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Department of Computer Engineering
B. Tech. Computer Science & Engineering
CSD334 MINI PROJECT
WatchWise
Software Design Document

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Contents

1	Introduction	3
2	System Overview	3
3	Functional Description	3
4	System Design	3
4.1	Mood-Based Movie Database	3
5	Component-Level Design	3
5.1	User Interface Component	3
5.2	Authentication Component	3
5.3	Database Component	3
5.4	Recommendation Engine Component	4
6	Interface Design	4
6.1	Login Screen	4
6.2	User Home Screen	4
6.3	Mood Detection Screen	4
6.4	User Feedback Profile Screen	4
7	Implementation Details	4
8	Testing and Quality Assurance	4
9	Deployment and Maintenance	4
10	UML Diagrams	5
10.1	Use Case Diagram	5
10.2	Architecture Diagram	6
10.3	ER Diagram	7
10.4	Activity Diagram	8
10.5	Data Flow Diagram Level 0	9
10.6	Data Flow Diagram Level 1	9
10.7	Data Flow Diagram Level 2	10
11	Conclusion	11

1 Introduction

WatchWise is a mood-based movie recommendation system designed to enhance the movie-watching experience by tailoring suggestions according to the user's emotional state. The platform utilizes Natural Language Processing (NLP) and Machine Learning (ML) techniques to analyze user input, detect mood, and generate personalized recommendations. WatchWise aims to provide a more engaging, relevant, and enjoyable selection of movies by taking emotions into account.

2 System Overview

The WatchWise system consists of a web-based platform accessible through both desktop and mobile devices. Users can input text describing their mood, which is analyzed using Natural Language Processing (NLP) techniques to determine an emotional state. The system then provides personalized movie recommendations using content-based filtering, collaborative filtering, and hybrid techniques.

3 Functional Description

WatchWise is structured into four core modules that ensure seamless functionality:

- **User Module:** Enables users to interact with the system, receive recommendations, search for movies, and provide feedback.
- **Mood Analysis Module:** Uses NLP models to analyze user text input and detect emotional states.
- **Recommendation Engine:** Employs content-based filtering, collaborative filtering, and hybrid techniques to provide personalized movie suggestions.
- **Feedback Learning Module:** Collects user ratings and feedback to dynamically enhance recommendation accuracy over time.

4 System Design

The system is designed to provide an interactive and intuitive experience for users while maintaining efficient backend processing.

4.1 Mood-Based Movie Database

WatchWise maintains a vast collection of movies categorized by genre, language, and IMDb ratings. The database dynamically updates based on real-time data retrieved from external sources such as the OMDb API. User interaction history, feedback, and ratings are stored securely to refine recommendation precision.

5 Component-Level Design

5.1 User Interface Component

Designed with a visually appealing and intuitive layout to maximize user engagement. Includes mood selection buttons, interactive search, and a movie recommendation display.

5.2 Authentication Component

Implements secure user login and registration using encryption protocols like Bcrypt

5.3 Database Component

Stores detailed information about movies, users, past interactions, and feedback. Uses MongoDB for efficient storage and quick retrieval of data.

5.4 Recommendation Engine Component

Employs advanced machine learning models for personalized recommendations. Continuously learns and adapts to user behavior based on feedback and interaction.

6 Interface Design

6.1 Login Screen

This module ensures secure user authentication through an email and password login mechanism, utilizing bcrypt for password hashing. Users can log in using their registered email and password.

6.2 User Home Screen

The system provides a dynamic interface that showcases the latest trending movies based on popularity, ratings, or recent releases.

6.3 Mood Detection Screen

Accepts user text input and processes it for sentiment analysis. Provides real-time mood classification and movie recommendations.

6.4 User Feedback Profile Screen

Displays a history of user interactions and recommendations. Allows users to provide ratings and feedback for refining future suggestions.

7 Implementation Details

The system will be developed using the following tools and technologies:

1. IDE: Visual Studio Code
2. Programming Languages: Python (Backend), JavaScript (Frontend)
3. Frameworks: Flask, React.js
4. Database: MongoDB
5. Version Control: Git and GitHub
6. Testing and Debugging: Chrome Developer Tools

8 Testing and Quality Assurance

The system will be tested using multiple approaches:

1. Unit Testing: To test individual components of the system.
2. Integration Testing: To verify data flow between modules.
3. Functional Testing: To ensure each feature works as expected.
4. Performance Testing: To ensure the system provides recommendations in under 2 seconds.
5. User Acceptance Testing: Conducted with a group of users to refine usability.

9 Deployment and Maintenance

The system will be deployed on cloud-based platforms such as Render or Heroku for scalability and accessibility. Regular updates will be released to:

- Enhance the recommendation model based on user feedback.
- Ensure compatibility with new technologies.

10 UML Diagrams

10.1 Use Case Diagram

Illustrates the interaction between users and system modules

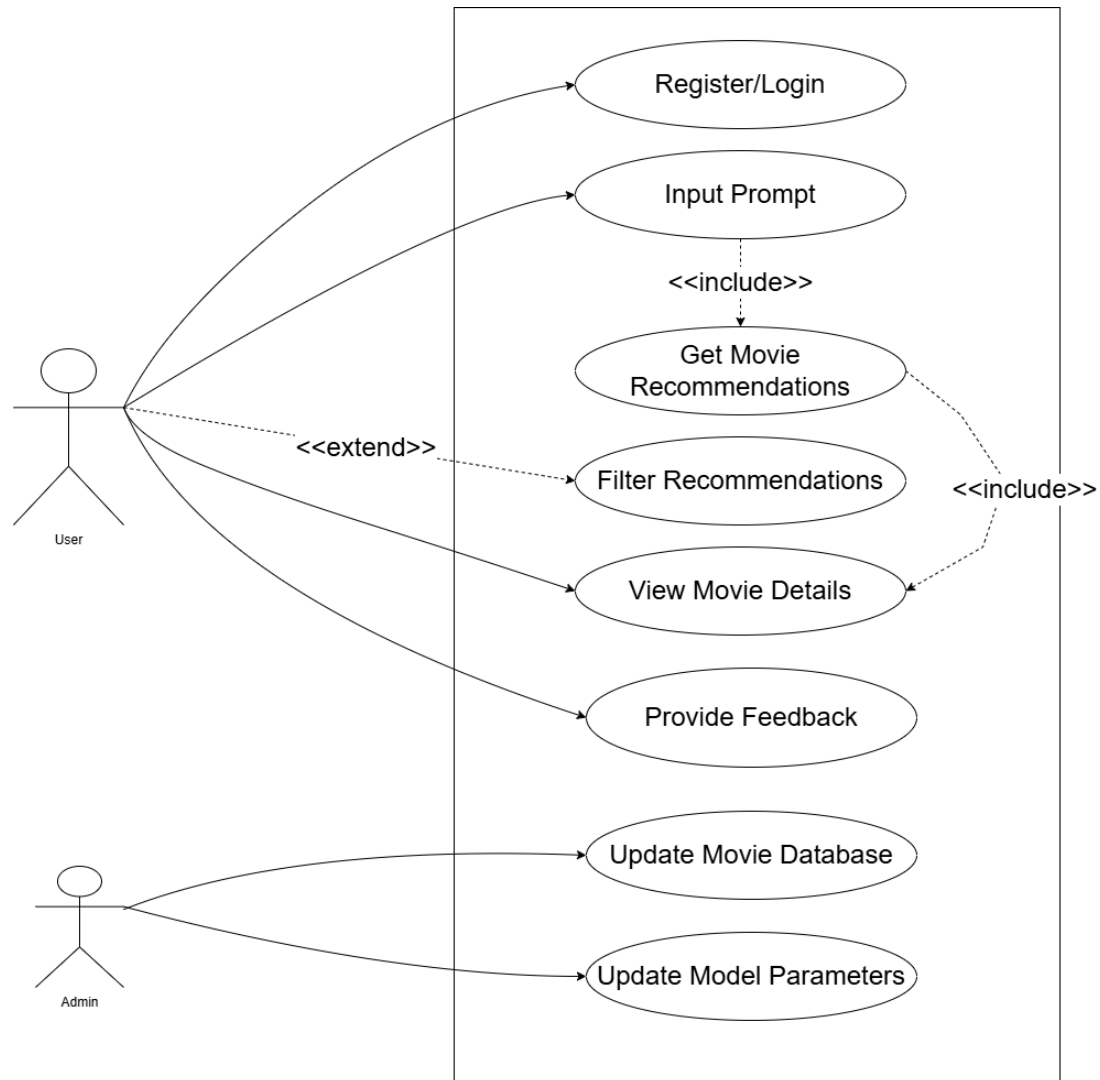


Figure 10.1.1: Use Case Diagram

10.2 Architecture Diagram

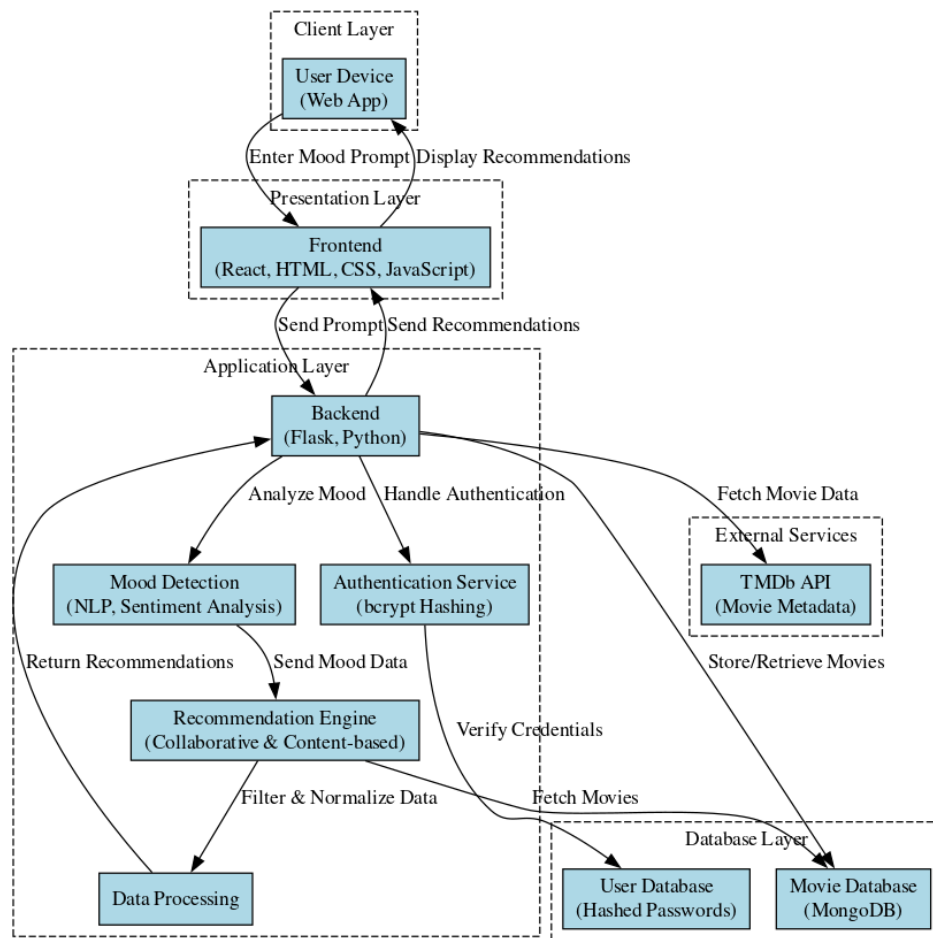
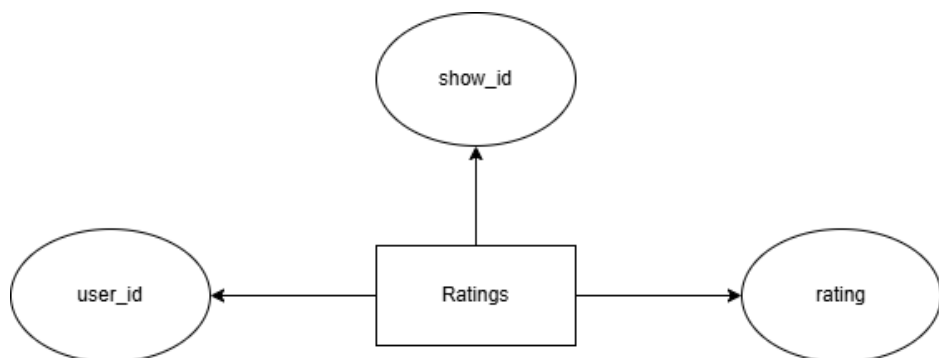
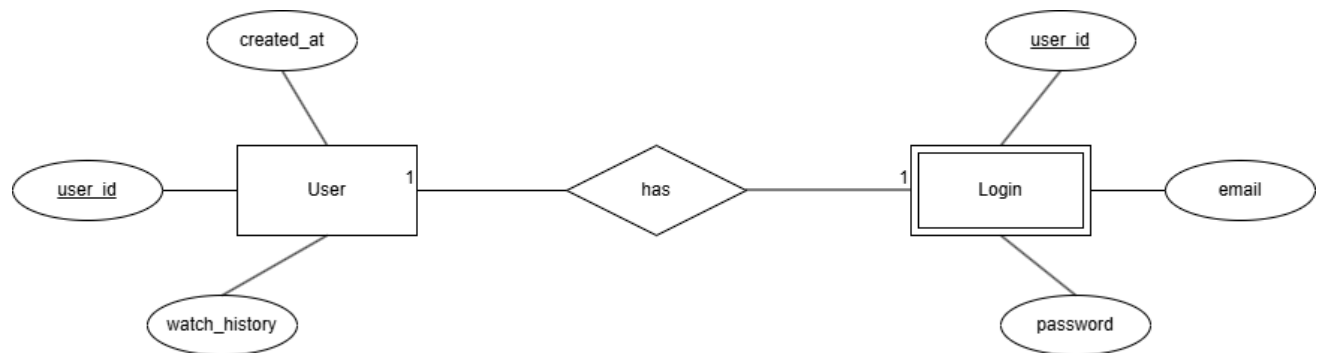
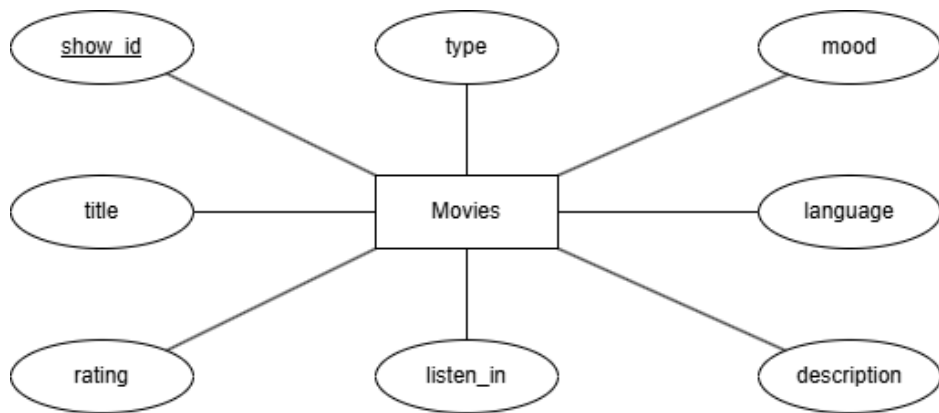


Figure 10.2.1: Architecture Diagram

10.3 ER Diagram

Defines the database schema and relationships among users, movies, and feedback.



10.4 Activity Diagram

Depicts the sequence of interactions from user login to receiving movie recommendations.

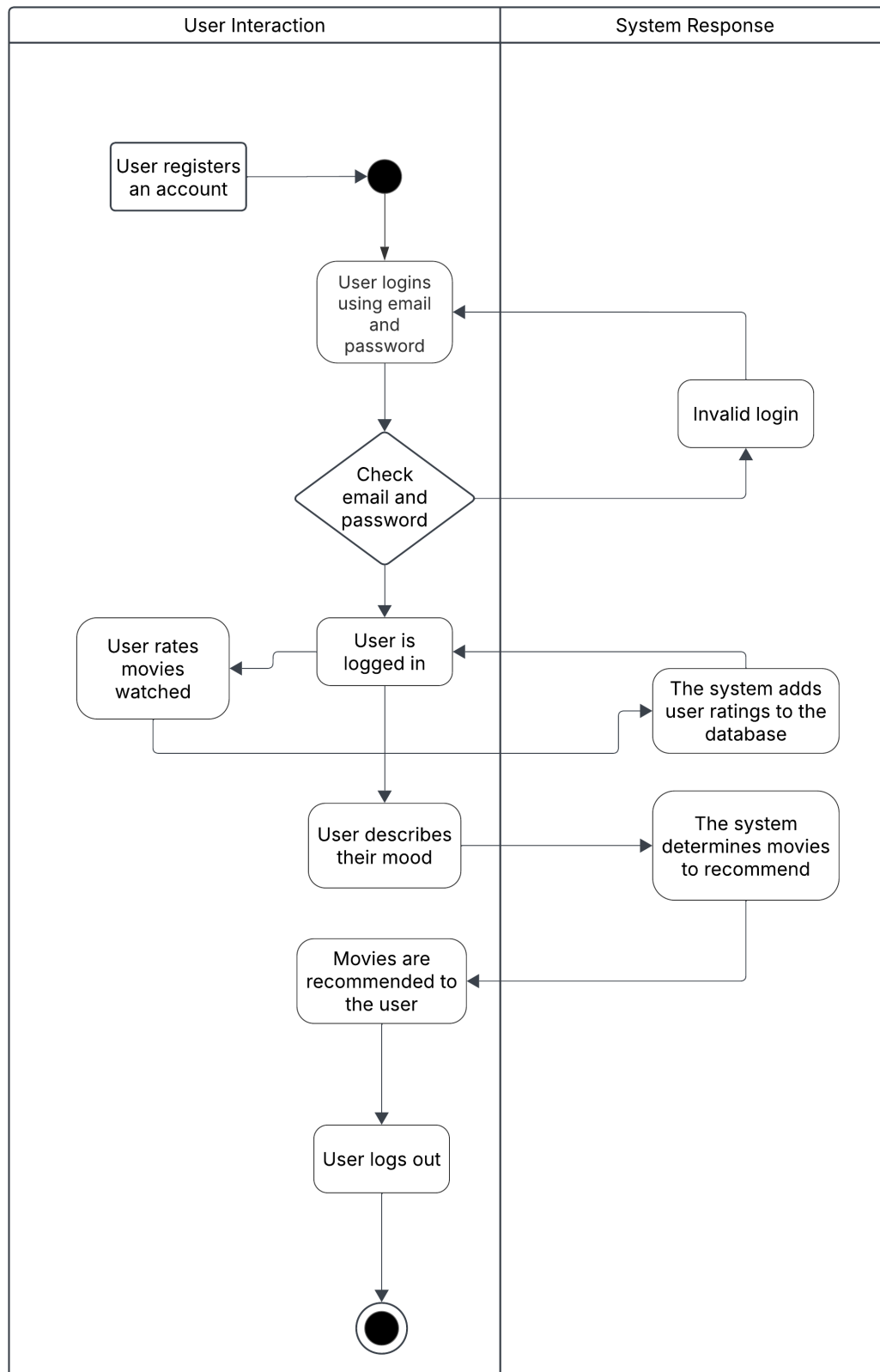


Figure 10.4.1: Activity Diagram

10.5 Data Flow Diagram Level 0

Represents the high-level data flow between major system components.

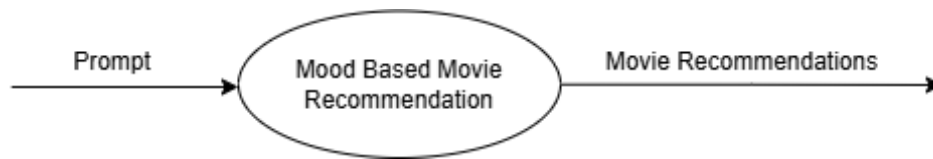


Figure 10.5.1: DFD Level 0 Diagram

10.6 Data Flow Diagram Level 1

Provides a detailed view of how data is processed at different stages.



Figure 10.6.1: DFD Level 1.1 Diagram



Figure 10.6.2: DFD Level 1.2 Diagram



Figure 10.6.3: DFD Level 1.3 Diagram

10.7 Data Flow Diagram Level 2

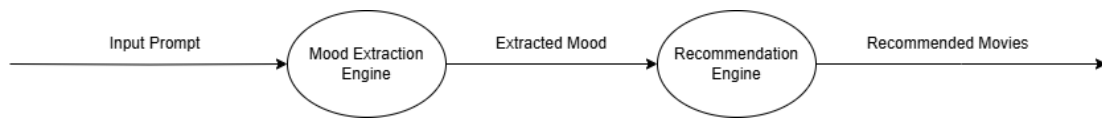


Figure 10.7.1: DFD Level 2.1 Diagram



Figure 10.7.2: DFD Level 2.2 Diagram

11 Conclusion

The Mood-Based Movie Recommendation System (WatchWise) revolutionizes the movie selection experience by tailoring recommendations based on emotional states. By leveraging sentiment analysis, machine learning, and user feedback, WatchWise ensures highly personalized suggestions. Designed with security, scalability, and cross-platform accessibility in mind, the system provides a seamless, engaging, and immersive movie discovery experience for users worldwide.

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