

Final Year Project

Movie Social Community

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Abstract

Due to the pandemic, people have fewer opportunities to watch movies in the cinema and lose interest in movies. So we hope to establish a movie-based friend-making website to build a huge and comprehensive community for movie communication, where users can express their opinions and meet like-minded friends, creating social opportunities for movie enthusiasts to transcend spatial limitations. This website will include a movie information module and a friends module. On this website, people can browse information such as the introduction and released stills of the currently released movie, as well as rate and post their own comments on the movie. The website will also recommend similar movies and users that may have similar topics based on their favorite movie tags. If users have anything they don't want to say in the public comment area, they can also discuss it in one-on-one chats with friends. We hope this website can become a "haven" for movie enthusiasts.

Project area: Machine Learning, Information Retrieval, Website design, Database design.

Keywords: movie, social, evaluation, online web

Chapter 1: Project Specification

The goal of this project is to create a movie community that facilitates users to learn about movies they may be interested in, rate and comment on movies they have watched, make friends with similar interests in the community, and have real-time communication with friends.

Next, we will showcase the core and advanced features of this project.

Core features:

1. Support movies partition display.
2. Visitor can register as a user.
3. User can log in.
4. User can like movies.
5. User can comment movies.
6. User can score movies.
7. User can edit personal information.
8. User can access other user homepages.
9. User can view the percentage of tags in their favorite movies.
10. User can view recent favorite movies.
11. User can view recent likes movies.
12. User can view his highly praised comments.
13. User can view his friend list.
14. Administrator can disable users.
15. Administrator can delete movies.
16. Administrator can delete comments.

Advanced features:

1. User can communicate online.
2. Support to recommend users with similar interests (potential friends) with collaborative filtering machine learning algorithm.
3. Support recommending movies to users based on their interests with collaborative filtering machine learning algorithm.
4. User can search for interesting movie information with IR search engine.
5. User can search for other users with IR search engine.

-
6. Support users to add friends.
 7. Administrator can submit information of a movie and add.

Chapter 2: Introduction

This project aims to establish a movie-based friend-making website. The website provide a movie information module and a friends module for users, allowing users to search and browse movie information, rate and post comments on movies, and connect with other users who share similar interests. For administrators, this website also provides an manager module to facilitate their management.

Our website offers a variety of user functionalities. Users can easily navigate and search for movies with the support of partition display. They can engage with movies by liking, commenting, and grading them, while also having the ability to edit their personal information and access other user homepages. Additionally, users can view the percentage of tags in their favorite movies, their recent favorite movies, recent likes, highly praised comments, and their friend list. Administrators have the ability to disable users, as well as delete movies and comments to maintain the platform's integrity.

In the same time, our website allows for online communication between users, supported by a collaborative filtering machine learning algorithm that recommends potential friends with similar interests. Users can also receive movie recommendations based on their interests through the same algorithm. The platform also provides an IR search engine, allowing users to easily search for interesting movie information and other users. Users have the ability to add friends, and administrators can submit information about a movie and add it to the platform.

This project provides a valuable service to movie enthusiasts by creating a platform for socializing, sharing opinions, and connecting with others who share similar interests. Due to the pandemic, people have fewer opportunities to watch movies in the cinema and socialize with others in person. A movie-based friend-making website can provide a sense of community and social connection, even when people are unable to attend movie theaters in person.

To provide the best possible experience for our users, we use Python Flask, web development frameworks, and other tools to create a user-friendly interface and ensure the website's functionality. In addition, our team creates content, including movies, labels, descriptions, reviews, ratings, and other information that users will find useful and engaging. We also integrate recommendation algorithms, information retrieval algorithms, one-on-one chat functionality, and other social networking tools to facilitate user engagement and interaction.

Chapter 3: User Documentation

Testing account:

Regular user account: username: user1; password: 12345678

Regular user account: username: user5; password: 12345678

Regular user account: username: user10; password: 12345678

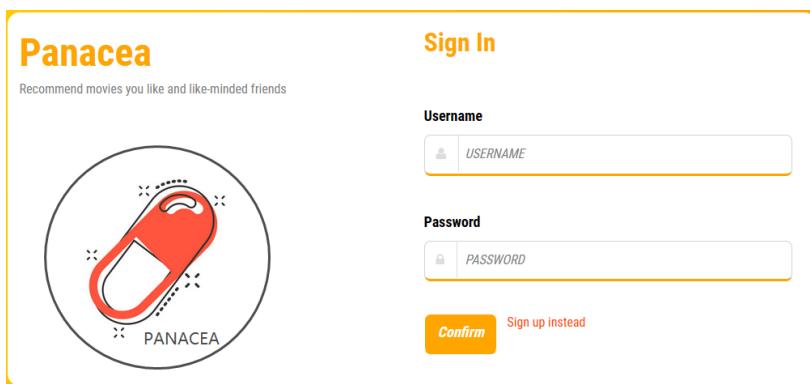
Administrator account: username: admin; password: 12345678

Server address: <http://ipa-004.ucd.ie/>

3.1 Regular User Functions

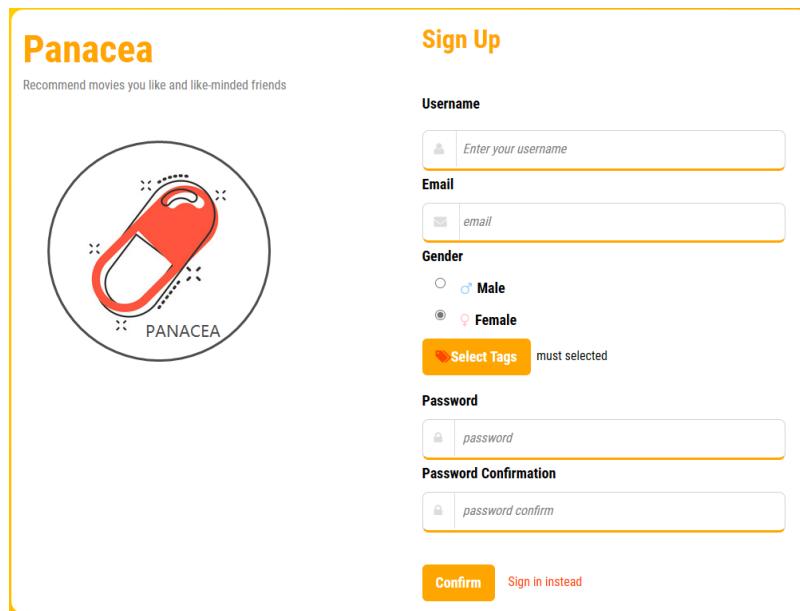
3.1.1 Login

As a user you can go to the login page by clicking the button in the top of the homepage, as shown in the following figure.

On this page you can enter a username and password to log in if you already have an account.
(Provide user accounts:username:user1 password:12345678)

3.1.2 Sign in



The image shows the sign-up page for the Panacea website. The page has a yellow header bar with the title "Panacea" and a subtitle "Recommend movies you like and like-minded friends". Below the header is a circular logo featuring a red capsule-like shape with the word "PANACEA" at the bottom. To the right of the logo is the "Sign Up" button. The form fields include:

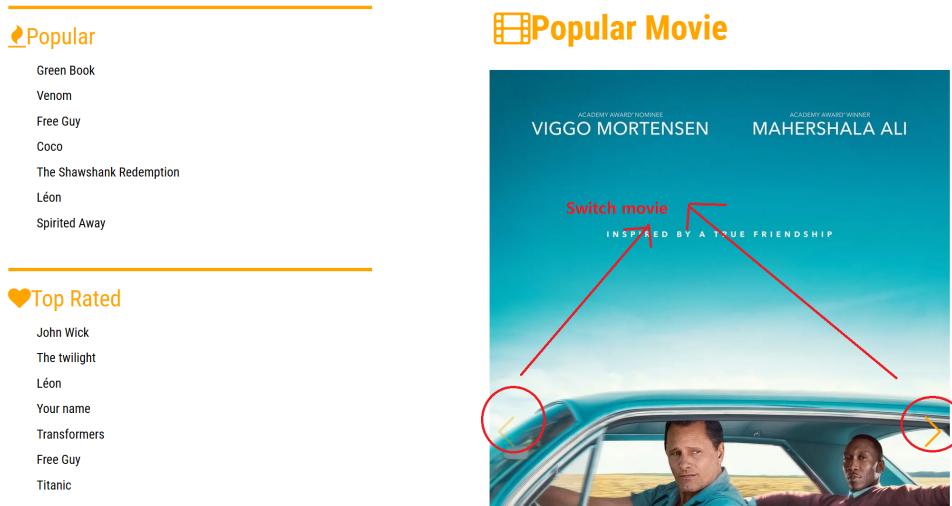
- Username:** An input field with a user icon and placeholder text "Enter your username".
- Email:** An input field with an envelope icon and placeholder text "email".
- Gender:** Radio buttons for "Male" and "Female".
- Select Tags:** A button with a heart icon and the text "Select Tags" followed by the note "must selected".
- Password:** An input field with a lock icon and placeholder text "password".
- Password Confirmation:** An input field with a lock icon and placeholder text "password confirm".
- Confirm:** A large orange button.
- Sign in instead:** A link in red text.

If you don't have an account, click "sign up instead" in login page and the page will jump to the registration page. On this page, you need to enter your username and email, select your gender, then select your favorite movie tag, then confirm your password, and finally click confirm to submit all the information. If there is any incorrect information filled out, the system will remind you.

3.1.3 Home Page

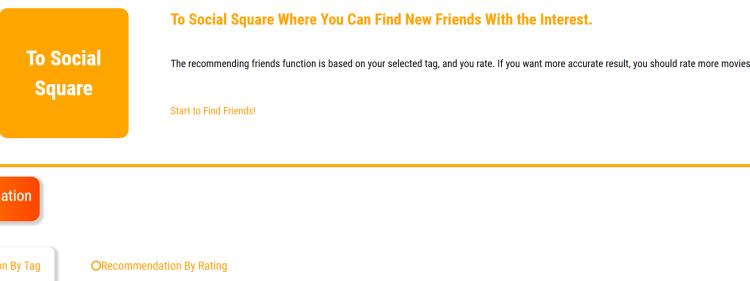
The website has a simple and intuitive home page with clear instructions for users.

1. The navigation bar at the top allows users to access other pages of the website.
2. On the left side, there are lists of the most popular movies (based on box office) and top rated movies. On the right side, there are large posters of the most popular movies, which users can slide or click the orange arrows to switch movies.



The image shows the home page of the website. On the left, there are two sections: "Popular" (with a list of movies: Green Book, Venom, Free Guy, Coco, The Shawshank Redemption, Léon, Spirited Away) and "Top Rated" (with a list of movies: John Wick, The twilight, Léon, Your name, Transformers, Free Guy, Titanic). On the right, there is a large poster for the movie "The Green Book". The poster features Viggo Mortensen and Mahershala Ali. Red arrows point from the text "Switch movie" to the orange arrows located at the bottom right of the poster, indicating that users can use these arrows to switch between different movie posters.

3. If users log in, they can see a big square button named “social square”, which leads them to a page where they can make friends with other users. Logged-in users can also see a recommendation section, where they can choose between two algorithms: “recommendation by tag” and “recommendation by rate”. The former recommends movies based on the tags (such as comedy, war, etc.) that users selected when they registered. The latter uses machine learning and takes user ratings as parameters.



4. At the bottom, there is a section where users can browse popular movies, latest movies, top rated movies and most viewed movies. Users can switch between these categories by clicking the corresponding buttons.



5. In the home page, user can click movie title, movie poster or "detail" button to the movie detail page where more detailed information are illustrated and further operations can be done.

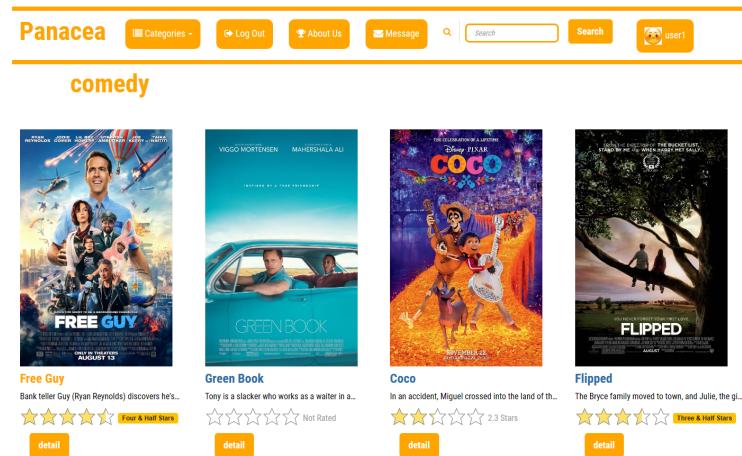
3.1.4 Category of movie

You can find movies by movie category on the homepage, as shown below.

The screenshot shows the Panacea homepage. The top navigation bar includes links for 'Log Out', 'About Us', 'Message', 'Search', and a user profile icon. A red arrow labeled '1' points to the 'Categories' dropdown menu. Another red arrow labeled '2' points to the 'comedy' option in the dropdown menu, which is highlighted. Below the navigation, the 'Popular' section lists movies like 'Green Book', 'Venom', 'Free Guy', 'Coco', 'The Shawshank Redem', 'Léon', and 'Spirited Away'. To the right, a movie detail page for 'The Shawshank Redemption' is displayed with the title 'Popular Movie', featuring stars Viggo Mortensen and Mahershala Ali.

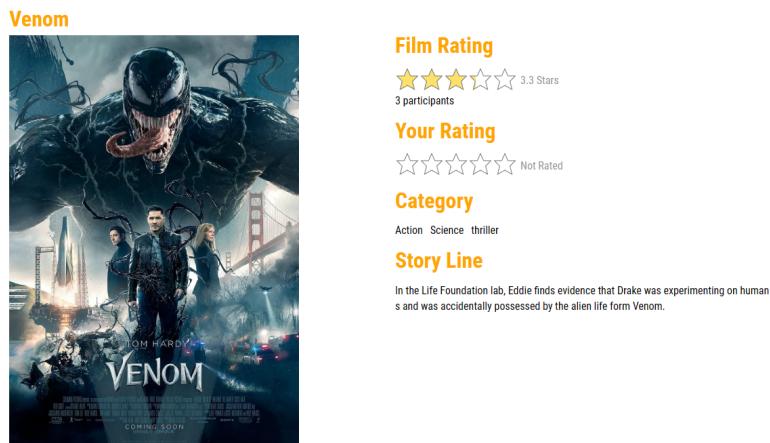
1. Clicking the category button will bring up a drop-down box containing many categories.
2. Clicking a different category will take you to a page that presents such movies.

3. For example, clicking comedy will bring up all the movies with the comedy label, as shown in the following figure.



3.1.5 Movie Details Page

After clicking on any movie, you will be taken to the movie details page. The first screen you will see is as shown below.



In this section, you will see the movie's overall rating, your rating, the category the movie belongs to and a brief storyline.

Scroll down the page and you will see many other features as shown in the image below.

The screenshot shows the movie details page for 'Venom' with additional social media interaction features:

- category:** Action Science thriller
- storyline:** In the Life Foundation lab, Eddie finds evidence that Drake was experimenting on humans and was accidentally possessed by the alien life form Venom.
- Like:** ❤ → 1
- Collect:** 📖 → 2
- Rate:** ⭐ → 3
- Comment:** 💬 → 4
- Comment:** (empty input field)

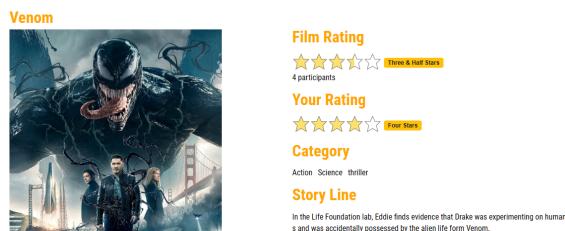
1. Click the Like button, the movie will be marked as your favorite, you can find your favorite

movie in the personal homepage. Click the button again to cancel the like.

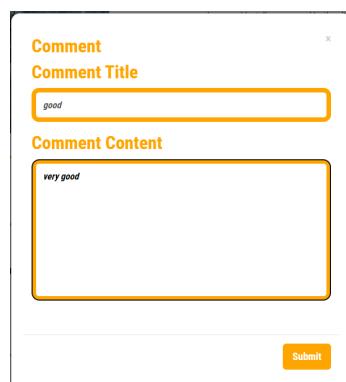
2. Click the collect button, the movie will be marked as your collection, you can find your collection in the personal homepage. Click the button again to cancel the collecting.
3. Click the rating button and the rating box will pop up as shown below. The score will change in real time when the mouse is placed on different pentacles. The score will be fixed after clicking, and then clicking the submit button will submit the score.



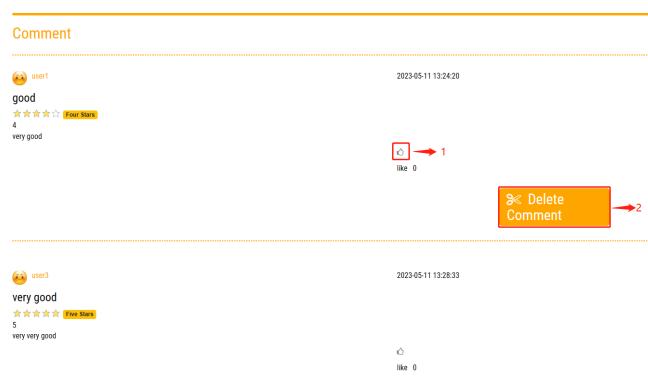
After rating, both the total rating of the previously shown movie and your rating will change.



4. Click the comment button and the comment box will pop up as shown below. After entering the title and content of the comment, you can click the Submit button to submit your comment.



At the bottom of the movie detail page is the comments section where you can see the comments of others and yourself as shown below.

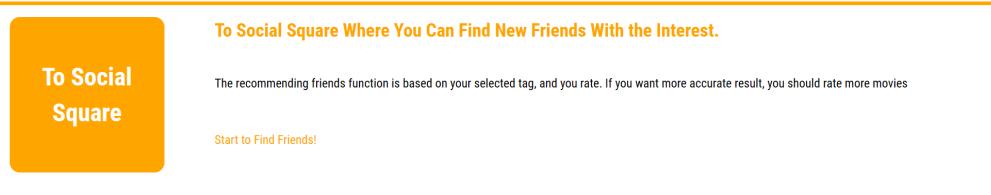


1. You can click on the icon to like a comment and click again to unlike it.
2. For your own comment, you can click the button to delete your comment.

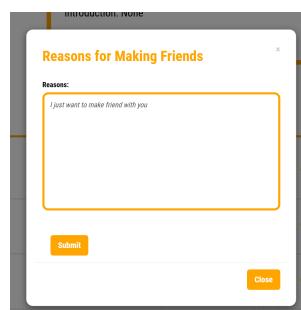
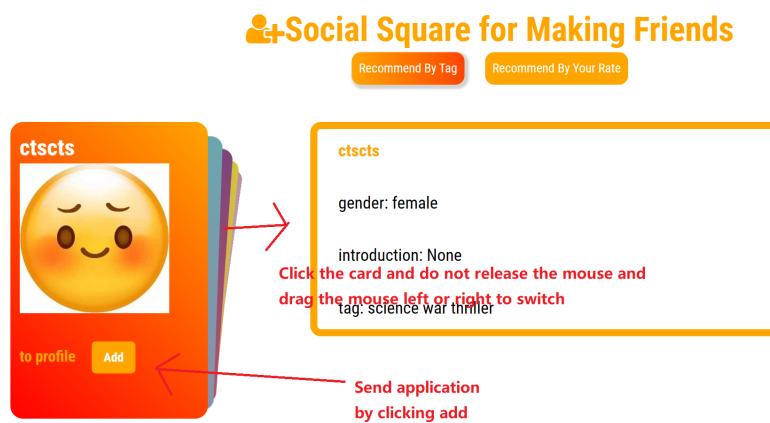
3.1.6 Social Square

Social square is a feature that allows users to see and connect with other users who share similar interests.

1. Users can access social square by clicking the button on the home page. (Only login user can have access to social square and user can only access it on home page)

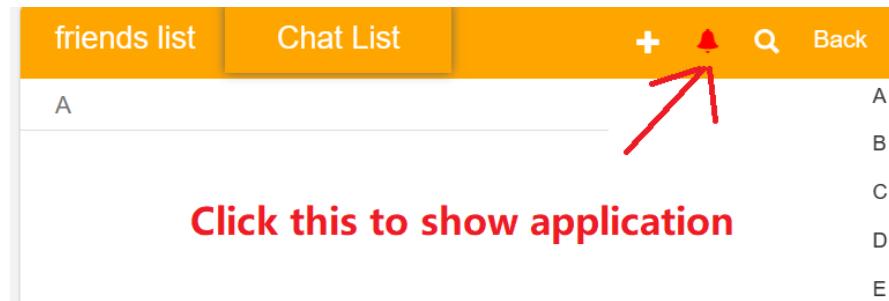


2. In social square, users can view recommended users in a card format, and swipe the cards with their mouse to change recommended users. Users can also switch the algorithm for friend recommendations, which is similar to the one for movie recommendations. User can click "add" button to send friend request and click "to profile" to get to other user's profile page.

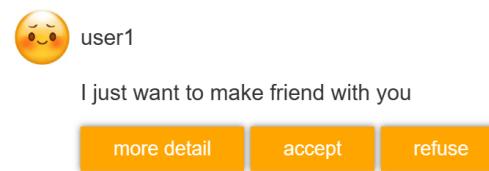


3. Below the cards, there is a list of all the users on the platform, where users can also send friend requests to anyone they like. The recipients of the requests can go to their friend list

page (by clicking message in the navigation bar after login and then a button in the profile page, as explained in the profile page section of the user document) and click the bell icon to accept or reject the requests.



Application



3.1.7 Search

Our website provides users to perform searches on various content on navigation bar. User should at least input one full word to make the result exact.

1. Users need to enter their query and click the search button, which will redirect them to a search result page. We take Coco as an example



2. The search engine employs the BM25 algorithm to rank the relevance of the results. The default result type is movie, but users can also switch to user as an alternative option by clicking.



3. Here takes username "ctscts" as an example. User need to click user result button in the search result page (In the user list below, user can add friends, however, some browser cannot execute this function and we could not find out the reason. Firefox can execute the function).

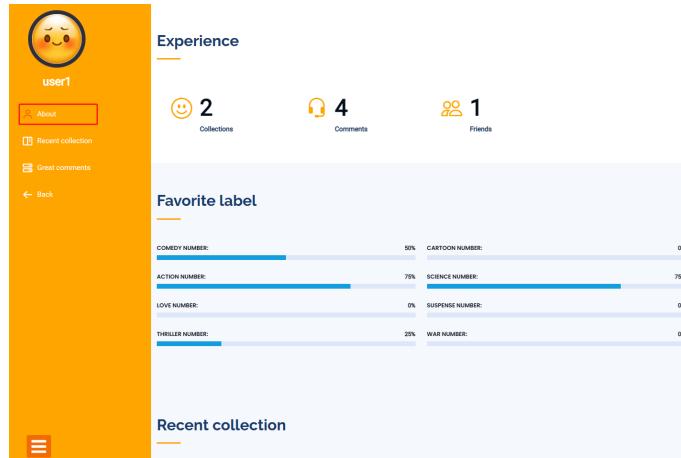


3.1.8 Personal Page

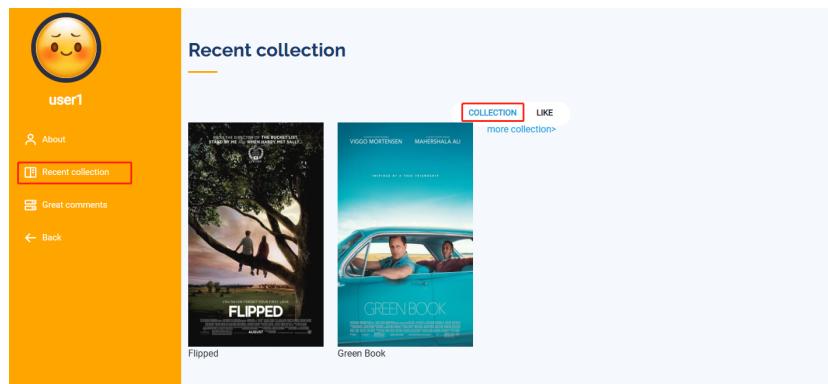
You can access your personal page by clicking the avatar button in the top right corner of the home page.



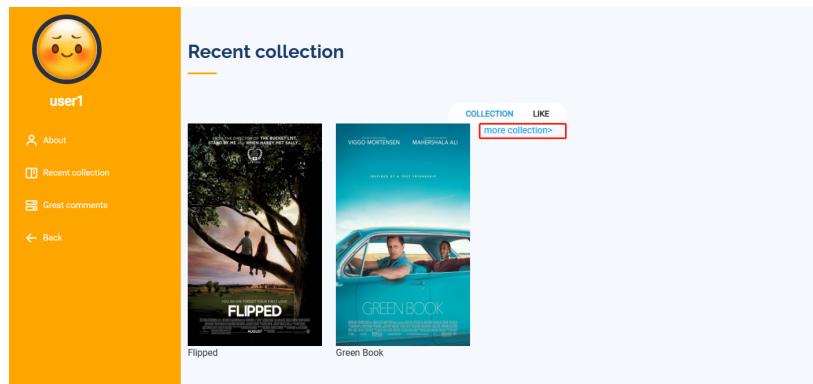
1. On the right side of your profile you'll see some basic information about yourself, including number of favorites, number of comments, number of friends, and the percentage of different tags that your favorite movies contain. You can also click the "about" button on the left to view this information.

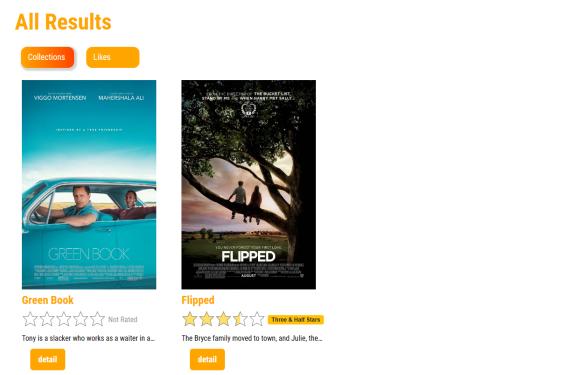


2. You can scroll down the page to see Recent collections and likes, or click "Recent collection" on the left to quickly locate them. Click collection or like to toggle the display.

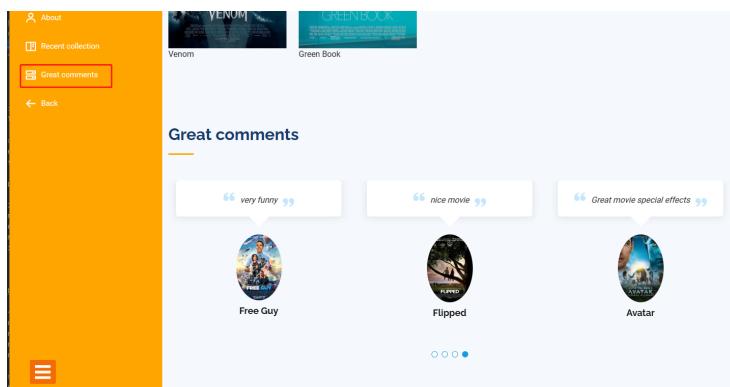


Clicking "more collection" will take you to a new page displaying all of your collections or likes.





- Finally, it displays your comments of a few movies, giving preference to great comments. Comments can be played on a scroll loop (you might see what you saw before).



3.1.9 Change avatar/personal information/password

You can change your avatar, information and password by clicking the toolbox in the bottom left corner of your personal page.

- Click change avatar to enter a new page, click the button to select the image you want, and then submit it to enter the cropping page.

Picture here

选择文件 rate2.png

提交

click the button to select the image you want

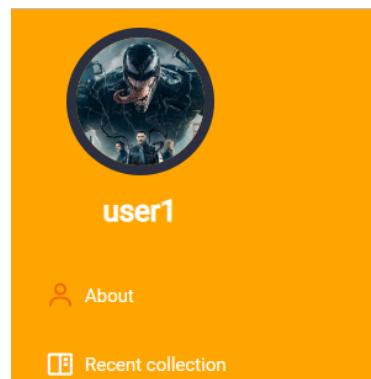
submit

Adjust the size and position of the cropping box to determine the final avatar, and click the complete button.

change avatar



When you're done, you'll see the avatar change.

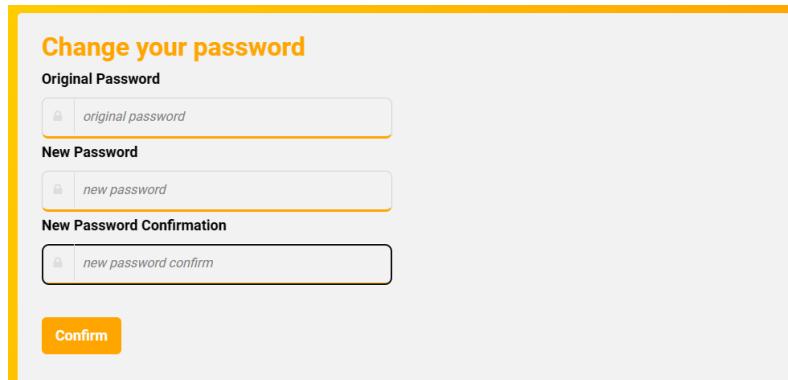


2. Click change info to enter a new page. In this page, you can enter the personal information you want to change (similar to the registration page), and then click the final confirm button to submit your changes.

change your information

Username	<input type="text" value="user1"/>
Email	<input type="text" value="user1_123@gmail.com"/>
Gender	<input type="radio"/> Male <input checked="" type="radio"/> Female
Select Tags	must selected
Introduction	<input type="text" value="None"/>
<input type="button" value="Confirm"/>	

-
3. Click change password to enter a new page. In this page, you need to enter your old password first, then enter your new password twice, and finally click confirm to complete the password change.



Change your password

Original Password

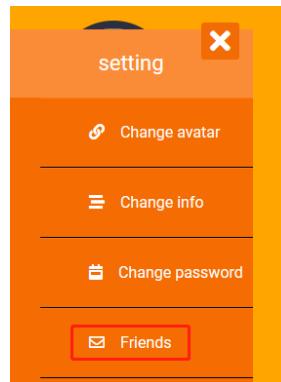
New Password

New Password Confirmation

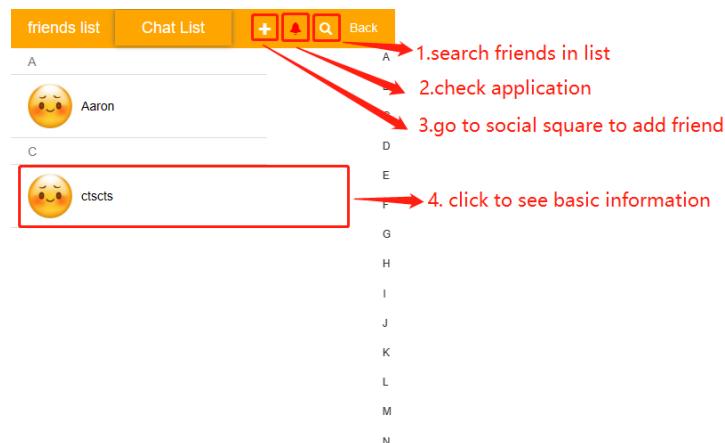
Confirm

3.1.10 Friend list

You can access your Friend list by clicking the Friends button in the toolbox on your personal page or the Message button at the top of your home page.



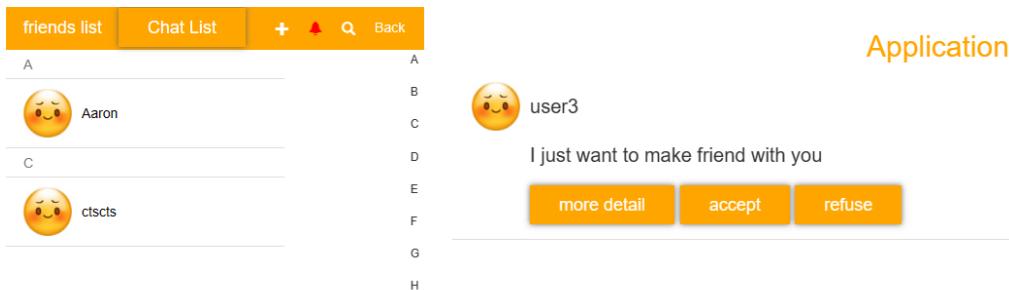
When you go to the friends list page you can see a list of friends sorted by their initials.



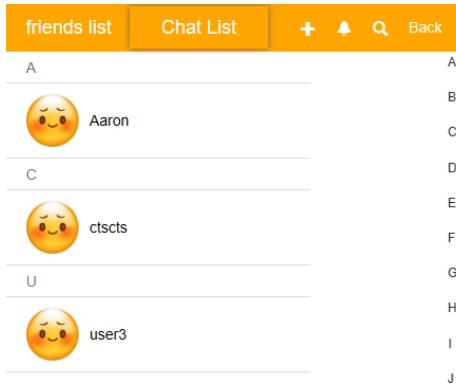
1. Click the search button to search for a friend in your friend list. Input any letter in a friend's name, and the friend will appear directly below.



2. Click the button with number 2 as shown, and the list of friend applications will be displayed (the button is red because there are applications waiting to be reviewed).



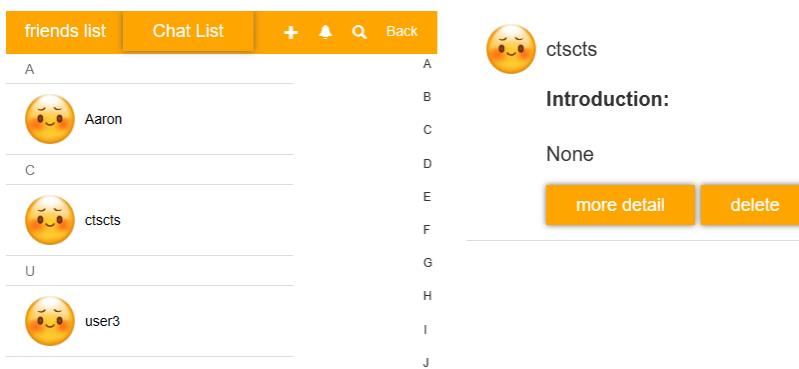
For a friend request, you have the option to accept or reject it. You can also click more detail to go to the applicant's home page to see his details to decide whether to approve the application.



Application

When you click Agree, the friend will be in your friend list.

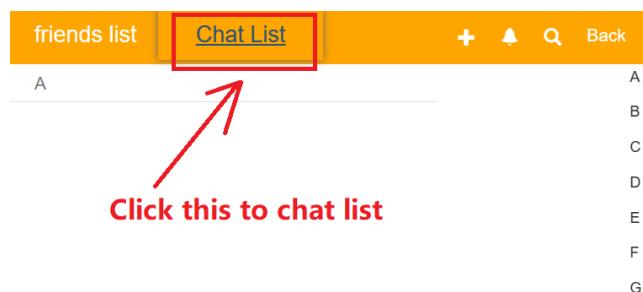
3. You can click the plus button and you'll go to social square to add friends.
4. You can click on any friend to see their introduction (if they have), and then you can choose to click the more detail button to go to their personal page to see their details, or click delete to delete a friend.



3.1.11 Chat List

Users can chat with their friends using the chat interface.

1. To access the chat interface, users need to go to the friend list page first, as described in the friend list section above in the user document. From there, users can click the chat list button on the top left corner and enter the chat list.



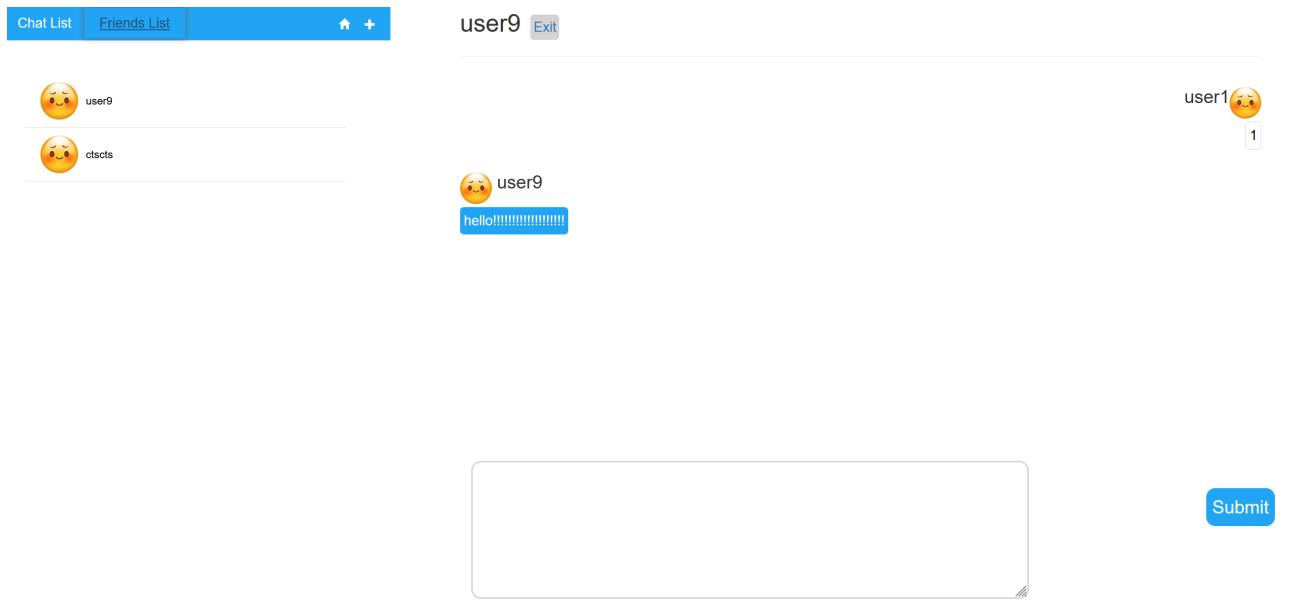
2. Chat list has a blue background to differentiate it from the friend list. If users have any friends, they will see them on the left side of the screen. Users can click on a friend's name

to open the chat window, where they can type their message in the bottom input box and click submit to send it.

Here taking user9 and user1 as an example



Here user1 receive greeting from user 9



3. Users can also receive messages from their friends in real time. If a user's friend sends a new message when user is not online, there will be a red dot next to their name to notify the user when user get into the chat list.



user1

6

Users can also receive messages from their friends in real time. If a user's friend sends a new message, there will be a red dot next to their name to notify the user.

3.1.12 Other personal page

You can go to someone's personal page by clicking more detail in their friend list or "to profile" or clicking their name in social square.

Social Square for Making Friends

wtjwj1

gender: female
introduction: None
tag: comedy action science war thriller

Recommend By Tag

Add Friend

This page is mostly the same as the user's personal page, except that it displays more basic information such as gender, birthday, etc. In addition, there is a button to add friends in the left navigation bar, and click it to send friend applications.

About

wtjwj1

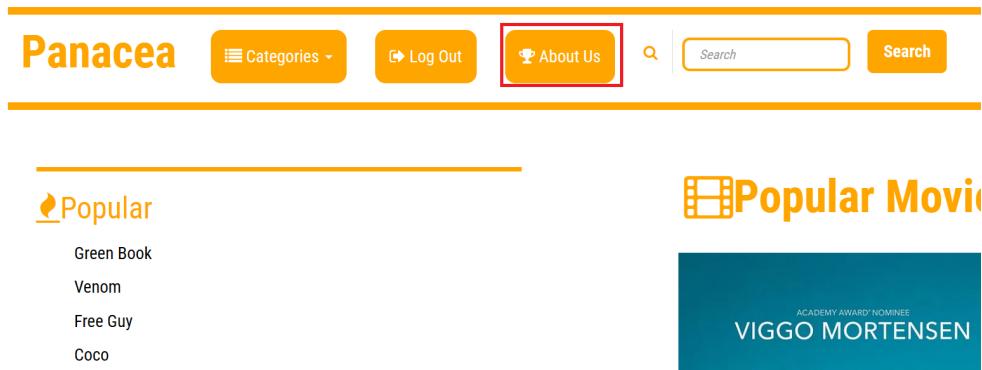
> Gender: female
> Email: 1342187631@qq.com
> Register time: 2023-05-12 15:32:41
> Introduction:
None

Experience

Collection number: 0
Comments: 0
Friends: 0

3.1.13 Introduction Page (About)

- Our project and team have an introduction page that users can access by clicking the “about” button on the top navigation bar after get into the website.



- On this page, users can learn more about our project and company, and they can also provide feedback by clicking the feedback button on the top left corner of the page. Regular User should login to feedback.

The image shows a screenshot of a website's "Introduction of Our Website" section. At the top left is a "Feedback" button. The main title is "Movie Recommendation And Social Networking Community". Below it is a sub-section titled "Introduction of Our Website" with a paragraph of text about the website's purpose and features. To the right is a painting of a park scene. Below this is another sub-section titled "Introduction of Our Company" with a smaller paragraph of text. There is also a small image of a landscape.

- The feedback will be sent to the administrator who can use it to improve our services.

3.2 Administrator Functions

The system has a single administrator account with the following credentials:

Account: admin

Password: 12345678

The administrator can access the website through the same login interface as regular users, but has additional privileges that allow them to delete or add movies and delete comments and ban users and view user feedback.

3.2.1 Administrator Home Page

To access the system as an administrator, the following steps are required:

1. Get to the website home page and click on the login button on the top navigation bar (see the illustration above in regular user part to check how to login).
2. Enter the administrator account and password (provided in user document) in the login interface and click on the login button (administrator account cannot be registered, there is only one account provided).
3. After logging in, click on the administrator button on the rightmost side of the top navigation bar to enter the administrator page.



4. In the administrator page, there are two sections: a left sidebar and a right side. Both sections have links to delete movie page, add movie page, website home page and ban users page and user feedback page. The administrator can choose any of these options to perform the corresponding actions.

The screenshot shows the administrator page. On the left is a sidebar with the following menu items: Home, Ban User, Add Movie, Delete Movie, and User Feedback. The main content area is divided into four sections, each containing a button and a brief description:

- Ban User**: Clicking this button, the website will jump to a page where administrator can see a list of users and administrator can ban or release user. Button: Ban User
- Add Movie**: Clicking this button, the website will jump to a page where administrator can add new movie. Button: Add Movie
- Delete Movie**: Clicking this button, the website will jump to a page where administrator can delete movies. Button: Delete Movie
- User Feedback**: Clicking this button, Administrators can access a page that shows the feedback from users. This helps them to enhance the website's quality and performance. Button: Home

3.2.2 Add Movie

To add a new movie to the system, the administrator needs to follow these steps:

1. From the administrator home page, click on the add movie button to enter the add movie page.

🎥 Add Movie

Clicking this button, the website will jump to a page where administrator can add new movie.

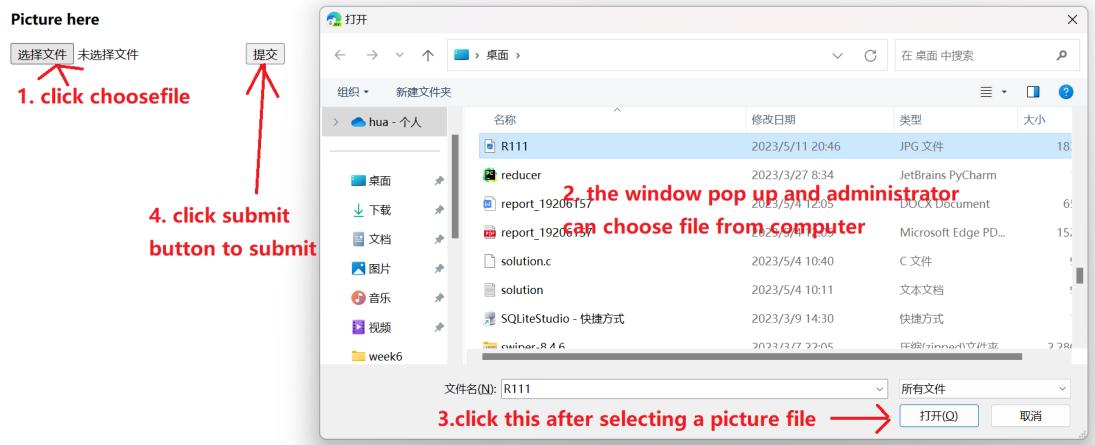
Add Movie

2. Fill in the required information for the new movie, such as movie name, release date, popularity score (box office, should be a integer), movie category (one or more categories can be selected), and introduction.

adding movie

movie name:	Lawrence of Arabia	click this to select date
release time:	1962/01/29	
popular:	box office, should be a integer	1000000
label:	<input type="checkbox"/> Comedy <input type="checkbox"/> Action <input type="checkbox"/> Love <input type="checkbox"/> Cartoon <input type="checkbox"/> Science <input type="checkbox"/> Suspense <input checked="" type="checkbox"/> War <input type="checkbox"/> Thriller choose label	
introduction		
<small>Lawrence of Arabia is a 1962 British epic historical drama film based on the life of T. E. Lawrence and his 1926 book Seven Pillars of Wisdom. It was directed by David Lean and produced by Sam Spiegel, through his British company Horizon Pictures and distributed by Columbia Pictures. The film stars Peter O'Toole as Lawrence with Alec Guinness playing Prince Faisal. The film also stars Jack Hawkins, Anthony Quinn, Omar Sharif, Anthony Quayle, Claude Rains and Arthur Kennedy. The screenplay was written by Robert Bolt and Michael Wilson.</small>		
NEXT click next make sure you input right information		

3. Clicking next button and administrator can get to a page where they can upload and cut movie poster. and then, they can click finish to upload a movie.



change movie picture



3.2.3 Delete Movie

To delete a movie from the website, the administrator should follow these steps:

1. Navigate to the administrator home page and click on the delete movie button, which is located on both the left and right sides.

Delete Movie

Clicking this button, the website will jump to a page where administrator can delete movies.

Delete Movie

2. On the next page, which displays all the movies in the database, click on the delete button next to the movie that needs to be removed.

Movie List

Your name



2016-12-02

Delete Movie!

3. Alternatively, use the search function (search part is on the top) on this page to find the movie by its name and then click on the delete button.
4. Alternatively, administrator can delete movie in movie detail page (how to get to movie detail page is introduced in regular user part). Click the red button in the top left side of the page.

Delete Movie

Green Book



Film Rating

Not Rated
0 participants

Your Rating

Not Rated

Category

Comedy

Story Line

Tony is a slacker who works as a waiter in a nightclub.

3.2.4 Ban User

To prevent malicious users from rating or commenting on movies, administrators have the option to ban them from the website.

1. This can be done by clicking the ban user button on the administrator home page, which leads to the ban user page.

Ban User

Clicking this button, the website will jump to a page where administrator can see a list of users and administrator can ban or release user.

Ban User

2. On this page, administrators can view a list of users and select the hammer icon next to the user name to ban them.

User List	
user1	Ban!!!
ctscts	Ban!!!
wjwjl	Ban!!!
use0	Release!!!
user5	Ban!!!

3. Banned users will not be able to rate or comment on any movie.
4. Administrators can also release users by clicking the release button, which will restore their rating and commenting privileges.

3.2.5 View Feedback

The feedback page allows the administrator to review user feedback to improve the website or other aspects of the service. (The general process is similar to the previous administrator functions so there is no illustration.)

1. The administrator can access the feedback page from the administrator home page by clicking on the button on either the left or the right side.
2. The feedback page displays a list of feedback entries from regular users, including their user id, feedback title and feedback content.
3. The administrator can search for a specific feedback title using the search bar.

3.2.6 Delete Comment

The administrator has the ability to remove user comments, but this feature is only available on the movie detail page, not on the administrator home page.

1. To remove a comment, the administrator needs to navigate to the comment section of the movie detail page and click on the delete button. (How to get to the movie detail page is introduced in the regular user section)

user1

1

Not Rated
not rated

1

2023-05-11 15:36:41

like 2

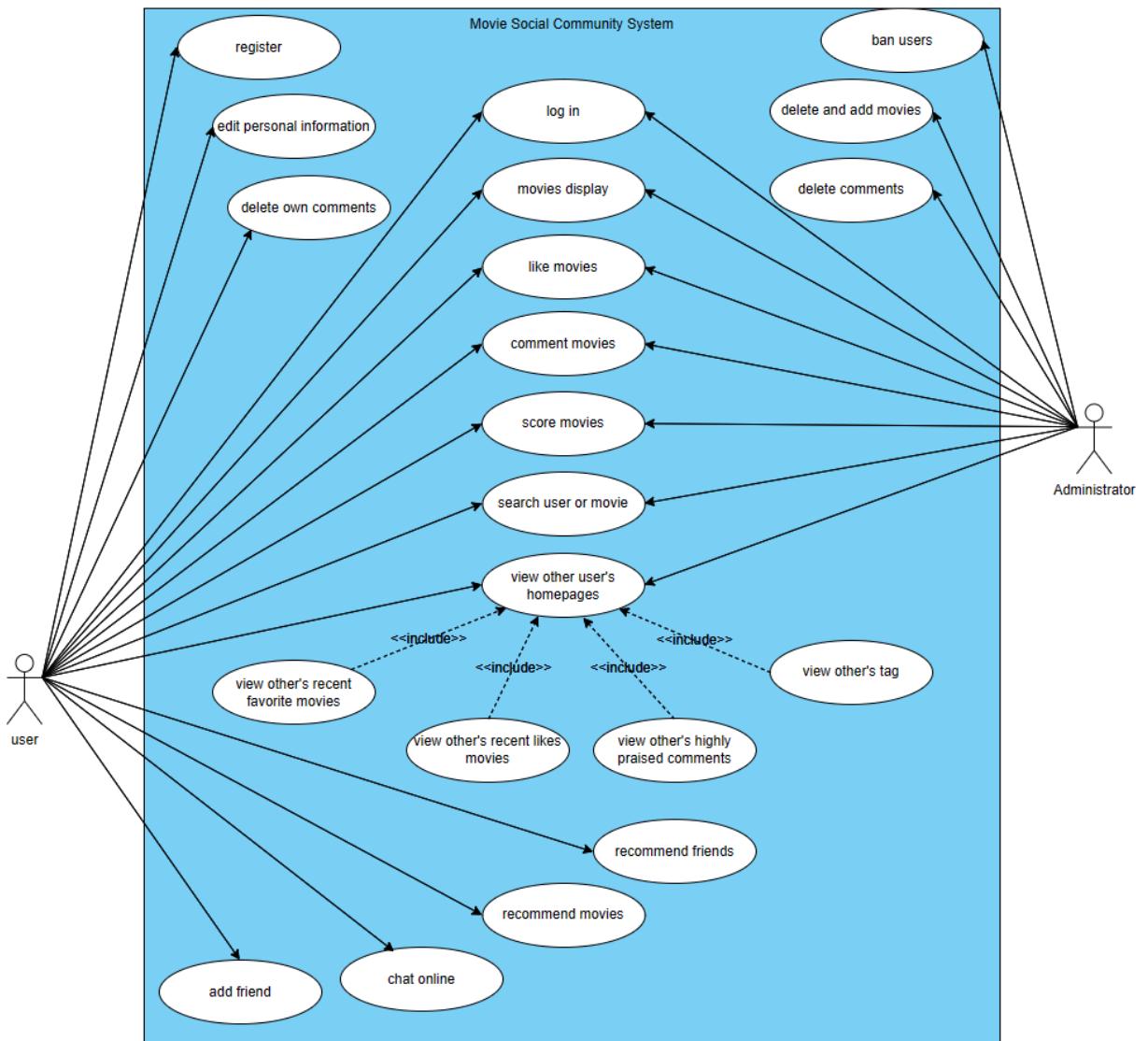
Delete Comment

Chapter 4: System Documentation

4.1 System Description

The goal of our website is to create a movie community that facilitates users to learn about movies they may be interested in, rate and comment on movies they have watched, make friends with similar interests in the community, and have real-time communication with friends.

This project provides a valuable service to movie enthusiasts by creating a platform for socializing, sharing opinions, and connecting with others who share similar interests. Due to the pandemic, people have fewer opportunities to watch movies in the cinema and socialize with others in person. A movie-based friend-making website can provide a sense of community and social connection, even when people are unable to attend movie theaters in person.



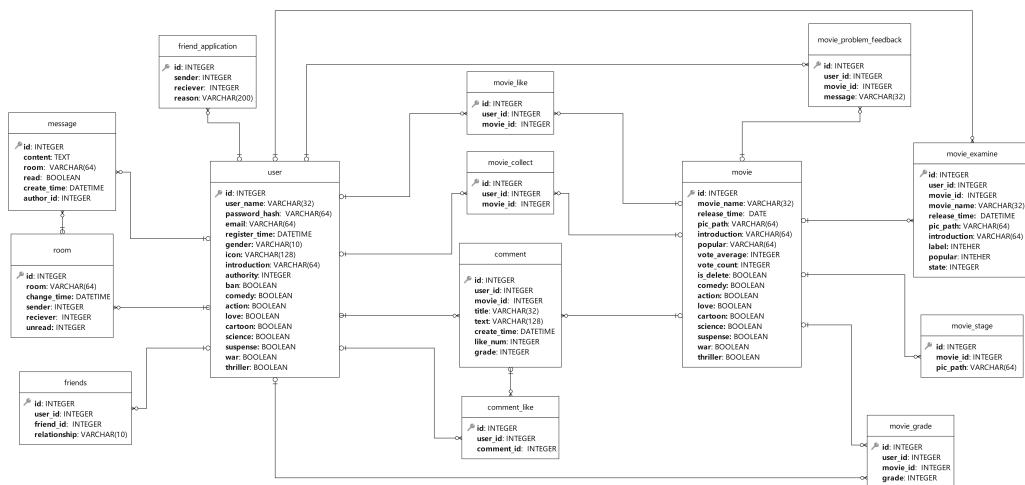
Provided Core functions :

Our website offers a variety of user functionalities. Users can easily navigate and search for movies with the support of partition display. They can engage with movies by liking, commenting, and grading them, while also having the ability to edit their personal information and access other user homepages. Additionally, users can view the percentage of tags in their favorite movies, their recent favorite movies, recent likes, highly praised comments, and their friend list. Administrators have the ability to disable users, as well as delete movies and comments to maintain the platform's integrity.

Provided Advanced functions :

Our website allows for online communication between users, supported by a collaborative filtering machine learning algorithm that recommends potential friends with similar interests. Users can also receive movie recommendations based on their interests through the same algorithm. The platform also provides an IR search engine, allowing users to easily search for interesting movie information and other users. Users have the ability to add friends, and administrators can submit information about a movie and add it to the platform.

4.2 Database Design



- **comment**: Store information related to comments

id	user id	movie id	title	text	creat tim	like num	grade
----	---------	----------	-------	------	-----------	----------	-------

- **comment_like**: Store user id who like the comment

id | user id | comment id

- **friend_application**: Store records of adding friends

| id | sender | receiver | reason

- **friends**: Store friends relationship

id | user id | friend id | relationship

- **message**: Store chat message between friends

id | content | room | read | create time | author id

- **movie**: Store movie information

id | movie name | release time | pic path | introduction | popular | vote avg | vote count | is delete | comedy | action | love | cartoon | science | suspense | war | thriller

- **movie_collect**: Store users who collect a movie

id | user id | movie id

- **movie_grade**: Store users' rate on a movie

id | user_id | movie_id | grade

- **movie_like**: Store users' like on a movie

id | user id | movie id

- **advise**: Store users' advise on movie

id | user id | movie id | message

- **movie_stage**: Store additional picture for movie

id | movie id | pic path

- **room**: Store chat room and members information

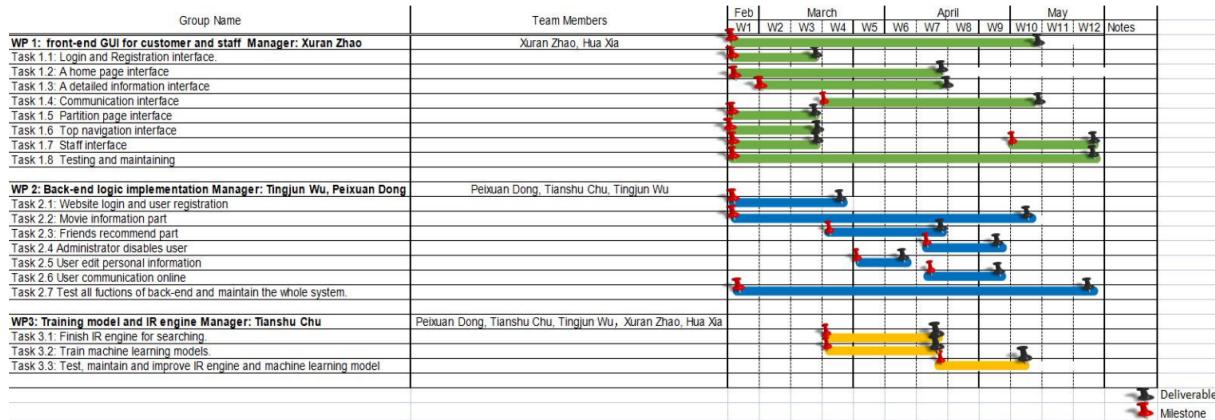
id | room | change time | receiver | sender | unread

- **user**: Store users' information

id | user name | password hash | email | register time | gender | icon | introduce | authority | ban | comedy | action | love | cartoon | science | suspense | war | thriller

4.3 Process Description

In the beginning of the project, in order to complete the system on time with high quality, our team made the work package and working schedule according to customer requirements and actual ability. Since customer requirements may change at any time during the development process, we will also modify our plan accordingly, so as to ensure timely completion of the project while meeting customer requirements.



Week 1

- What we done in this week:
 1. We discuss the proposal of our project such as topic of project, division of labor and so on.
 2. We contact the TA and set up a meeting time.
- What we plan to do in next week:
We are going to finish the team agreement, work packages and modify proposal according to feedback.

Week 2

- What we done in this week:
 1. We have completed the project plan and project agreement.
 2. We created gitlab, selected the front-end framework and uploaded it, designed and built the database.
 3. Complete the division of labor in the first stage.
- What we plan to do in next week:
We plan to start the logics of login and registration, film information display/partition, likes, comments, collection, scoring, release of film information, approval of film information, and navigation bar this week.

Week 3

- What we done in this week:
 1. We have completed the functions of login and registration, film information display/partition, release of film information, and navigation bar this week.

2. Some functions are partially completed and still need to be improved, such as likes, comments, collection, scoring.

- What we plan to do in next week:
We plan to finish building and training of machine learning.

Week 4

- What we done in this week:
 1. We prepared and participated in the project presentation.
 2. We have improved the comment function, added the comment "like" function, realized the back-end logic of adding friends and friends list, realized the movie collection, view history and other functions.
- What we plan to do in next week:
We plan to select the best machine learning model and apply it to the project, preprocess the data set, build and train the machine learning model.

Week 5

- What we done in this week:
 1. Finishing rating, commenting, collecting and liking movie function.
 2. Start to implement social function like recommend potential friends.
 3. We start building our machine learning model for recommending friends and movies
- What we plan to do in next week:
We plan to complete the recommendation function related to machine learning and the IR engine of our website, we will also improve the website for better demo display.

Week 6

- What we done in this week:
 1. We completed the movie rating, comments, favorites and other features in the movie details page.
 2. We have completed the selection and application of the machine learning model to recommend friends and movies.
 3. We have completed the selection and application of IR model to achieve the search function.
 4. We start to deal with social functions.
- What we plan to do in next week:
We plan to complete all social functions, such as displaying friends, adding friends, chatting online and so on. We plan to complete all administrator functions such as banning users, editing movies information and so on.

Week 7

- What we done in this week:
 1. Start developing administrator related features (including disabling users, deleting comments, etc.)
 2. Start developing social functions (including making friends between users)
 3. Improve the relevant functions of the personal
- What we plan to do in next week:
 1. Continue to improve and develop administrator related functions
 2. Continue to improve and develop social functions
 3. Start developing online chat

Week 8

- What we done in this week:
 1. Administrator can ban user and release user.
 2. User can see friend list, send friend application and add friends.
 3. Part of the online chat.
 4. More information on personal pages.
- What we plan to do in next week:
 1. Improve the personal home page function
 2. Realize the interactive function of entering the friends' home page.
 3. Continue to complete the administrator related functions
 4. Continue to realize the online chat function.

Week 9

- What we done in this week:
 1. We have implemented the online chat function, so that 2 friends can chat with each other.
 2. Administrator and the one who sent the comment can delete comment.
 3. Perfect the personal home page, and the list of friends page.
- What we plan to do in next week:
 1. We will plan to completely change the personal information function and personal card display function.
 2. We will complete the administrator functions so that administrators can delete movie.
 3. Continue to fix previous bugs.
 4. Refactoring code to reduce redundancy.

Week 10

- What we done in this week:
 1. We almost complete administrator page where administrator can delete comments, movies, ban user and add / modify movie information.
 2. We have completed the function that users can change their personal information and personal profile picture.
 3. We completed the personal business card display and display collection details page.
- What we plan to do in next week:
 1. We will conduct partial optimization and testing of the project.

Week 11

- What we done in this week:
 1. We complete all the functions but still need to improve.
- What we plan to do in next week:
 1. Debug, test and improve to finish our project..

Week 12

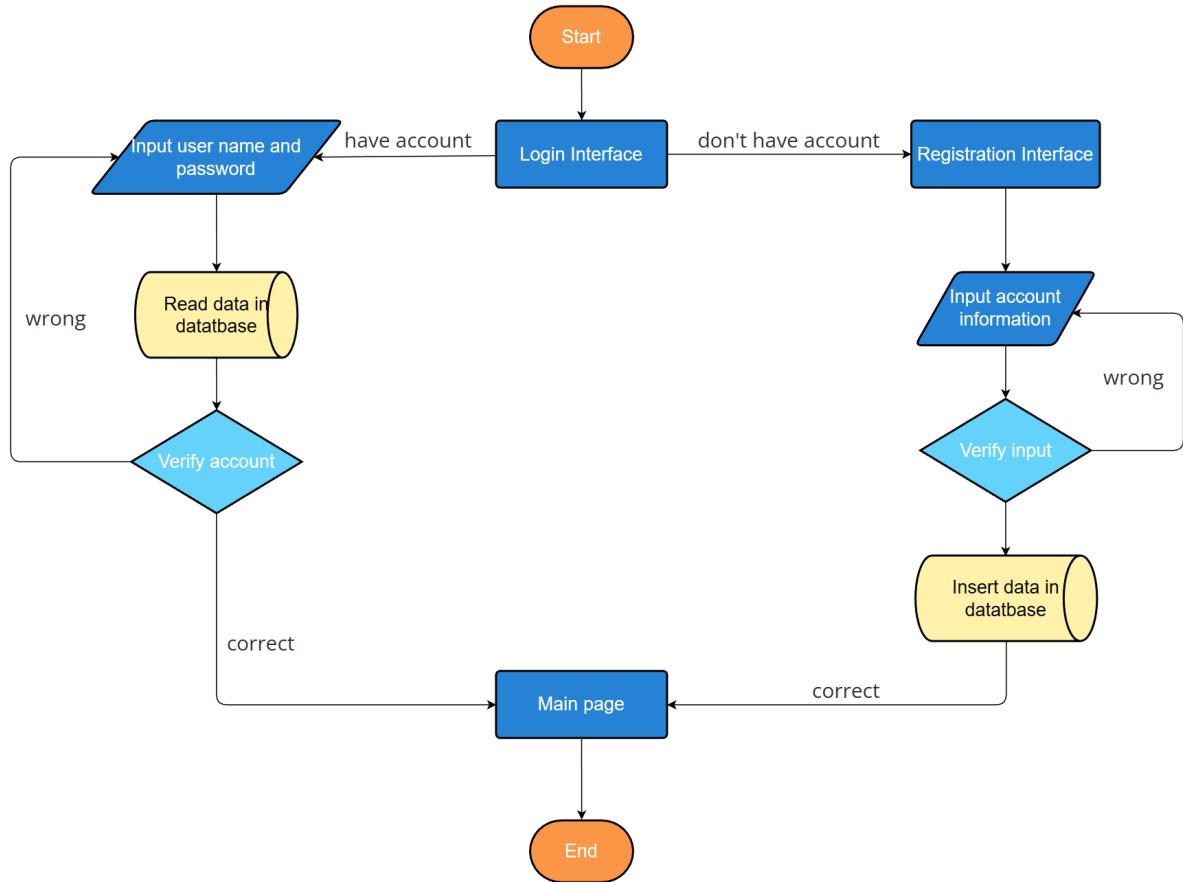
- What we done in this week:
 1. Conduct final optimization of the project.
 2. Conduct comprehensive and systematic testing of the project.
 3. Complete all the work of this project.

4.4 Functional Requirements Implementation

1. Login and registration)

Design Idea: The website should support users to register new accounts and log in to existing accounts.

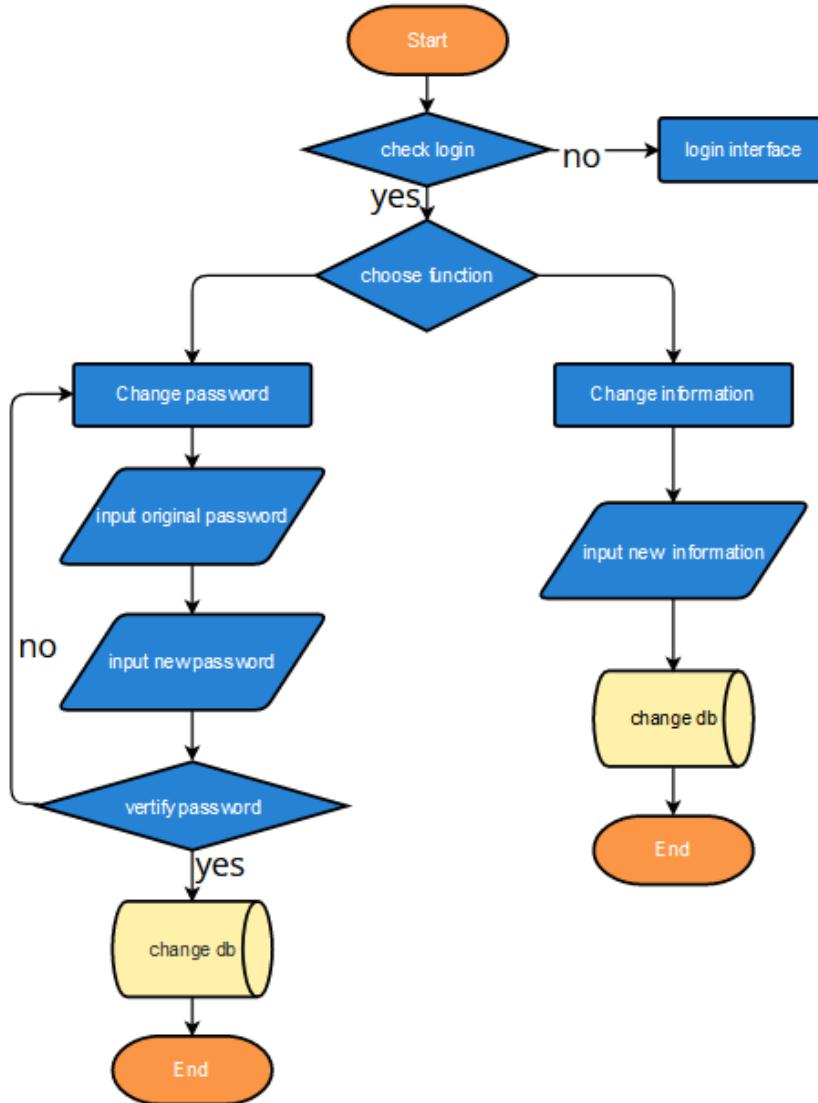
Flow chart:



2. Change password and personal information (For user already login)

Design Idea: User of the website should be able to change their password and personal information such as (username, gender, email, favorite movie labels) after they login.

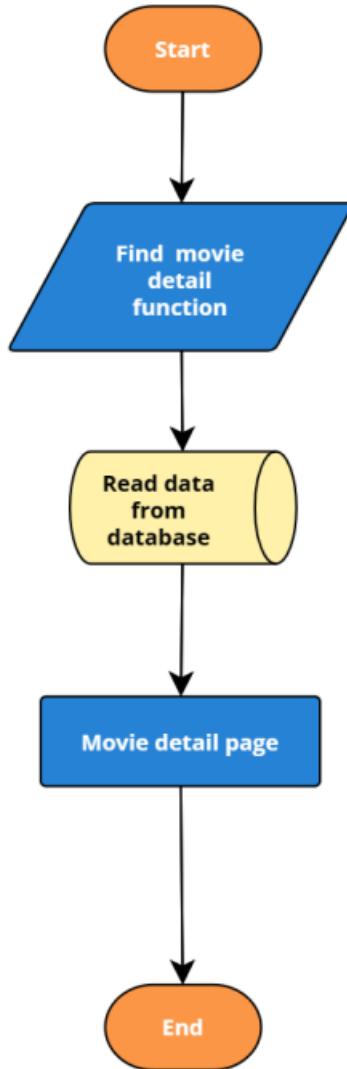
Flow chart:



3. Movie details page

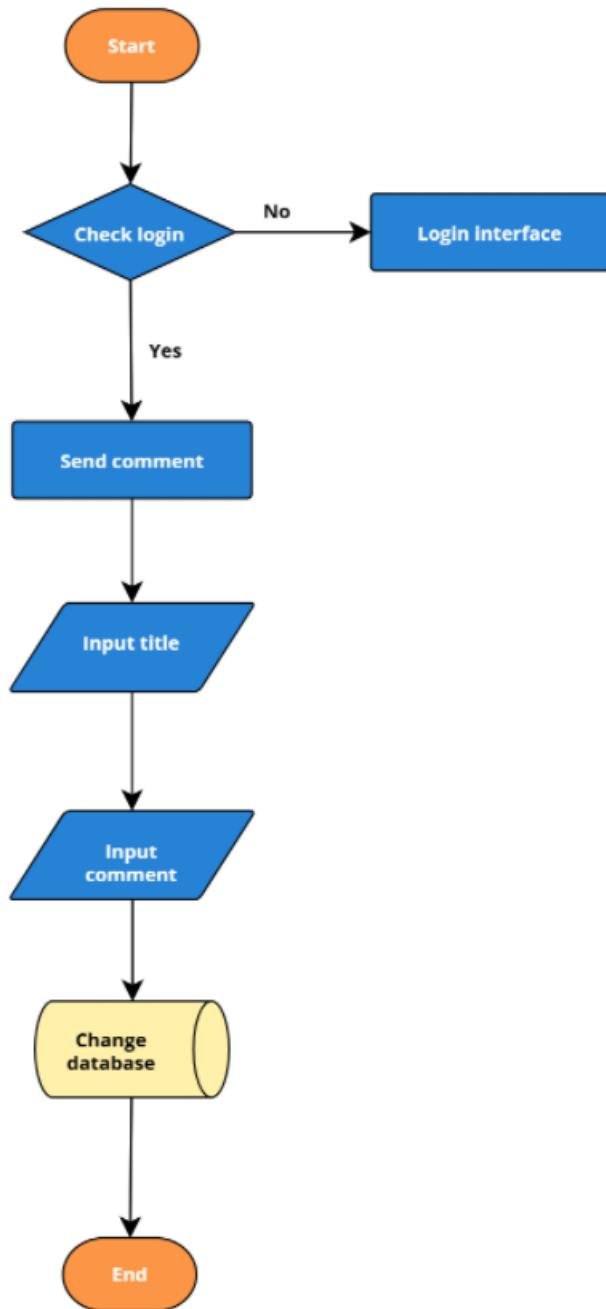
Design Idea: Visitors to this website can view the movie details page of the movie they want to watch.

Flow chart:



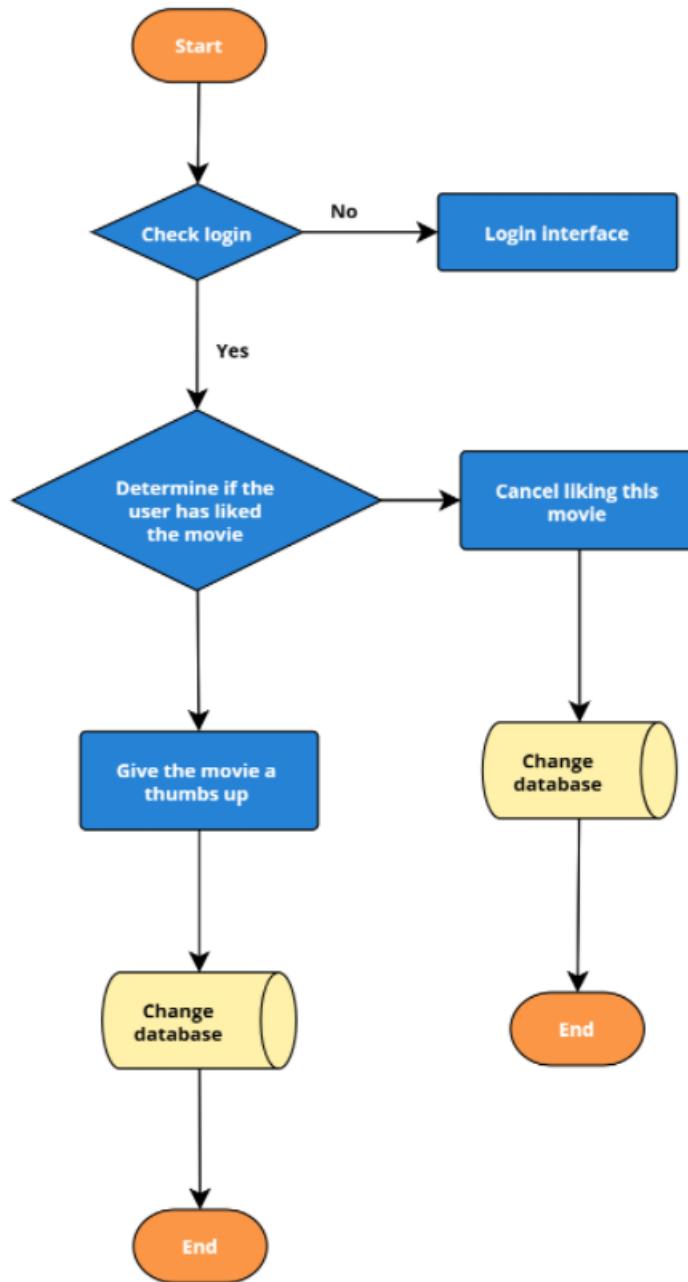
Design Idea: Users of the website can post comments.

Flow chart:



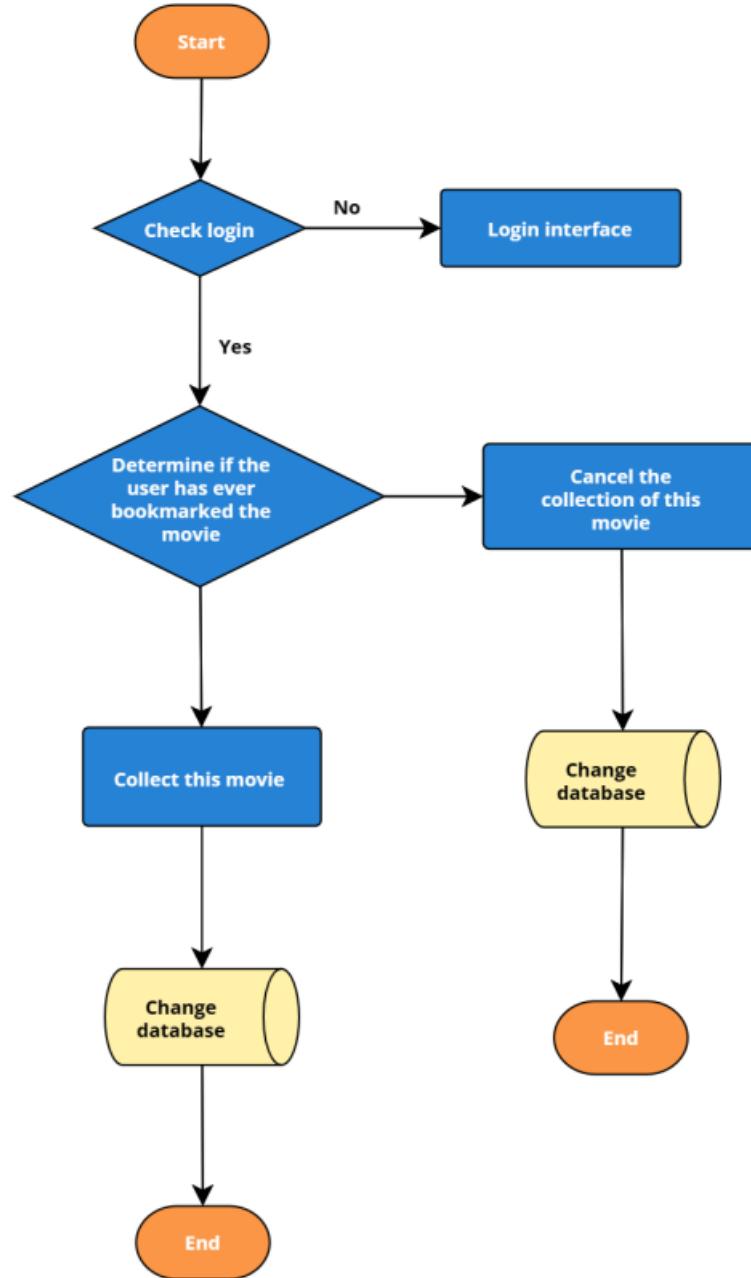
Design Idea: User of the website can like his favorite movies or cancel the likes.

Flow chart:



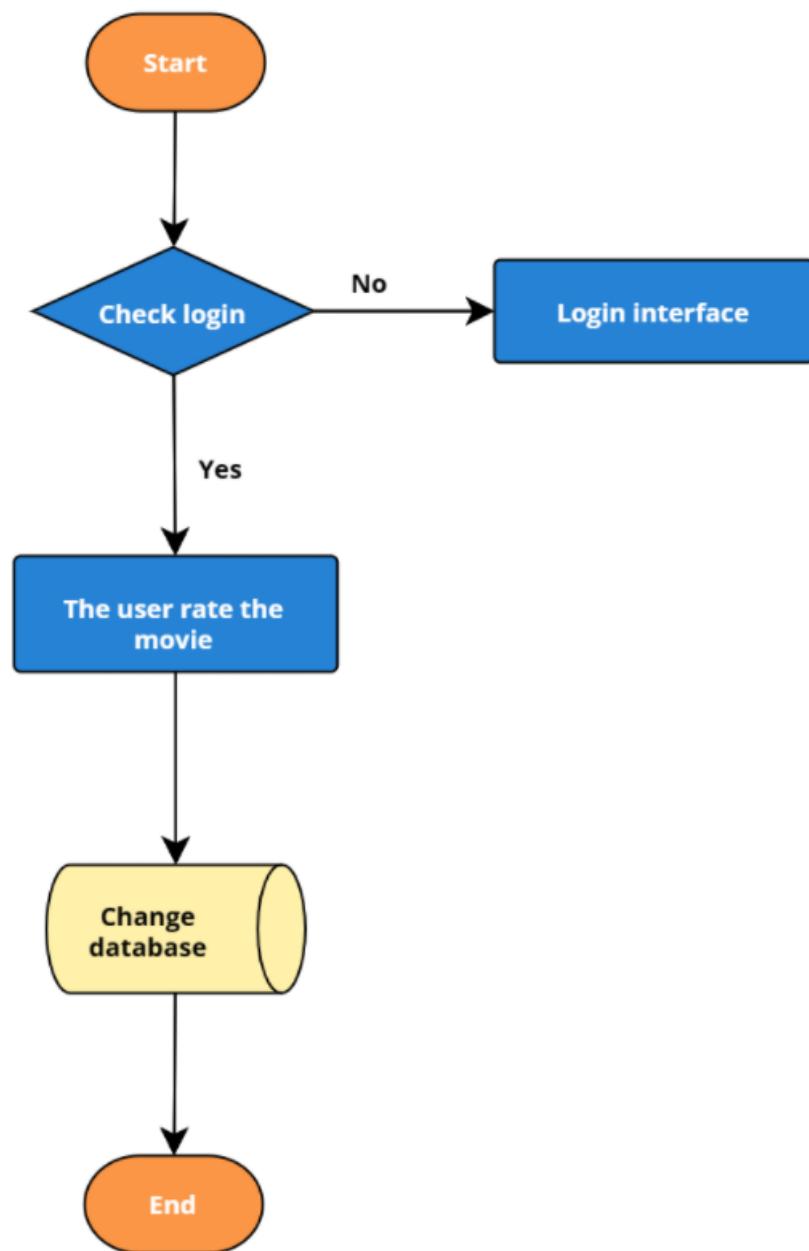
Design Idea: Users of the website can bookmark movies they are interested in, and at the same time, they can also cancel the bookmark operation.

Flow chart:



Design Idea: User of the website can rate different movies based on his own feelings.

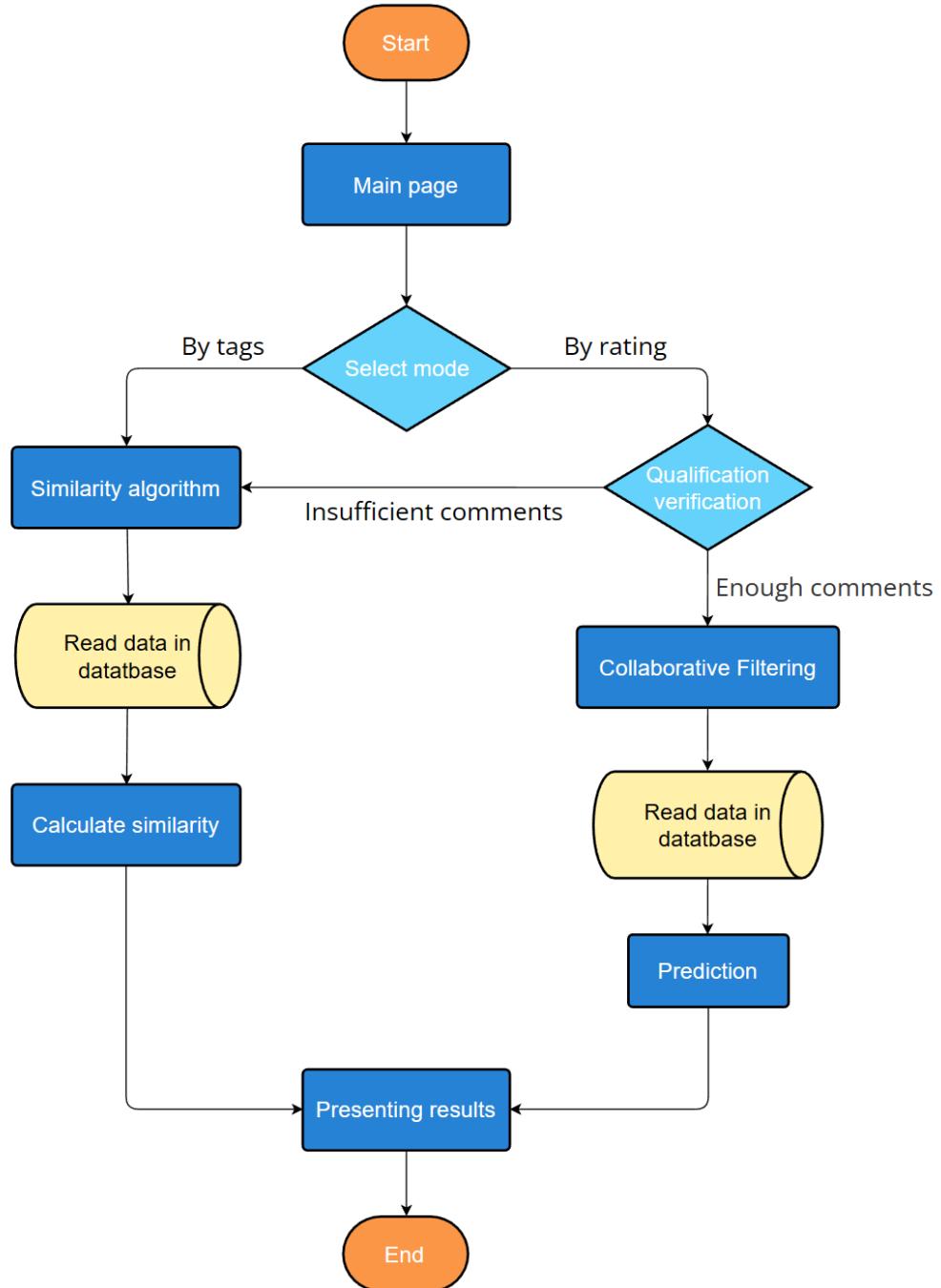
Flow chart:



4. Movie recommendation)

Design Idea: The website can recommend movies that users may like, based on their tags or historical ratings.

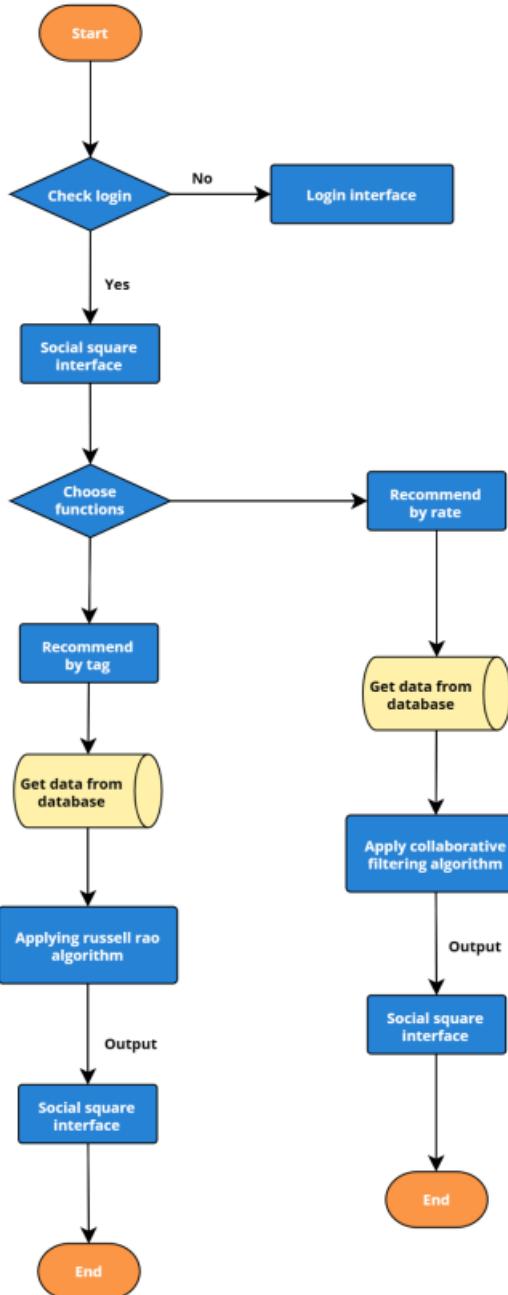
Flow chart:



5. Recommended users

Design Idea: The website can recommend potential friends to users based on their favorite movie tags and their ratings for different movies.

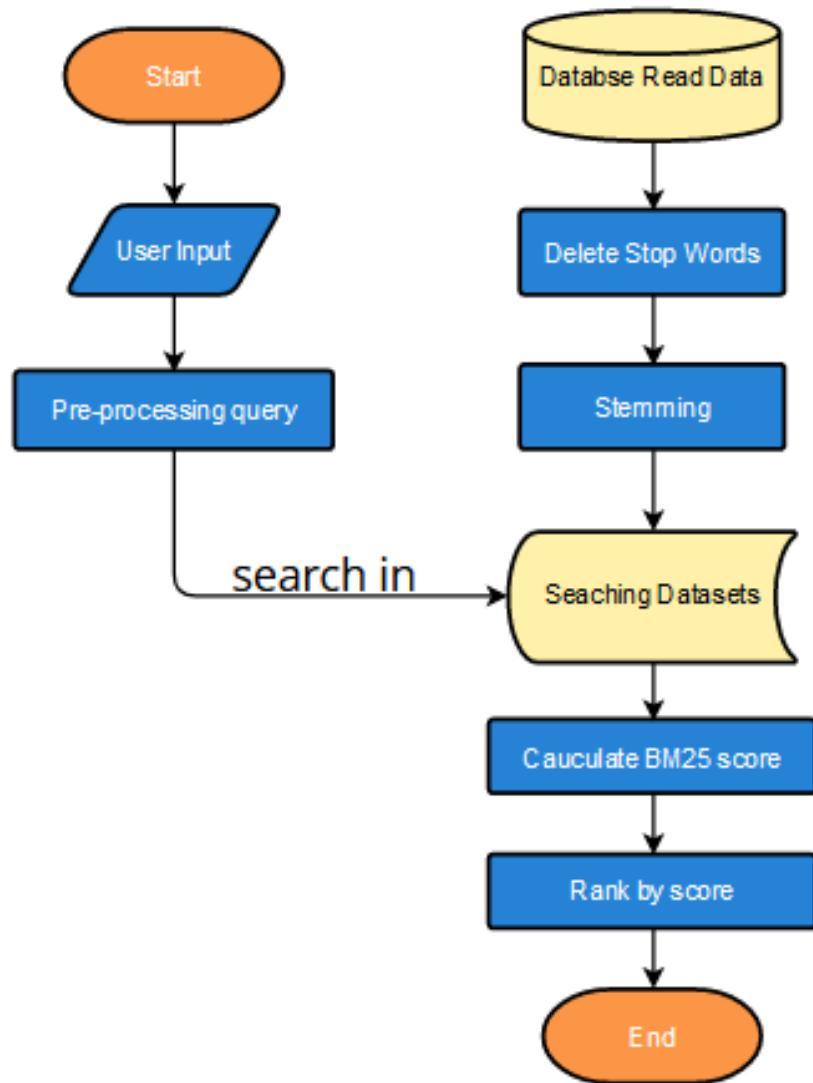
Flow chart:



6. Searching

Design Idea: User of the website should be able to search another users and movies by related information. So that they can find their friends and favourite movie.

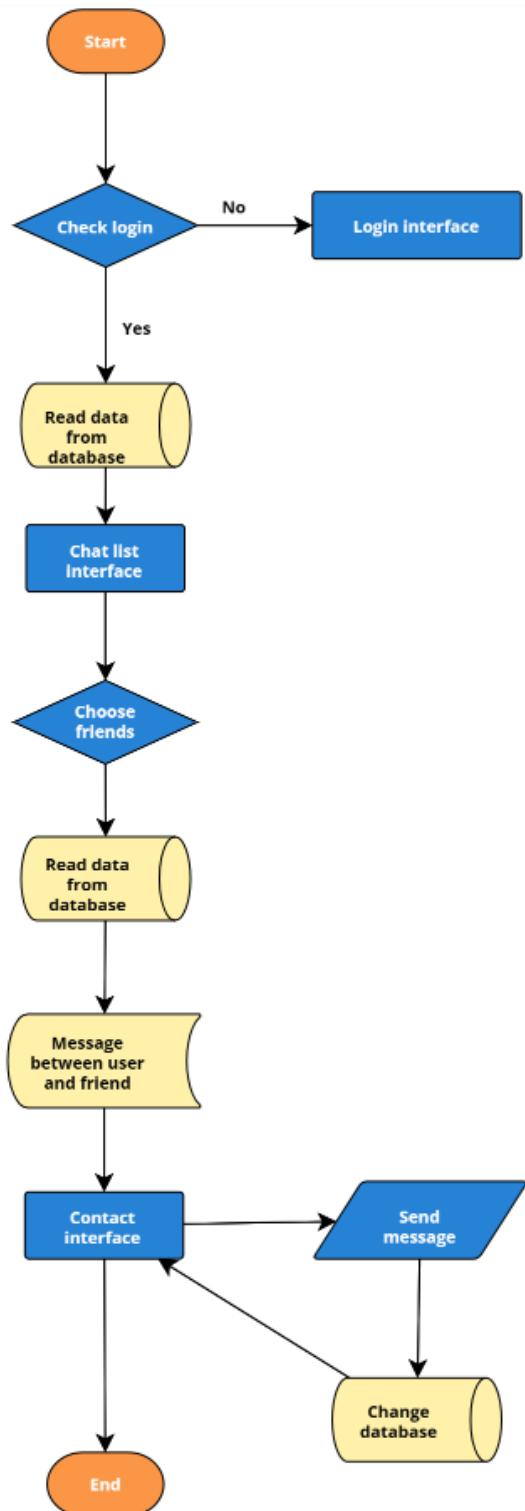
Flow chart:



7. Online chat (For user already login)

Design Idea: User of the website can communicate online with his friends.

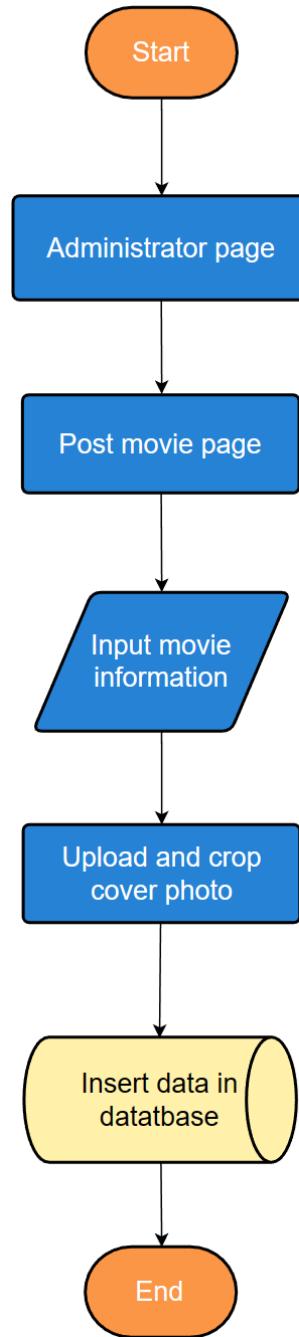
Flow chart:



8. Upload movies (administrator only)

Design Idea: Administrators should be able to upload new movies through permissions on the website in order to make the website complete with movies.

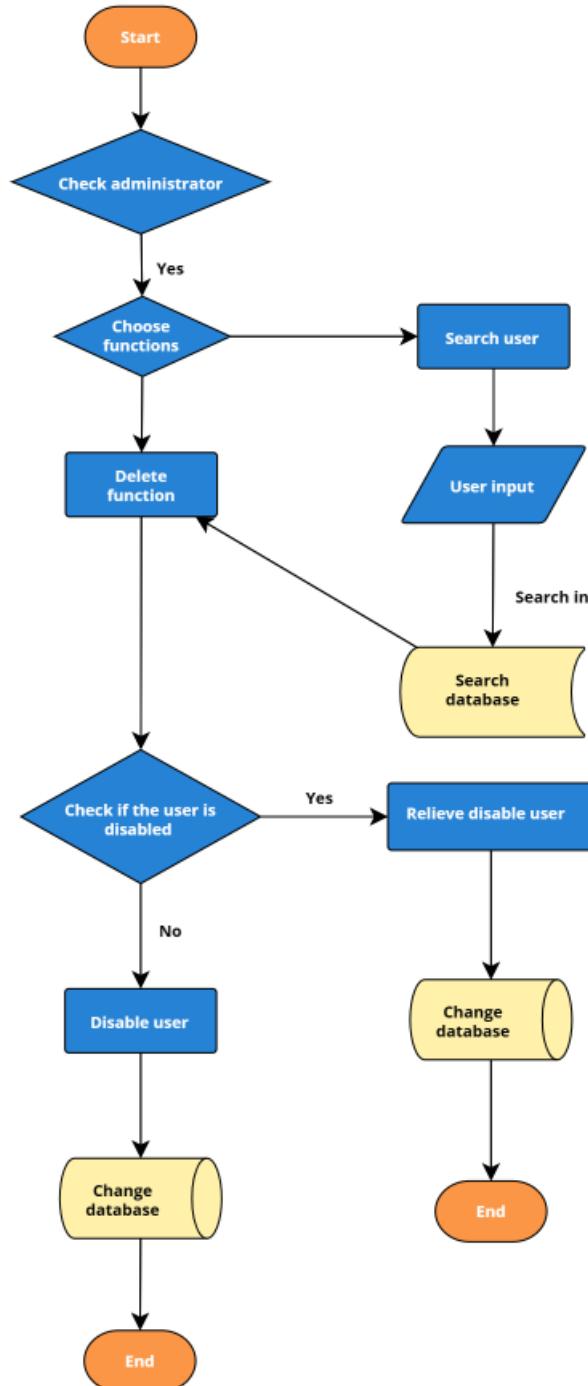
Flow chart:



9. Disable users (administrator only)

Design Idea: The website administrator can disable non compliant users or lift the ban on disabled users.

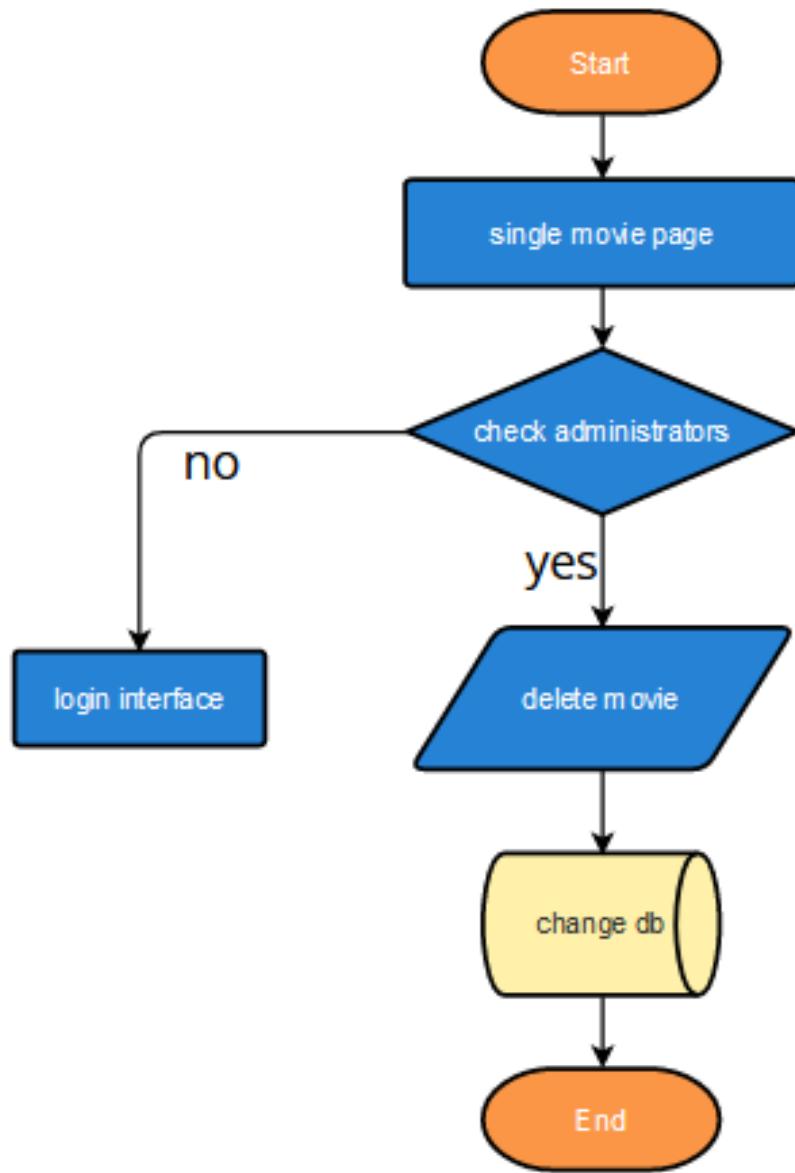
Flow chart:



10. Delete movie (administrator only)

Design Idea: Administrator of the website should be able to delete movie if he/she wants.

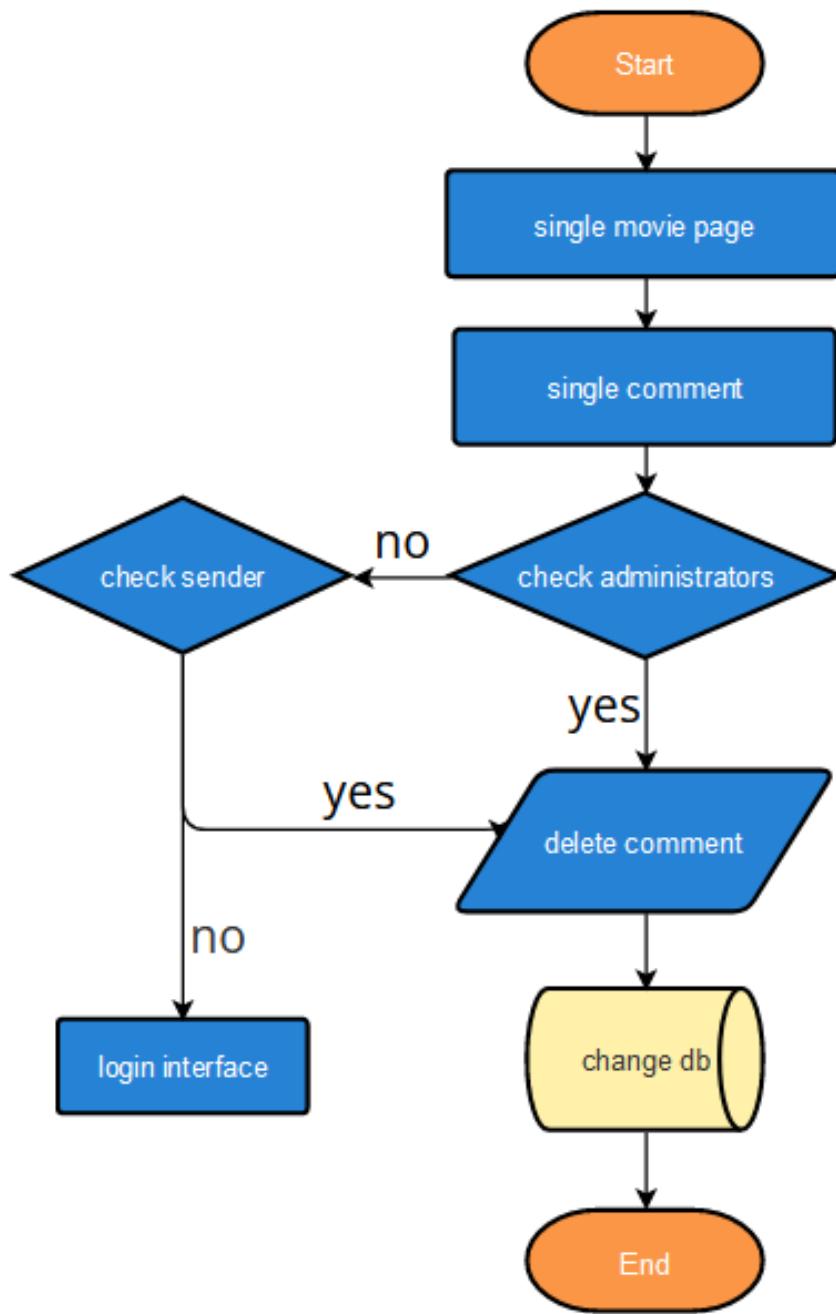
Flow chart:



11. Delete comment (sender or administrator)

Design Idea: The sender of a comment should be able to delete it too, the administrator should also have the right to delete comments.

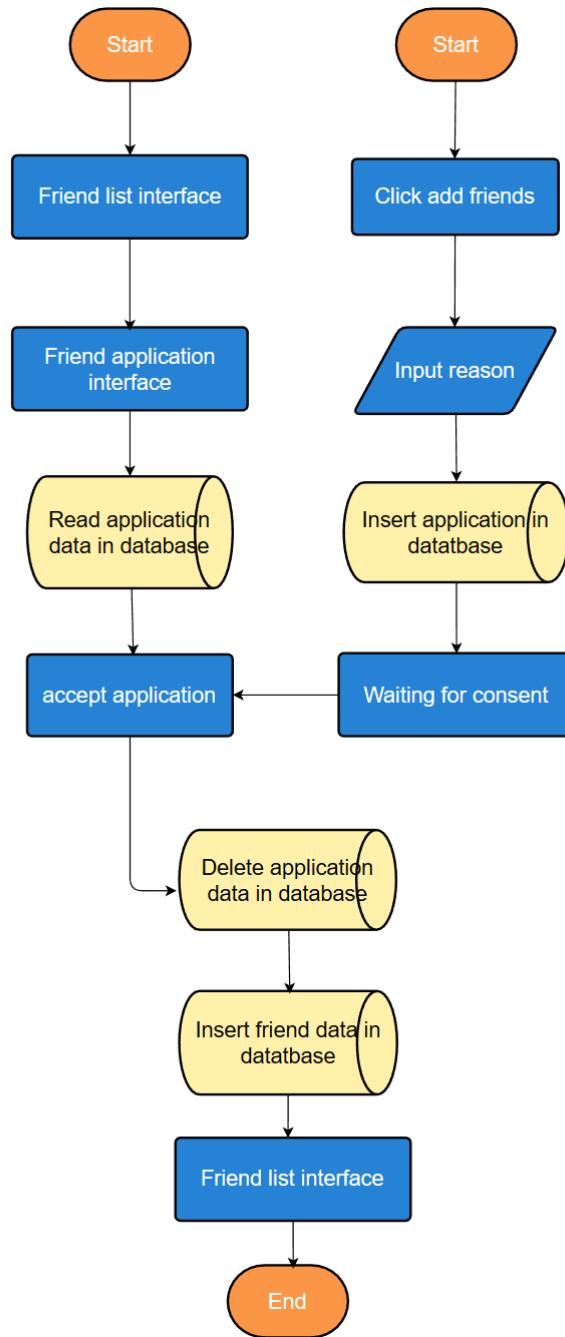
Flow chart:



12. Add friends (For user already login))

Design Idea: As a website that includes the attribute of making friends, there should be a feature that allows users to add friends to each other.

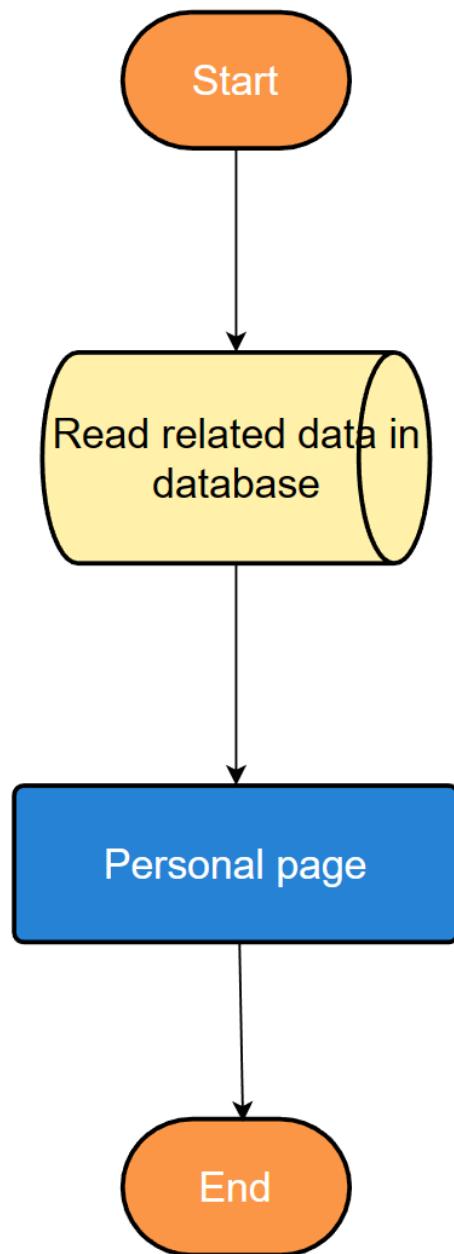
Flow chart:



13. Personal page (For user already login))

Design Idea: The website should allow users to view their personal information as well as information such as favorites, likes, comments, etc.

Flow chart:



4.5 Justification for Design and Decisions

4.5.1 Recommendation Algorithm

For our recommendation part, we chose to use collaborative filtering algorithm. The reason why we use this algorithm are as follows:

1. Our preferred approach is to use a supervised machine learning algorithm to implement recommendation functionality, but based on the reality of our website, we do not have enough datasets to train our own model.
2. Collaborative filtering algorithm plays an important role in the recommendation field.
3. Collaborative filtering algorithm is one of the most popular algorithms in personalized recommendation systems.
4. Collaborative filtering uses the preferences of a group with similar interests and shared experiences to recommend information that users are interested in, which meets the needs of our website for recommendation modules

In our website, we need an algorithm to recommend movies that users may be interested in, quickly respond and generate results. However, our data volume is relatively small and we do not have a large amount of database data. The collaborative filtering algorithm has excellent speed and robustness, as well as high performance under non-large number of users, which is very consistent with the needs of our website.

4.5.2 Online Communication

For our live chat part, we chose to use socket technology for the implementation. The reasons for this choice are as follows:

1. Socket technology allows clients and servers to establish connections, and then exchange information by sending and receiving data packets.
2. The use of socket technology can achieve a real-time bidirectional communication function, which meets our project requirements.
3. Application of socket technology, the transmission of data can be customized, small amount of data, saving traffic and costs.
4. The application of socket technology has short data transmission time, block response speed, high performance, and can provide users with a good experience.

For our website, we need to provide online chat functionality between friends. We need to achieve real-time bidirectional communication, and at the same time, we need this function to have good performance, be able to respond quickly, and try to save costs and expenses. Therefore, socket technology is very compatible with our website.

WebRTC technology can also be used to achieve online chat functions, but socket technology has more advantages than it. Firstly, socket technology can better ensure the reliability and orderliness of data, while WebRTC technology may cause data loss or disorder. Secondly, socket technology can achieve more communication modes than WebRTC technology. Finally, Socket technology can be better compatible with different browsers and devices compared to WebRTC technology.

Therefore, we believe that applying socket technology is a better choice.

4.5.3 Information retrieval

For information retrieval section, we choose BM25, the reasons for selecting BM25 as the ranking algorithm in information retrieval are as follows:

1. BM25 is a classic information retrieval ranking algorithm that has been widely used and proven to be effective.
2. BM25 can handle long texts and optimize for query term frequency, document length, etc., making it suitable for information retrieval on large-scale text data-sets.
3. BM25 does not rely on prior parameter settings and can automatically adjust parameters based on the specific data-set, reducing the difficulty of manual parameter settings.
4. BM25 has high computational efficiency and is suitable for sorting tasks on large-scale text data-sets.

For our website, we need to provide movie-searching and user-searching functions. We want the data-set to be as large as possible, with more relevant information for each movie and user. Therefore, the BM25 is very suitable for us.

4.6 Troubleshooting

4.6.1 Recommendation Algorithm Troubleshooting

- For our recommendation algorithm, We use the collaborative filtering algorithm to recommend movies that may be of interest to users. However, with the increase of movies and users in the database, the performance of the collaborative filtering algorithm will become lower and lower, and the execution speed will also become slower, which affects the normal use of users.
- To solve this potential issues, we can extract random values. When the data in the database exceeds a certain amount, we change the collaborative filtering algorithm from taking the entire database data as the basic dataset to randomly extracting a part of data from the database as the dataset. This ensures the performance of the recommendation system.

4.6.2 Information Retrieval Troubleshooting

- For searching engine, we choose BM25 for searching method, when pro-processing searching data-set, words is the smallest unit. Thus, query input by user has to be at least one complete word, Otherwise, user won't be able to get useful results.
- To solve this potential issues, we can use 'like' method in MYSQL when there is only one word in the query, and use BM25 method when there is more than one word in the query. Or, we can combine both methods, assign different weights to each algorithm, calculate a comprehensive score, and sort them based on the score.

4.6.3 Project File Structure Troubleshooting

- For our current project file structure, we store all HTML files in the templates folder, all CSS files in the css folder, all JavaScript files in the js folder, and all routing methods in the routes.py file. This may make it difficult for maintenance personnel to perform maintenance, fix vulnerabilities, and upgrade operations in future project operations and maintenance. The readability and maintainability of the code are reduced. The scalability and flexibility of the code are reduced, making it difficult to adapt to changes and growth in business requirements.
- To address this potential issue, we can store routes related to different HTML files separately in multiple py files. And create corresponding folders for each HTML file. Store the HTML file, the applied JavaScript file, the CSS file, and the corresponding routing py file in the folder created for it.

4.7 Future System Upgrades

4.7.1 Add more relevant information on the movie information page

We now have some basic information about movies on the movie information page, but as a movie-based website, we believe that more relevant information can be added to the movie to give users a more comprehensive understanding of the movie.

At present, we have the most basic information such as movie posters, movie box office, and movie introductions. We believe that it is also possible to include movie stills (existing databases), movie trailer videos, behind-the-scenes footage videos, as well as participant information (actors and directors).

We believe that this can bring more useful information to users, helping them understand and choose their favorite movies.

4.7.2 Enhance Social Aspects And Add Forum Features

Although our project has added users to add friends and chat online for users to communicate with their friends in terms of social interaction, users can also see different users' comments on different movies by posting comments. If there is more development time, we still believe that in terms of social functions, we can add more features to enable users to experience a better social experience.

We think that we can add forum functionality to enhance the sociality of our project. Users can post posts related to movies on the forum, and those interested in such posts can also leave comments below. Users can socialize and discuss topics of interest on forums. Each user can speak freely and express their own opinions, while also colliding with the opinions of others.

We believe that adding this feature will greatly enhance the social attributes of our project, increase the frequency of communication between users, and increase the likelihood of users making friends. Provide users with a better social experience.

4.7.3 Enhance Searching Engine

The BM25 algorithm is a classic information retrieval algorithm. However, with the continuous increase in data volume and user demand, relying solely on the BM25 algorithm may not be able to meet user needs. Here are some possible upgrades to our search engine in the future:

1. Semantic search based on deep learning

Using deep learning models for semantic search can help search engines better understand users' intentions. For example, a word vector model can be used to convert user queries into semantic vector representations and then match them with documents.

2. Sort search results

The BM25 algorithm typically relies on the degree of keyword matching in documents to sort search results. However, this may not always accurately reflect the needs of users. Therefore, search engines can use other sorting algorithm to better rank search results, such as Page-Rank algorithm, TF-IDF algorithm.

4.8 Test and Maintenance

4.8.1 Test

In the testing phase of our project, to ensure a good user experience and eliminate potential vulnerabilities, we conducted detailed and meticulous testing using a combination of two testing methods.

Firstly, we used black box testing, which only designed test cases based on functional requirements and specifications without considering the internal structure and source code of the program. We checked whether the input and output of each program in the project met expectations, and evaluated the quality and usability of the software from the perspective of the end user.

Secondly, we also used white-box testing (logic-driven testing) to design test cases according to the internal logic path of the program. Check if each statement, condition, branch, loop, etc. in the program method is correct. From the perspective of developers, identify and eliminate errors and defects in code.

4.8.2 Maintenance

To provide users with a better website experience and improve the quality of our website. Our team attaches great importance to the maintenance of products, and two to three members will be involved in the maintenance of the website in the future. We will regularly monitor and record the operation of the project to address any abnormal situations that may arise. We will also regularly maintain and update the database. Receive improvement suggestions from users during use, and make upgrades and adjustments.

4.9 Technique

4.9.1 Front-end:

- HTML
- CSS
- JavaScript (including JQuery)
- Bootstrap (including many bootstrap plugins like swiper and rating plugins)

4.9.2 Back-end:

- Python-Flask
- SQLite
- Python

4.10 Requirements

- attrs == 22.2.0
- bidict == 0.22.1
- click == 8.1.3
- colorama == 0.4.6
- debugpy == 1.6.3
- Flask == 2.2.3
- Flask-Avatars == 0.2.2
- Flask-SocketIO == 5.1.1
- Flask-SQLAlchemy == 2.5.1
- Flask-WTF == 1.0.0
- greenlet == 2.0.2
- itsdangerous == 2.1.2
- jieba == 0.42.1
- Jinja2 == 3.0.3
- joblib == 1.2.0
- jsonschema == 4.16.0
- MarkupSafe == 2.1.2

-
- `nltk==3.8.1`
 - `numpy == 1.22.3`
 - `pandas == 1.4.4`
 - `Pillow == 9.4.0`
 - `pyrsistent == 0.19.3`
 - `python-dateutil == 2.8.2`
 - `python-engineio == 4.4.0`
 - `python-socketio == 5.5.2`
 - `pytz == 2023.3`
 - `regex == 2023.3.23`
 - `six == 1.16.0`
 - `SQLAlchemy == 1.4.7`
 - `tqdm == 4.65.0`
 - `typing-extensions == 4.5.0`
 - `websocket-client == 1.5.1`
 - `Werkzeug == 2.2.3`
 - `WTForms == 3.0.1`

Chapter 5: Reflections

5.1 TianshuChu 19206193

In this movie-community website project, I played the role of a back-end developer, and I was also responsible for the search engine part. In this warm group of five members, I learned a lot from my teammates and discovered some of my own shortcomings, not only in programming skills but also in team collaboration abilities. I am really grateful for their help.

First of all, I have some weaknesses in programming skills, but I have also made a lot of progress during this time. There are three back-end programmers in our group, The other two developers besides me are both excellent. At the beginning of the project, I didn't have a deep enough understanding of many codes and front-end and back-end docking operations and was not proficient in using them. During the first demo developing time, I always ask many questions, and they always answered me kindly. With their help, I gradually felt that these programming tasks were not so difficult. By implementing functions such as liking, collecting, commenting, and collecting folders for movies, I gradually became familiar with database addition, deletion, modification, query operations, as well as related functions such as session and request. Each small success brought me a sense of accomplishment, and as I watched our project getting better and better, I became more and more motivated.

In the second demo phase, I was mainly responsible for the information retrieval part. Our website needs to provide the functions of searching for movies and searching for users. For searching movies, I put the movie name and introduction (may include: date, main actors, tags) into the data-set, use the BM25 model for retrieval, delete the stop-words, stem the word, and rank them by the similarity score. For searching users, I initially wanted to use BM25 to search for usernames, but in actual testing, the user's name was often a single word, which easily caused data loss during prepossessing. In the end, I combined the user ID, username, and prepossessed self-introduction to build the data-set and used BM25 for retrieval.

By the third demo phase, I could quickly identify and solve problems and write reliable code proficiently. For example, when completing functions such as user changing personal information, changing passwords, and administrator deletion, I could easily and efficiently complete them. And in several joint efforts with the front-end, I also gained some understanding of the front-end code.

On the other hand, I believe that friendly communication is the advantage of all our team members. Everyone's positive and patient has contributed to the smooth progress and ultimate success of the project. No one of us chooses easy works, we actively choose for difficult works. When the work encounters difficulties, we can still maintain a positive attitude. We plan, deploy, learn, and grow together. Through the team collaboration, I have a deeper understanding of communication and attitude.

Except of meeting time, all members of our group will select two days each week to sitting together. Discuss those coming tasks, thinking how to divide the work, who needs to be coordinated with whom, and communicate the current progress. Everyone works together in the same room, encourages each other, solves problems together, and communicates immediately when there is a need. Both the front-end and back-end work together. Because of the information gap, my efficiency is not very high when I work alone, and encountering problems easily deflates me. However, when the team is together, the work efficiency is very high. When everyone is united,

everyone's strengths will be magnified, and weaknesses will be minimized. At this time, there is no difficulty that cannot be solved. A good team will be very beneficial to people. In my eyes, each of our members has their own shining points.

In my future work, when I encounter difficulties, I hope I can maintain a positive attitude as much as possible and try to solve problems from a different perspective. I also want to hear advice from others more and avoid stubbornly insisting on my own point of view.

Overall, I really cherish this opportunity to do a team graduation project. This project has allowed me to gain a deeper understanding of myself, discover my strengths and weaknesses, and provided me with valuable opportunities for reflection and learning for my future personal and career development. Additionally, it has also given me a deeper appreciation of the importance of teamwork and communication, as well as the necessity of continuously improving my technical and soft skills.

5.2 PeixuanDong 19206154

In this movie community project development, my responsibility is the back-end developer, responsible for participating in the development of the back-end part of the entire project, and also involved in front-end docking work and related development of machine learning.

At the beginning of this semester, I participated in discussing the group topic selection for the Graduation Design Project. Among the many alternative topics, I chose to design and implement a movie community. Provide a platform for fans to learn about movies, post comments, and make like-minded friends.

After that, the team entered the preparation phase of the project, and I participated in the writing of team agreements, project proposals, and project plans. Two other back-end developers and I designed and created the project's database (SQLite database). Together, we designed the structure of the tables in the database, as well as the elements and element types contained in each table. The database was created successfully.

In the first milestone session, I implemented the back-end logic for user registration so that visitors can register as new users on our website and experience the related services on our website. I implemented back-end logic for movie reviews, collections, reviews, and ratings so that users can comment on their favorite movies, collect movies of that interest, express their opinions, and rate different movies. At the same time, I also implemented the back-end logic of the movie zoning display and movie list functions to facilitate users to find their types of movies of interest and understand the trend of today's movies (what kind of movies are most popular with everyone). And participate in front-end and back-end docking of the above functions, so that the functions can operate normally.

In the second milestone session, I participated in the work of recommending users for mechanical learning, finding and learning appropriate algorithms for machine learning to adapt to the recommended functions that we need to achieve. To achieve this function, I searched a lot of data and had a heated discussion with other members. Finally, we chose to use a collaborative filtering algorithm to achieve the recommended user function. My teammates and I apply the collaborative filtering algorithm to recommend users (potential friends) who have the most matching and similar interests to use this feature, based on how members rate different movies and how other users rate different movies.

In response to the fact that some users have too few ratings for different movies, which may result in the inaccurate use of collaborative filtering algorithms to recommend potential friends to such users. Finally, I chose to use the Russel Rao similarity algorithm. Implement recommend users with similar movie types to the user according to the genre of the user's favorite movie.

In the milestone3 section, we started developing social functions and adding administrator-related functions. I'm responsible for the back-end development of online chats. This is the second time I have been exposed to the development of such a feature, and after reviewing the relevant information and combining my previous experience, I decided to use socket technology to achieve this feature. Connect according to socket technology, and use the socketio emit method to achieve online chat between friends. This feature is a core part of our project's social functionality and plays a decisive role in how well users experience their social experience when using it. This development not only improves my learning ability but also makes me a deeper understanding of socket technology. In this section, I also implemented the administrator's back-end logic for disabling and enabling users. This part of the functionality is necessary for our project. If a user posts an illegal comment, the administrator can disable the user so that he can no longer use the comment service, thereby maintaining a good site environment.

In the final section, we participate in project optimization and testing to ensure that users of our

website can have a good experience without encountering bugs on the site. At the same time, we make our site more user-friendly.

In this project development, I have learned a lot of knowledge, and at the same time, I have obtained a lot of harvests. Technically, in the development of this project, I have used and deepened Flask, Python, SQLite, html, jquery, socket, and other technologies. I think the biggest challenge for me is in the machine learning section, where I need to implement an applied machine learning algorithm and recommend potential friends to users. None of the machine learning algorithms I had perfectly matched the functions I wanted to achieve, which made me face difficulties at that time. I looked through a lot of information and consulted the group members. Ultimately, I decided to use an Unsupervised machine learning algorithm, Collaborative Filtering. This algorithm is user-based and uses similarity statistics to get neighboring users with similar interests or interests. This algorithm fits perfectly with the function of recommending potential friends, recommending users with the same movie interests to be friends. This challenge not only enhances my understanding of the machine learning algorithm but also makes me feel the unity and cohesion of the team.

In this project development, I deeply understand the importance of teamwork and team cohesion. Previously, whenever I faced problems and challenges, I was used to solving them on my own, and at that time I often fell into an unsolvable dilemma. But in this project development, our team members help and encourage each other. Each member is very friendly and helpful. When any team member is in a dilemma, the other team members will help, discuss and tackle the problem together. This not only greatly improves our work efficiency, but also gives our team a good atmosphere and greater unity among the members. I think the strength of the team is very strong when all the people in the team work together for a goal and pay unreservedly, any difficulties and challenges will be solved.

With this unforgettable development experience, I believe that in my future work and life, I will apply the knowledge and insights I have learned in this development to face any challenges and difficulties in the future. I will be full of confidence and courage to overcome and face it.

5.3 Hua Xia 19206157

I am Xia Hua and I am the front end programmer in this project and responsible for part of the front end part and I also participate into the design of the websites, machine learning algorithms, and document writing together with all my teammates.

My reflection could be divided into 2 parts:

- Individual Contribution on the Project: In this part I would introduce my contribution to the project in detailed manner and also discuss about some personal experience gained from this project.
- Personal Development: This section will present my development of both soft and hard skills throughout this project, as well as the collaboration strategies employed by our group.

Individual Contribution to the Project

1. In a group discussion before the start of the semester, I participated in the selection of our topic: movie recommendation with social functions. My group mates and I agreed on this topic because we wanted to explore how to combine movie analysis and recommendation algorithms with social networking features.
2. At the beginning of our project, as front end programmers, Zhao Xuran and I discussed some technical aspects of our website, especially about the choice of front end technologies (Bootstrap, CSS, HTML, JavaScript) and the design of the user interface. Based on our skills and preferences, we divided the tasks accordingly. I took charge of the front end programming because I had more experience and interest in this area than in the back end part.
3. One of my tasks was to design and implement the registration and login page of the website. Creating a static HTML page was relatively easy, but I encountered some challenges when I tried to connect it with the back end. I had to refresh my memory on how the front end and back end communicate with each other. For instance, I had to figure out how to handle user input errors, such as too short passwords or already used usernames. As a front end developer, these issues were not very difficult, but they required a lot of time and energy to solve. I also had to collaborate with the back end programmer to determine what kind of data they needed from the back end.
4. One of my tasks was to design and implement the navigation bar and the home page of the website. The navigation bar allows users to access different features of the platform, such as the category page, the login/logout and register functions, the website introduction page, the search function, and the administrator or profile page (depending on the user role). The home page displays a variety of movies for users to browse and select. Users can see the rating, name, and introduction of each movie. They can also view movies in different ranking methods, such as popularity, most viewed, top rated, and latest. If users log in, they can see some personalized movie recommendations based on two algorithms: one that uses movie tags and another that uses machine learning. Users can switch between these algorithms. Users can also click on any movie title, picture, or "detail" button to go to the movie detail page.
5. Another task that I completed was the movie detail page, where users can see the detailed information of a movie, such as rating, category, story line, and poster. Users can also interact with the movie by liking, collecting, rating, and commenting on it. The page also shows the comments of other users and allows users to click a thumb icon to express agreement.

I found this task to be one of the most challenging for the front end, as it involved a lot of data exchange between the front end and the back end. I was not confident that I could finish this task at first, but I kept learning and asking questions until I successfully recalled how to use ajax to send and receive data and how to use forms to submit data.

6. One of the features of our platform is the social square page, which allows users to interact with other users who share similar interests or preferences. It uses swiper to display cards that contain information about the recommended users. Users can swipe the cards to see different options and click the add friend button to send a friend request. The friend request is then stored in the application database and the recipient can accept it in the friend interface (this part was done by Zhao Xuran). However, this feature posed some challenges in terms of design and functionality. Firstly, the animation and effect of card switching was not always smooth and consistent. To solve this problem, I consulted the documentation of swiper and tried various methods until I found a suitable function that improved the performance of the feature. This experience taught me the importance of persistence and problem-solving skills in software development. Secondly, the feature required some machine learning techniques to generate user recommendations based on user preferences of movies. Since I was not familiar with machine learning, I had to do some research and ask for help from my teammates. Together, we managed to implement a user-based collaborative filtering algorithm that matched users with similar tastes and preferences. This experience taught me the importance of teamwork and learning new skills in software development.
7. In addition to the social square page, I also partly developed several other functions of our website, such as the search page (reuse the home page), the category page (reuse the home page), the chat page (reuse the friend list page done by Zhao Xuran), and some parts of the administrator functions. The administrator functions included creating an administrator home page (reuse profile page done by Zhao Xuran), deleting movies (reuse social square page), and banning users (reuse social square page), viewing feedback. These functions were not very technically challenging and I reused existing codes from me and my teammates, but they required careful design and coordination with my teammates. The interactive features of these functions were later improved by other teammates.

Personal Development

1. Soft Skills: Our group was characterized by a high level of equality, democracy and collegiality among the team members. We established a regular schedule for weekly meetings and used WeChat as a platform for online communication and problem-solving. I appreciated the supportive and cooperative atmosphere in our group, where everyone was willing to share their ideas and offer assistance. Through this project, I learned the importance of timely and effective communication, as well as seeking and providing feedback. I also experienced the power of teamwork in enhancing our performance and potential and pushing us going. Moreover, I developed my skills in conflict resolution, negotiation and compromise, as well as asserting my opinions when necessary.
2. Hard Skills: This project also enhanced my hard skills, especially in problem-solving. Previously, I would get stuck when encountering coding challenges, but during this project, I became more resilient and learned how to use indexing and online resources such as Stack Overflow to find solutions. Furthermore, I advanced my front-end programming skills by applying and deepening my knowledge of HTML, CSS, JS, jQuery and Ajax techniques. I also learned how to use Bootstrap and other components such as Swiper from GitHub or other sources to improve the appearance of my web pages. Additionally, I gained more familiarity with front-end and back-end interaction and acquired some practical skills in using Flask to facilitate the communication between them. I also improved my machine learning knowledge.
3. This project was a highly beneficial experience for me, as it enabled me to develop both my soft and hard skills. I feel more confident and prepared to face new challenges in the future.

5.4 Xuran Zhao 19206154

I'm Xuran Zhao, a web front end developer in the third group. My reflections will be divided into two main parts. The first part covers the specifics of the development I was involved in at each milestone. The second part will introduce what I have learned during the project development process and consider its impact on my personal development.

At the beginning of the project development, I collaborated with my group members to establish the direction and theme of our project. This was a challenging process that required us to take into account various factors, such as the market situation (the availability and demand of similar products), the technical feasibility (the alignment of our skills with the technologies needed), and our personal interests. After that, I also participated in the writing of project plan, work package and other files.

My role in the website project was to develop the front end. For the first milestone, I focused on coding the main structure of the personal page. The personal page consists of two sections: the left section and the right section. The right section displays some personal information, such as favorite movie genres, recent favorites and comments. The left section has three components: a profile picture and name at the top, a navigation bar in the middle, and a toolbox button at the bottom. The navigation bar allows the user to switch between different content on the right section. The toolbox button opens a pop-up box that offers some additional functions, such as editing personal information and password. I also implemented the post movie feature at this stage, which is intended for admin use only.

In the second milestone section, I and another member were responsible for the machine learning part of the movie recommendation system. We first searched online and learned about possible machine learning models that we could use. We chose the alternating least squares (ALS) algorithm based on the suitability of the models for our project. ALS is a collaborative filtering algorithm that uses alternating least squares to solve for user and item factors. It infers user preferences and recommends items based on the observed ratings of all users. Then I also created a friend list display page, where friends are sorted by their initials, and each letter is shown on the right side of the list. Users can click on a letter to quickly locate friends whose names start with that letter. Moreover, there is a search function at the top to find friends in the list. There is also a function to view friend requests at the top. After clicking on it, all the friend requests will be displayed on the right side. Users can choose to accept or reject them.

In the third milestone section, I first completed all the information to be displayed on the personal page. This included the basic information such as the number of favorites, comments, friends, and the percentage of each tag in the movies that I liked. Then I displayed the recent favorites and likes (up to six), which could be switched by clicking two different buttons. I could also click on more to go to a new page to view all the likes and favorites. Finally, I displayed the user's high-praised comments, showing which movie they were for. I also completed the pages for changing personal information and password. These functions were in the toolbox at the bottom left corner of the personal page. In addition, I completed the function of viewing other people's homepages. Other people's homepages had roughly the same content as the personal homepage, but they showed some more basic information, such as email, gender, age, etc. There was also a button to add friends on this page.

In the fourth milestone stage, our program was basically finished. My work was to test the program, fix bugs, and write the thesis (especially the user document).

Throughout the project development process, I acquired various technical skills and knowledge, such as how to use HTML, CSS, JavaScript, MySQL, and AJAX to build a dynamic and interactive website. I also learned how to apply machine learning algorithms, such as alternating least squares

(ALS), to design the recommendation system based on user ratings and item features. I also learned how to use GitHub to work with my team members and control the code version.

In addition to the technical skills and knowledge, I also developed some soft skills and personal qualities that are crucial for collaborating in a team and creating a project. For instance, I learned how to communicate effectively with my team members and stakeholders, such as defining the requirements, providing feedback, solving conflicts, and demonstrating the results. I also learned how to manage my time and resources effectively, such as setting deadlines, prioritizing tasks, assigning roles and responsibilities, and monitoring progress. I also learned how to be creative and innovative in addressing problems and finding solutions. Of course, all these accomplishments were enabled by the active cooperation of the team members. Everyone contributed actively to the team project development, which allowed us to finish each task productively and promptly.

The project development process has had a positive impact on my personal development. It has increased my confidence and competence in web development and machine learning. It has also enhanced my teamwork and communication skills. It has also aroused my curiosity and interest in learning new technologies and exploring new domains. It has also helped me cultivate a professional attitude and work ethic.

To sum up, the website project development with my team was a valuable learning experience for me. It has imparted me many technical skills and knowledge, as well as soft skills and personal qualities. It has also affected my personal development in various aspects. I am thankful for this opportunity and proud of what we have achieved.

5.5 Tingjun Wu 19206159

I'm Tingjun Wu, one of the back-end developers in this project group, participated in most of the back-end code and designed this website together with my teammates.

My role in our group project on movie recommendation and social networking community is a back-end developer. I design and implement the machine learning module that generates personalized recommendations for users based on their preferences and ratings. I also develop the user-related modules that enable users to sign up, log in, check their profiles and interact with their friends. Additionally, I create the movie publishing module that allows administrator to upload movies. Furthermore, I establish and maintain the database that stores the data of our website. I use various tools and techniques to ensure the security, efficiency and scalability of the back-end system.

This project has made me aware of the gaps and challenges in my back-end development skills. I realized that some technologies that I had learned before became rusty due to lack of practice, and I had to relearn them when I encountered them in the project. This has led me to take many detours when programming some modules and spend more time thinking about how to implement code. Moreover, our back-end code was not well-structured and modularized. I initially planned to use the Flask-blueprint framework to organize our project into modules, but I did not follow through with it. When the code became too complex and cumbersome, it was too late and difficult to refactor it. Furthermore, our database design was not optimal and comprehensive, I didn't fully consider something, which led us to make multiple modifications to the database during programming.

One of the positive aspects of my experience is that I have played an effective role as a "facilitator" in the team. I have fostered smooth and productive communication among team members and helped them overcome problems when they encountered difficulties. I have also maintained a friendly and respectful relationship with my teammates. We express different opinions and negotiate on the functions of many project modules. I often chat with my back-end partners about the back-end implementation of the project and solve the defects in each other's ideas. In order to better communicate with front-end members, I have learned a lot of front-end knowledge from them, which has enriched my knowledge reserve.

In the first demo, I designed the database and developed the modules for login registration, movie information release and friend functionality. I also contributed to other back-end features. I tried to create a comprehensive and robust database design, but I had to modify it several times as the project progressed and the plan changed. In order to better beautify the website pages, as a back-end programmer, I actively communicate with my front-end teammates to adapt the front-end and back-end code.

In the second demo, my front-end teammate Xuran Zhao and I focused on implementing the machine learning module for recommendation algorithms, improving the friend functionality and redesigning the user profile pages. We initially planned to use supervised machine learning algorithms for our movie recommendation system, but we realized that we did not have enough data to train a reliable model for our website. After doing some research and discussion, we decided to use similarity algorithms and collaborative filtering algorithms instead. The similarity algorithms use the user's preferred tags to calculate the similarity with movies and recommend the most similar ones. The collaborative filtering algorithms fill a sparse matrix with all users' ratings of all movies

in our database, and then use the ALS (alternating least square) algorithm to predict the movies that the current user may rate highly.

In the third demo, I improved the friend system and developed the features for friend list, personal homepage, other users' profiles and online chat. I had to modify many tables in the database for this demo. I had some experience with using socket to implement the online chat module on the website, but I faced the challenge of how to switch between conversations with different friends in different scenarios. We solved this problem after extensive discussion and research in our group.

This project experience has been very beneficial for me, as it has allowed me to apply many of the technologies that I learned during my university years to a comprehensive project. I have improved my coding skills and gained a deeper understanding of web development based on the Flask framework. The use of new machine learning algorithms has also given me a better understanding of machine learning and taught me how to choose the appropriate algorithm in different situations. The extensive interaction with front-end members has also made it easier for me to communicate in group work, and I have also gained an understanding of the semantics of front-end languages such as HTML, JavaScript, and Ajax, making it easier for me to collaborate with front-end classmates. The most valuable outcome of this project is that I have found four like-minded partners, and our friendship will last forever.

Chapter 6: Summary and Conclusions

In this section, you will sum up your project, draw some conclusions about your work, and make some general observations about the work could be extended in the future.

In this project, we developed a website that combines movies and social networking features. The website allows users to browse, rate, and review movies. The website also provides personalized recommendations based on the user's preferences and ratings. The website was implemented using HTML, CSS, JavaScript, and SQLite. We evaluated the website's usability, functionality, and performance using various methods such as user testing, and web analytics.

The website meets the requirements and objectives that we set at the beginning of the project. It provides a user-friendly interface and a variety of social networking features. The website demonstrates the potential of integrating movies and social networking in a web-based platform.

The possible future work for this project are:

1. Add more relevant information on the movie information page, and expand the movie database by integrating with external sources.
2. Enhance the social aspects by adding forum features.
3. Improve the searching engine.
4. To optimize the website's performance by using caching, compression, and load balancing techniques

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We hope that our website meets their expectations and standards, and that it contributes to the community in a meaningful and engaging way. We are happy with our achievements, and we recognize that they are the result of their guidance and support. Thank you for everything!

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