createdAt (Date)`: Timestamp indicating when the wishlist was created.
  - `updatedAt (Date)`: Timestamp indicating the last update to the wishlist.
- **Profile**
  - `_id (ObjectId)`: Unique identifier for each profile entry.
  - `userId (ObjectId)`: Identifier linking the profile to a user.
  - `bio (String)`: User's biography or personal description.
  - `profilePicture (String)`: Path or URL to the user's profile picture.
  - `bannerImage (String)`: Path or URL to the user's banner image.
- **Normalization Technique Used:** The database schema adheres to **2nd Normal Form (2NF)** to eliminate redundancy and ensure data consistency:
  - Attributes are grouped into separate collections to remove partial dependencies.
  - Relationships between collections (e.g., `Users` and `Posts`) are managed using unique identifiers (`userID` and `postID`).

This design ensures efficient data retrieval and minimizes duplication, which is critical for maintaining performance and scalability in a high-traffic application.

Chapter 5

Project Plan

5.1 Project Schedule

5.1.1 Time Line Chart

A project timeline chart is presented below, which outlines the key phases and milestones of the Collaborative Investment Platform project. The timeline is divided into the following stages:

- **Phase 1: Project Initiation (Week 1-2)**
  - Defining project objectives and scope.
  - Research and selection of technology stack (MERN, MongoDB, etc.).
  - Setting up initial project repository and version control.

- **Phase 2: Requirement Analysis and System Design (Week 3-4)**
  - Finalizing system requirements and creating a detailed specification document.
  - Database design, including schema, normalization, and data relationships.
  - UI/UX design for the platform.

- **Phase 3: Development (Week 5-8)**
  - Setting up the backend architecture (Node.js, Express).
  - Implementing the frontend components (React.js, Redux).

- Integrating live stock data and charting features (TradingView API).
    - Developing user authentication and account management (JWT, bcrypt).
- **Phase 4: Testing and Quality Assurance (Week 9-10)**
    - Performing unit testing and integration testing for frontend and backend modules.
    - User acceptance testing to ensure the platform meets requirements.
    - Bug fixes and performance optimizations.
- **Phase 5: Deployment and Final Presentation (Week 11-12)**
    - Deploying the application to a live server (e.g., Heroku, AWS).
    - Final project presentation and demonstration to stakeholders.
    - Documenting the project and preparing the final report.

The project timeline provides a clear overview of the expected milestones and helps in tracking the progress of the project from initiation to deployment.

Chapter 6

System Design

6.1 System Architecture
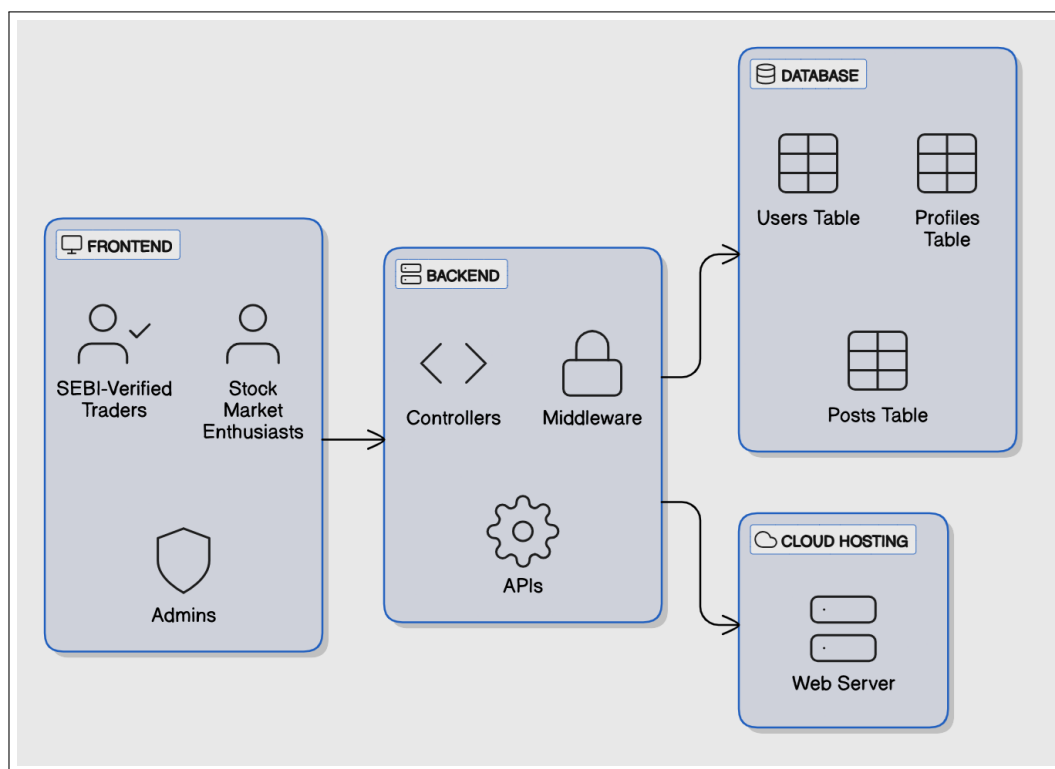
Figure 6.1: System Architecture

The system architecture depicted in Figure 6.1 represents the interaction between the frontend, backend, and database components. The system is designed as follows:

(a) **Frontend**: The frontend serves as the user interface, allowing users to interact with the system. It includes functionalities such as login, posting thoughts, checking stock charts, and viewing dashboards. It is built using modern web technologies to ensure a seamless and responsive user experience.

(b) **Backend**: The backend acts as the intermediary between the frontend and the database. It handles user authentication, processes requests, manages business logic, and communicates with the database to fetch or store data. The backend is implemented using robust frameworks and APIs to ensure secure and efficient data handling.

(c) **Database**: The database stores all persistent data, including user credentials, posts, stock data, and other relevant information. It is designed to ensure data integrity and supports quick retrieval for real-time stock analysis and user interaction.

This architecture ensures a modular, scalable, and secure platform, facilitating efficient interactions between the user, the application logic, and the stored data.

Chapter 7

Project Implementation

7.1 Overview of Implementation

The **StockWeb** project has been implemented as a modern full-stack web application, leveraging the MERN stack to ensure scalability, modularity, and an intuitive user experience. Below are the key architectural components:

7.1.1 Frontend Architecture

- **React-based Component Structure**
  - Modular components for **reusability** and **maintainability**.
  - Well-defined **parent-child component hierarchy** for structured development.
  - **State management** using Redux Toolkit for efficient global state handling.
- **Real-time Stock Data Integration**
  - **TradingView widget** for live stock market data visualization.
  - Categorization of stocks by sectors, including:
    * Banking
    * IT
    * Energy
    * Others
  - Dynamic stock chart rendering with support for:

   * Multiple timeframes (e.g., daily, weekly, monthly).

- **User Interface Features**
  - **Responsive design** using Tailwind CSS for seamless experiences across devices.
  - **Interactive components** with real-time updates.
  - **Intuitive navigation system** to enhance user accessibility.

7.1.2 Backend Architecture

- **Node.js and Express Server**
  - RESTful API endpoints for efficient frontend-backend communication.
  - Middleware for:
    * **Authentication** using JWT.
    * **Request validation** to ensure input correctness.
    * **Error handling** to manage runtime issues gracefully.

- **Database Design**
  - MongoDB schemas for:
    * **Users**: For user authentication and profiles.
    * **Profiles**: To manage user-specific settings.
    * **Posts**: To store posts and user interactions.
  - Relationships between collections to ensure data consistency and integrity.
  - Optimized querying and indexing for high performance.

- **Authentication System**
  - **JWT-based authentication** for secure and scalable session management.
  - Secure cookie handling for persistent login sessions.
  - Password encryption using **bcrypt** for robust user security.

7.2 Tools and Technologies Used

The following tools and technologies were utilized to build the platform:

7.2.1 Frontend Technologies

- **Core Technologies**
  - React.js
  - Redux Toolkit
  - TradingView Widget API
  - Tailwind CSS
- **Additional Libraries**
  - Axios for HTTP requests
  - React Router for navigation
  - React Icons for UI elements
  - React Avatar for user profiles

7.2.2 Backend Technologies

- **Server Technologies**
  - Node.js
  - Express.js
  - MongoDB
  - Mongoose ODM
- **Security and Authentication**
  - JWT (JSON Web Tokens)
  - Bcrypt.js for password hashing
  - Cookie-parser for session management

7.2.3 Development Tools

- Nodemon for development
- Dotenv for environment variables
- CORS for cross-origin resource sharing

This implementation provides a robust foundation for a scalable, secure, and user-friendly stock market platform with social features.

7.3 Flowchart of the System
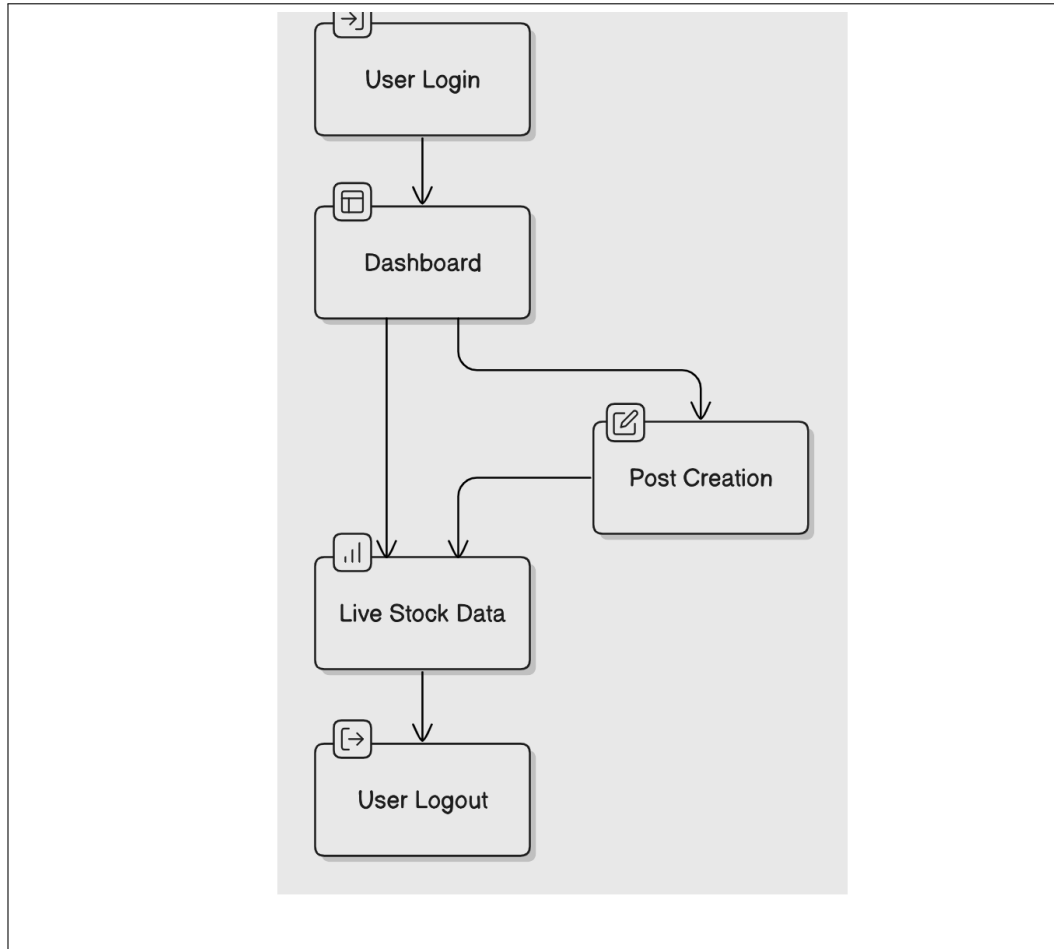
Figure 7.1: Flowchart of the System

The flowchart depicted in Figure 7.1 illustrates the primary function-
alities and user interactions within the stock market social media plat-
form.[3] The system follows these steps:

(a) **Login**: Users access the system by logging in with their creden-
tials. This ensures secure and personalized access.

(b) **Dashboard**: After successful login, the user is directed to the
dashboard, which serves as the central hub for navigation and
features.

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(c) **Post**: Users can share their thoughts, analyses, or market predictions by creating posts visible to their network.

(d) **Check Stocks**: The system allows users to analyze stock charts and performance by selecting specific stocks, providing real-time insights.

(e) **Logout**: Users can securely log out of the platform after their session.

Chapter 8

Results

8.1 Screen Shots
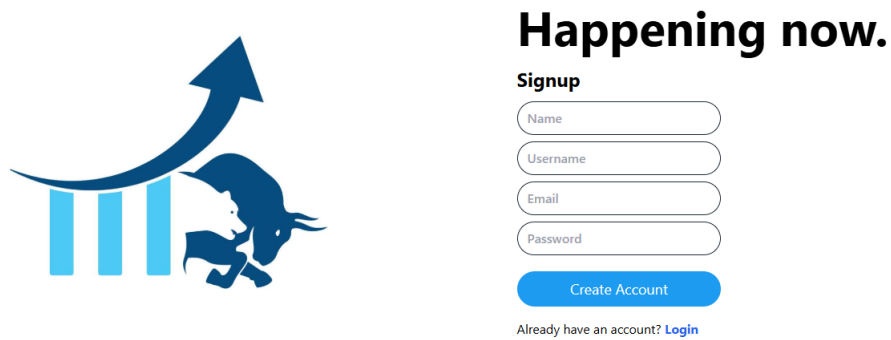
Figure 8.1: Signup
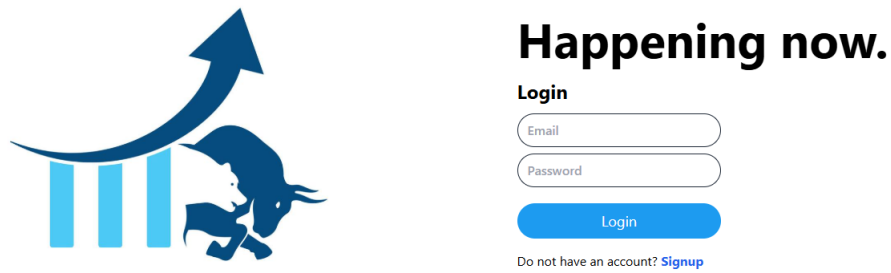
Figure 8.2: Login
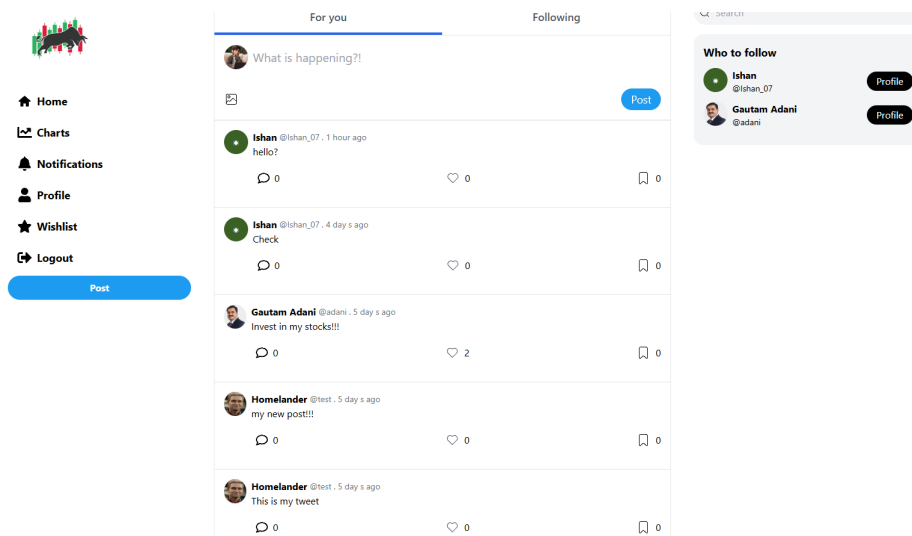
Figure 8.3: Home
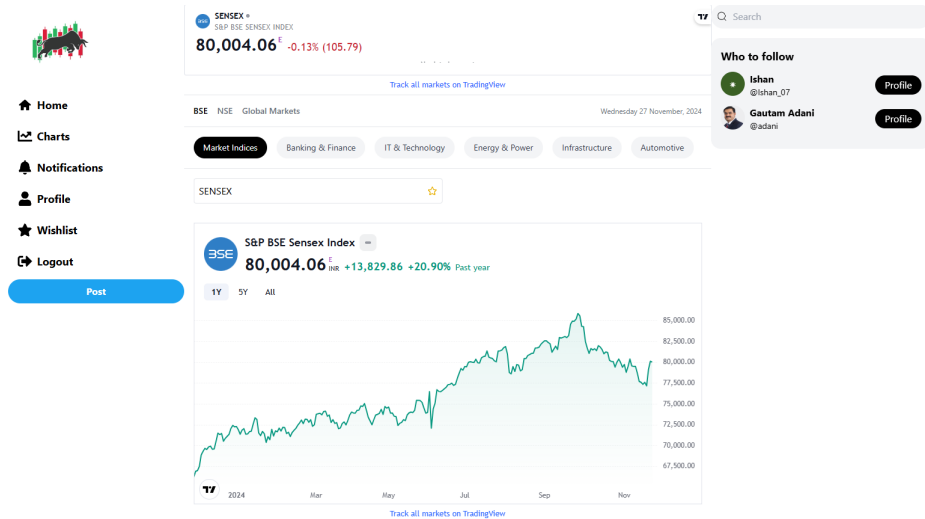
Figure 8.4: Charts
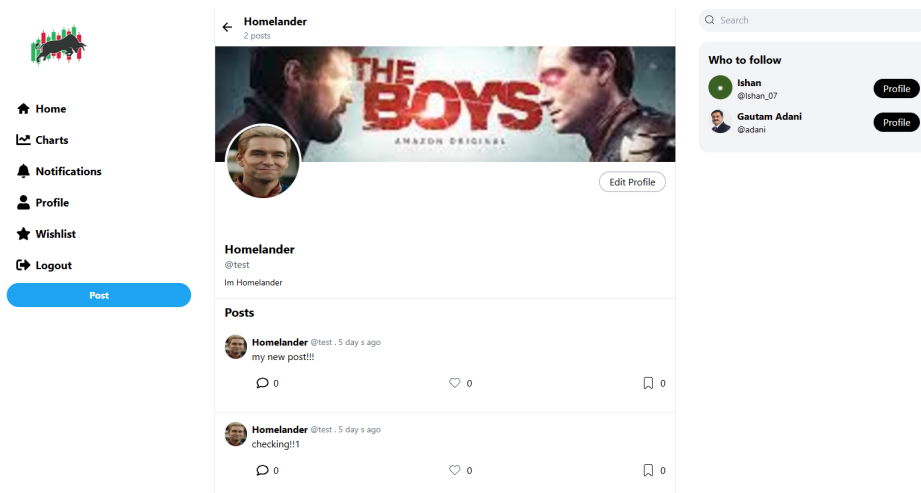
Figure 8.5: Profile
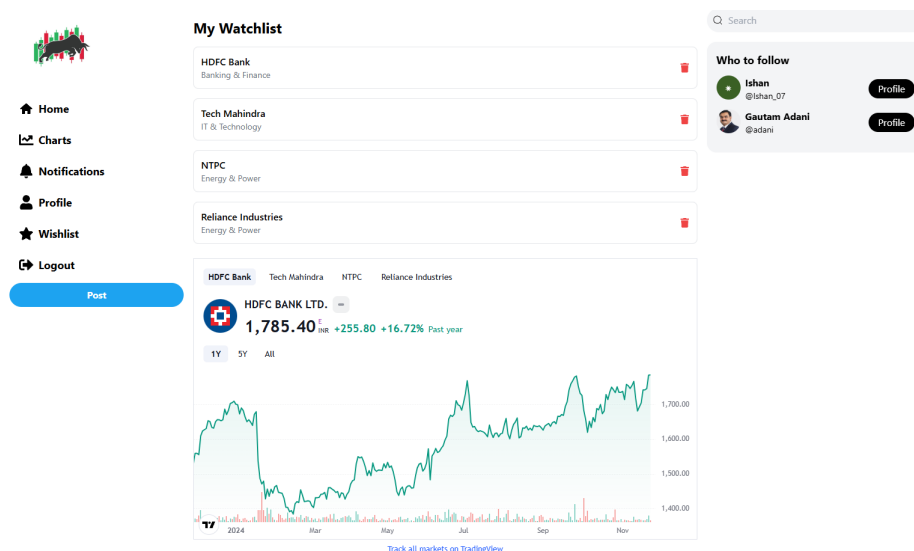
Figure 8.6: Wishlist

8.2 Outputs
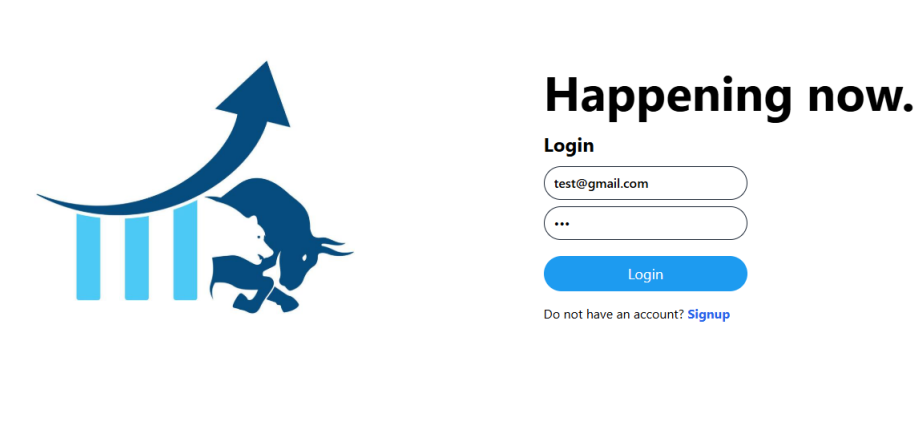
Figure 8.7: Output of Signup
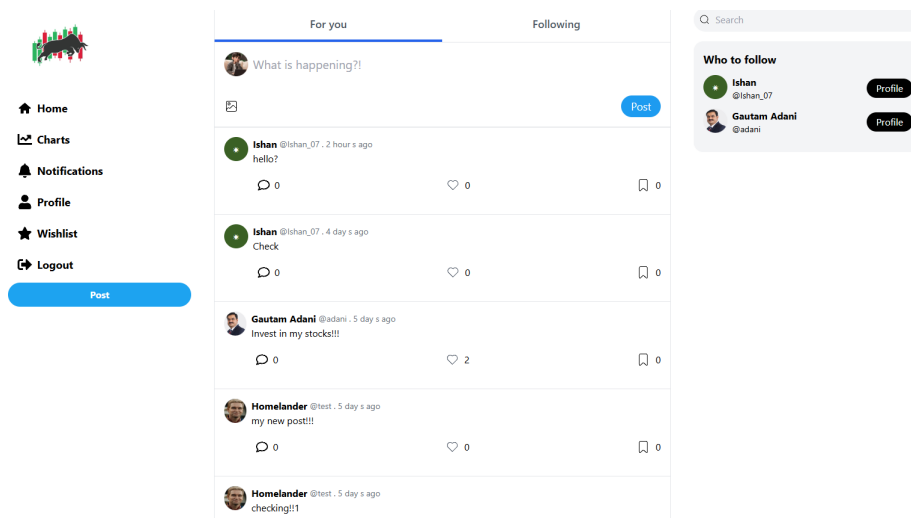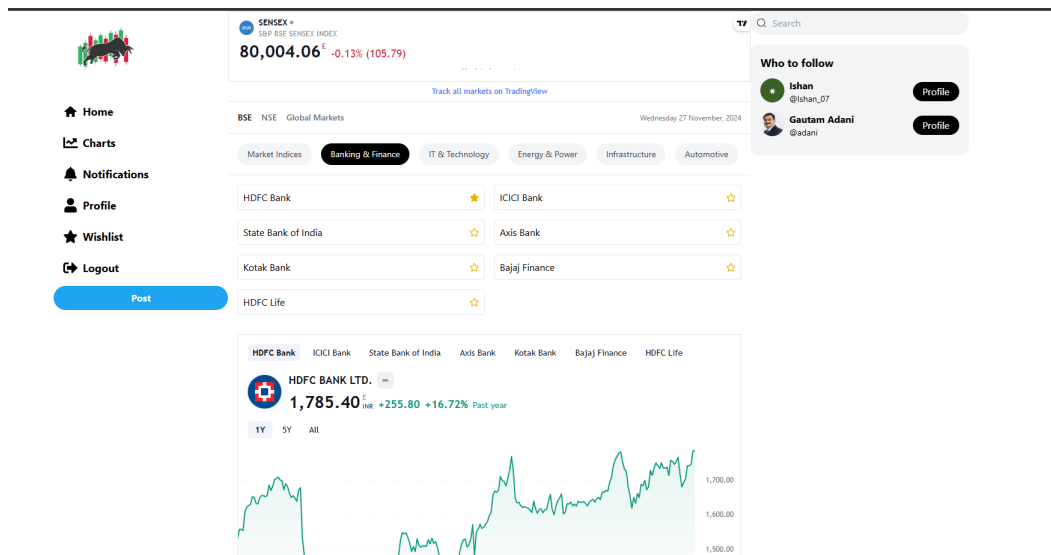

Figure 8.8: Output of Login
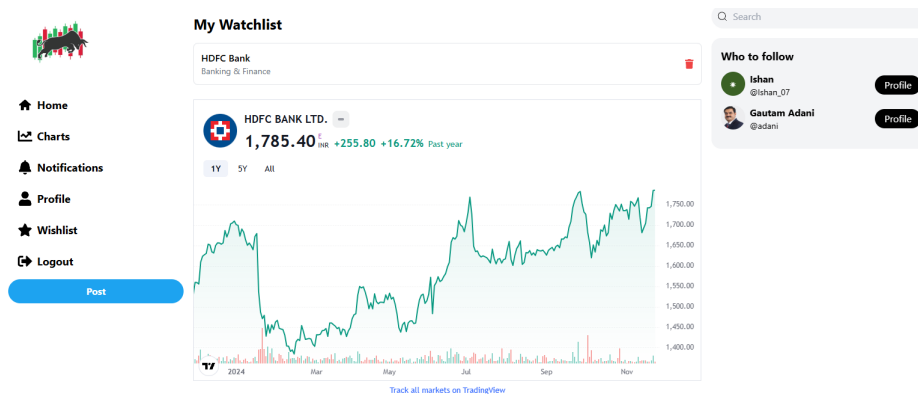
Figure 8.9: Charts Add to Wishlist

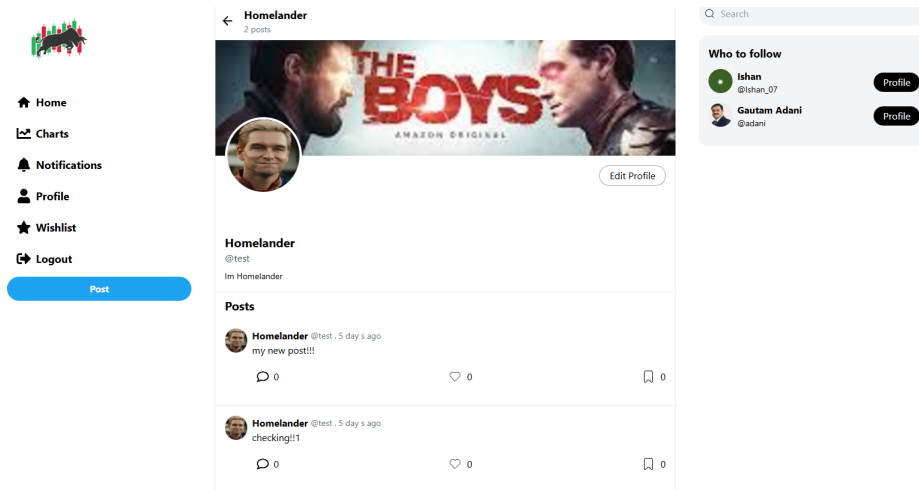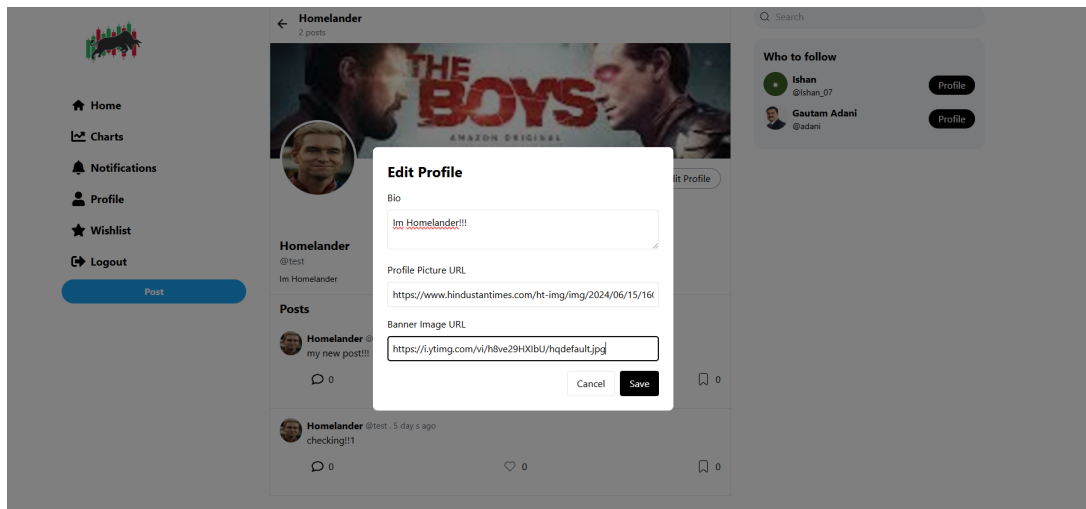Figure 8.10: Added to Wishlist

Figure 8.11: Before Edit Profile
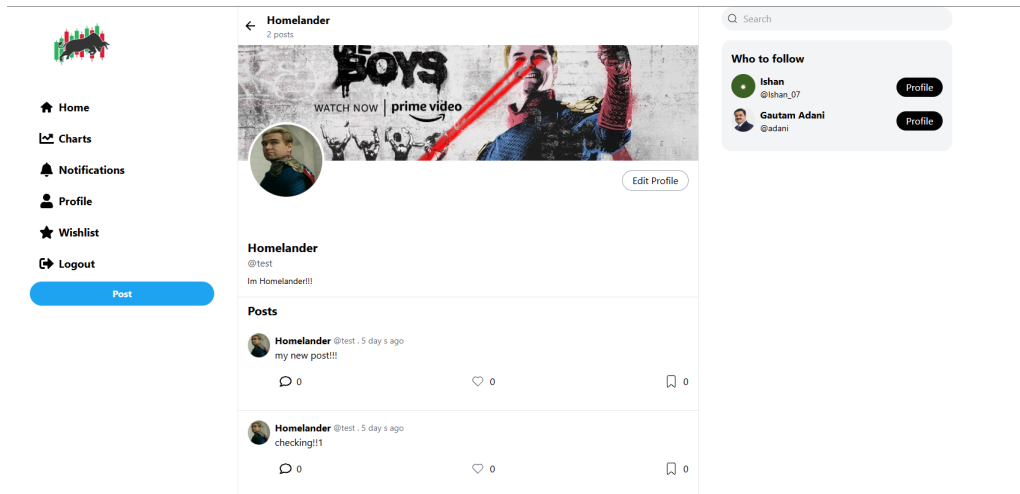

Figure 8.12: Profile Edit Form
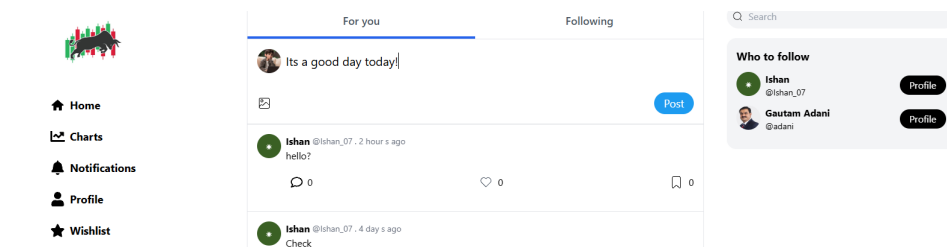
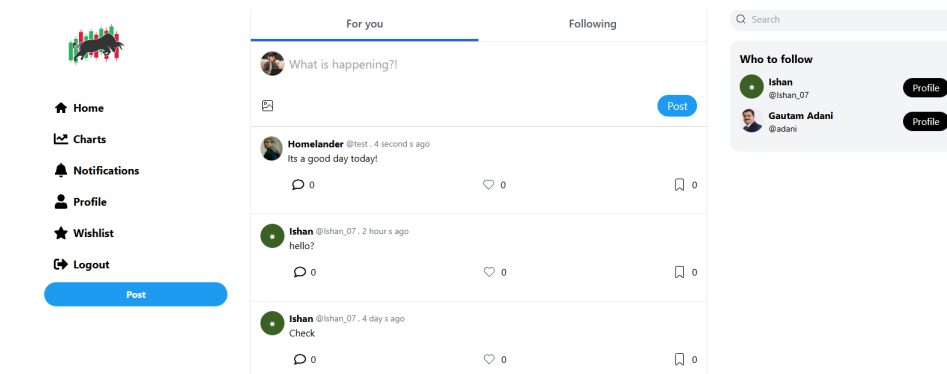Figure 8.13: After Edit Profile

Figure 8.14: Before Post

Figure 8.15: After Post

Chapter 9

Conclusion and Future Scope

9.1   Summary

The Collaborative Investment Platform aims to create a specialized social media environment specifically tailored to stock market enthusiasts. By integrating real-time stock market data, dynamic charting tools, and social interaction features, this platform empowers novice and experienced traders to share insights, discuss trends, and analyze market performance effectively. Users can post market-related content, share thoughts and opinions, and interact with others through comments and likes. The platform also features live data integration from major stock exchanges, an interactive chart tool for stock analysis, and secure user authentication for data privacy.

The project was developed using the MERN stack (MongoDB, Express, React, Node.js), ensuring scalability, flexibility, and a smooth user experience. The backend leverages MongoDB for dynamic data storage, while the frontend utilizes React for efficient rendering and interactive components. Real-time stock data is integrated through the TradingView API, improving the platform's capabilities to provide live market insights.

9.2   Conclusion

The Collaborative Investment Platform successfully addresses the need for a unified space where stock market enthusiasts can interact, analyze, and share market insights. By combining the social aspects of a

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traditional social media platform with advanced analytical tools, this platform provides a unique solution for investors looking for community engagement and data-driven decision making.

The project highlights the importance of integrating real-time market data and interactive features in creating an engaging user experience. Through rigorous testing and implementation, the platform meets its goals of providing a secure, user-friendly interface and an intuitive social network for stock market discussions. As a result, this project offers a valuable tool to investors of all levels, fostering collaboration and knowledge sharing within the stock market community.

9.3 Future Scope

While the current version of the Collaborative Investment Platform serves as a solid foundation, several enhancements and features can be introduced in the future to expand its functionality:

- **Real-Time Trading Integration:** In the future, the platform could incorporate real-time trading functionality, allowing users to execute buy and sell trades directly within the platform.

- **Professional Financial Advisory Services:** A feature offering personalized financial advice from experts, helping users make more informed investment decisions.

- **Cryptocurrency Analysis:** Given the growing interest in cryptocurrencies, the platform could extend its data analysis capabilities to include digital currencies, providing insights and analysis similar to that of traditional stocks.

- **Mobile Application Development:** A mobile version of the platform could be developed to enhance accessibility and engagement, allowing users to stay updated and interact on the go.

- **AI-Powered Market Insights:** Leveraging machine learning algorithms, the platform could provide personalized recommendations, stock predictions, and automated trend analysis based on user behavior and market data.

These future enhancements will not only improve user engagement but also ensure the platform remains competitive and continues to provide value to its users as the stock market landscape evolves.

Annexure A

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