A Case Study Report on

Movie Recommendation System using Cosine Similarity

Submitted in partial fulfilment of the requirements for the award of degree

BACHELOR OF ENGINEERING

in

COMPUTER SCIENCE AND ENGINEERING

by

Rama Krishna Parjanya Varanasi (160118733038)

G Venkat Sai Teja (160118733055)

Department of Computer Science and Engineering,

Chaitanya Bharathi Institute of Technology

(Autonomous),

(Affiliated to Osmania University, Hyderabad),

Hyderabad, TELANGANA

(INDIA)-500 075

CERTIFICATE

This is to certify that the project entitled **Movie Recommendation System using Cosine Similarity**, submitted to the Computer Science and Engineering Department, Chaitanya Bharathi Institute of Technology, in partial fulfilment of the requirement for the course Case Study, is a bonafide record of work done by **Rama Krishna Parjanya Varanasi (160118733038)** and **G Venkat Sai Teja (160118733055)**, from February, 2021 to May, 2021 under our guidance and supervision.

Mentors,   Supervisor,

Smt. D.Naga Jyothi   Smt. T.Suvarna Kumari
Assistant Professor   Assistant Professor
Department of CSE,   Department of CSE,
CBIT   CBIT

Smt. Isha Padhy
Assistant Professor
Department of CSE,
CBIT

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ABSTRACT

Nowadays, everyone's go-to applications for watching movies and TV series are the video streaming websites such as Netflix, Prime, Hulu, etc. Gone are the days when people used to wait for their favourite movie or TV series episodes to air on the TV. The video streaming websites have a large collection of movies and TV series. You can watch them at any place, at any time and on any device. This makes them very versatile and convenient for the users.

A lot of times, whenever we finish watching a TV series or a movie, we'll be left craving for more. That may be content from the same genre or from the same director or from same actors, etc.

The recommendation system plays a major role in this case. It analyses the content that you have watched and recommends other TV series and movies that are from the same genre or from the same director, etc. The recommendation system also analyses the data of other users that have similar tastes as yours and recommend the movies and TV series accordingly too.

This helps the streaming websites to boost their revenue and ensure high customer satisfaction and retention.

INTRODUCTION

A movie recommendation system analyses the movies that the user has watched and suggests similar movies based on various factors such as genre, director, actors, etc. Thereby the users don't have to waste their time by searching for movies that are similar to the ones that they have watched. The user may also come across new movies that were previously unknown to them.

Recommendation systems help the streaming websites to boost their revenue, Click-Through Rates (CTRs), ensure high customer satisfaction and retention.

BACKGROUND INFORMATION

For a recommendation system to provide effective suggestions, it needs to know you better. Therefore, the information it collects and integrates is a vital aspect of the process.

This information can be related to two types of interactions:
1. Explicit Interactions: Information about your past activity, your ratings, reviews and other information about your profile, such as gender, age, etc.
2. Implicit Interactions: Includes info such as the device you use for access, clicks on a link, location, and dates.

There are 3 types of techniques for Recommendation systems:
1. Content-based filtering
2. Collaborative filtering
3. Knowledge-based filtering

In our project, we used content-based filtering using cosine similarity.

Content-based filtering is based on a single user's interactions and preference. Recommendations are based on the metadata collected from a user's history and interactions. Returning information such as products or services will relate to the user's likes or views.

Cosine similarity measures the similarity between two vectors of an inner product space. It is measured by the cosine of the angle between two vectors and determines whether two vectors are pointing in roughly the same direction.

SCOPE

The scope of this project is to provide relevant movie/TV series recommendations to the users based on the name of the movie/TV series name that they enter in the search bar. For this purpose, we are going to use content-based filtering using cosine similarity.
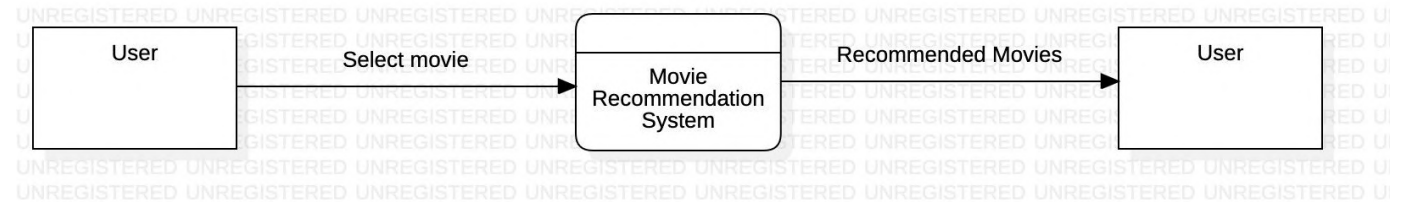
Through this method, the user will be provided with a vast range of recommendations that are similar to their interests, thereby saving the time of the user. The user may also come across new movies/TV series that were previously unknown to them. This way the streaming websites will be able to boost their revenues and ensure high customer satisfaction and retention.

DESIGN AND IMPLEMENTATION

The dataset containing the movie details is taken from the Kaggle website. To build the web application, HTML, CSS, JavaScript and Flask were used.
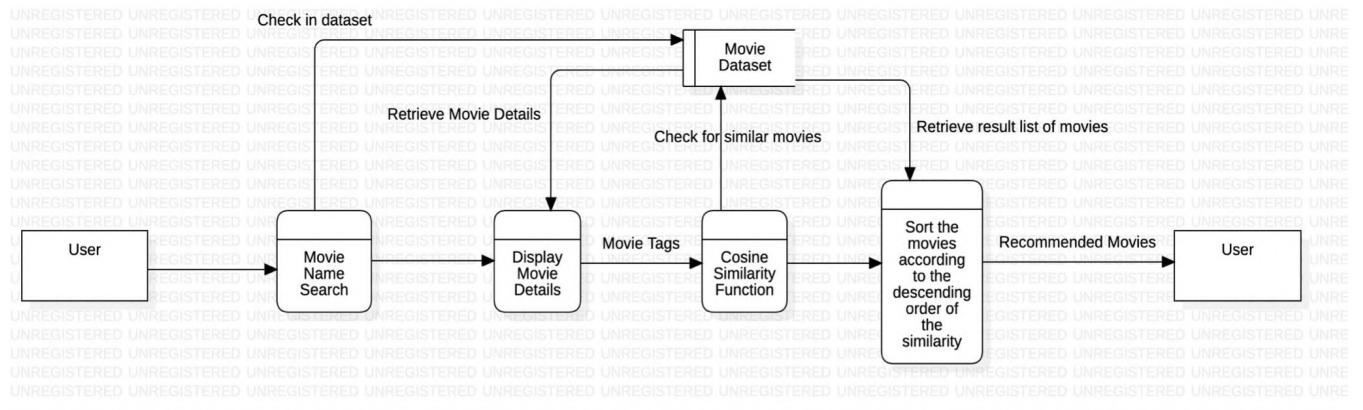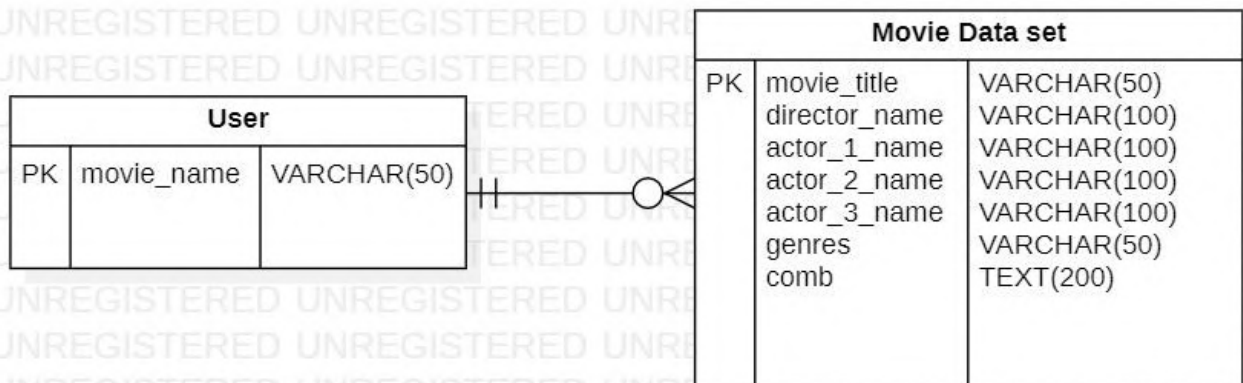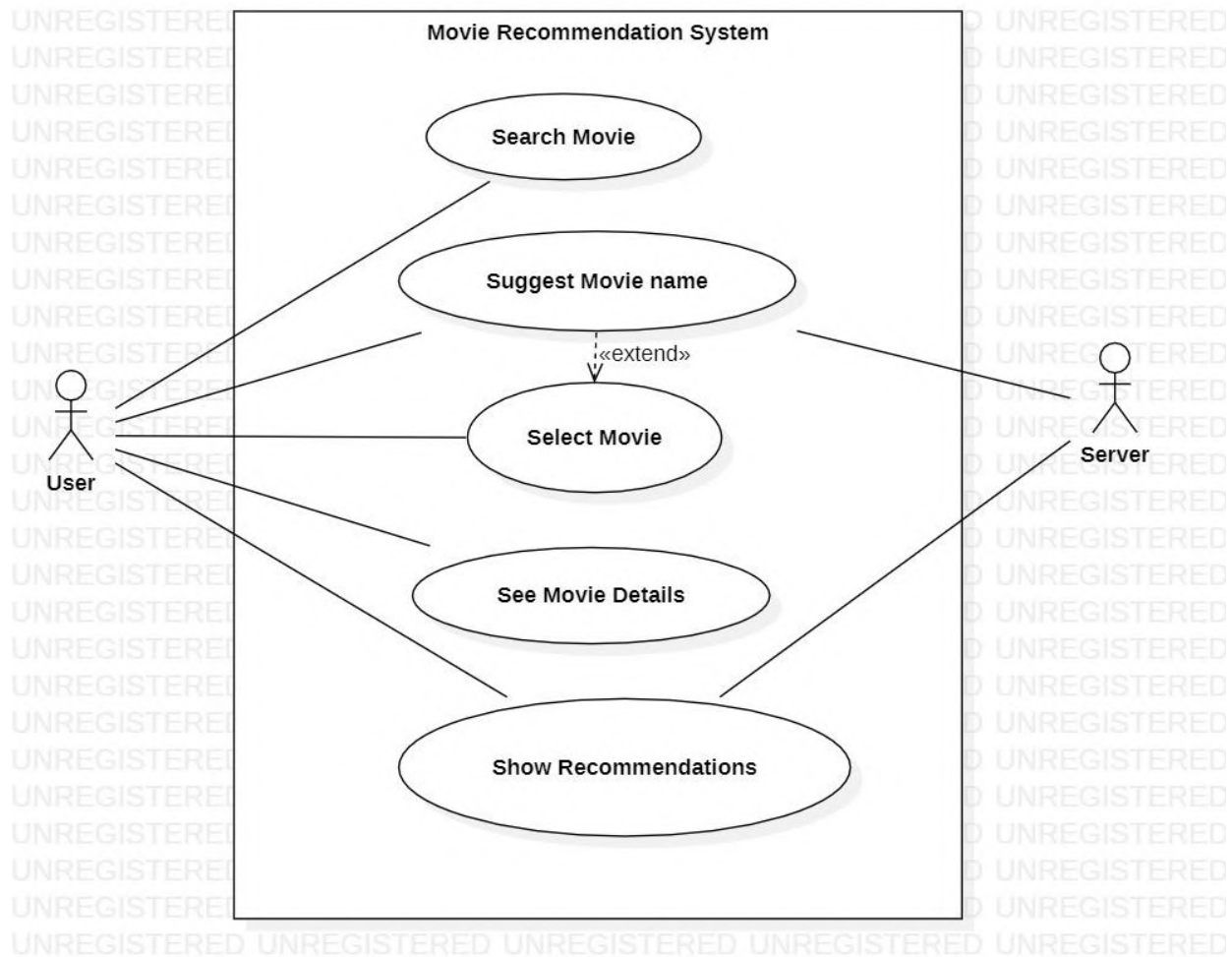
Data Flow Diagrams
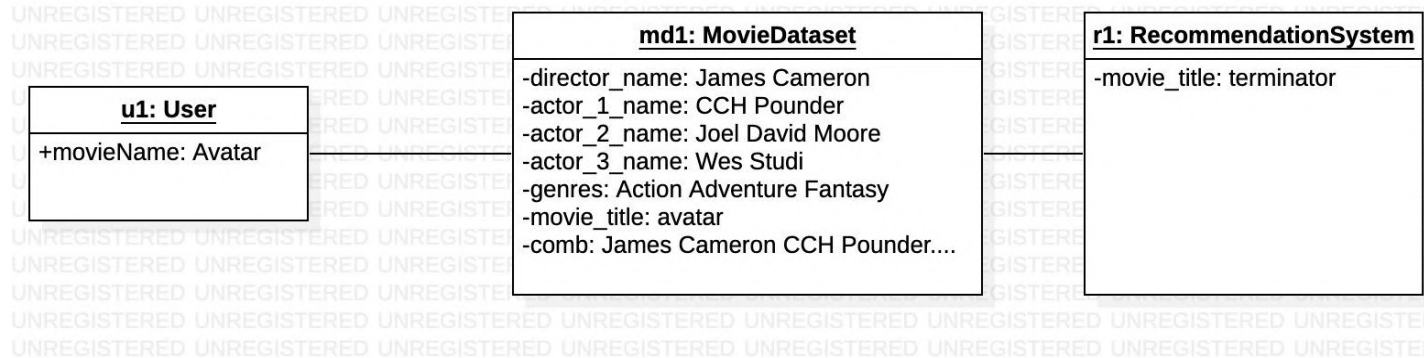
Level 0

Level 1
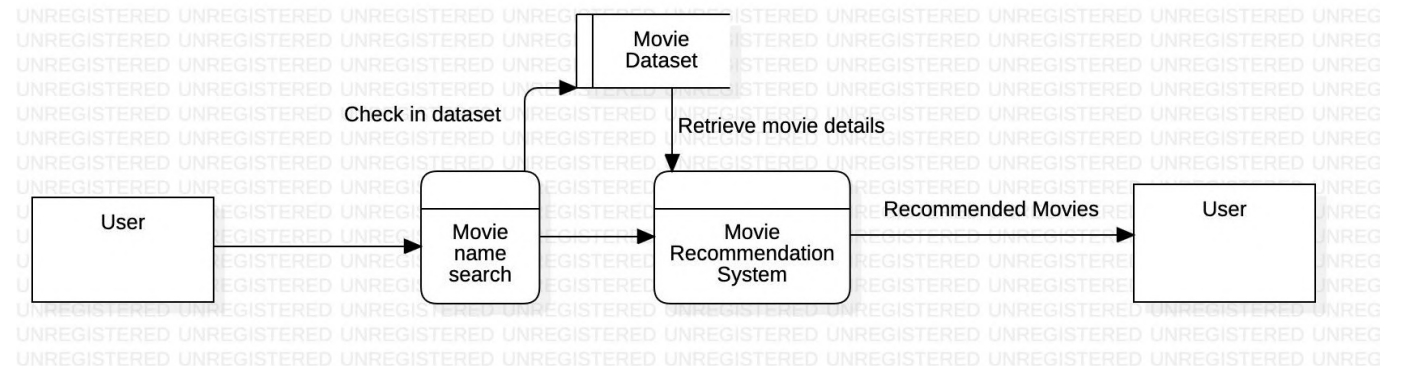
Level 2

ER Diagram

Use Case Diagram

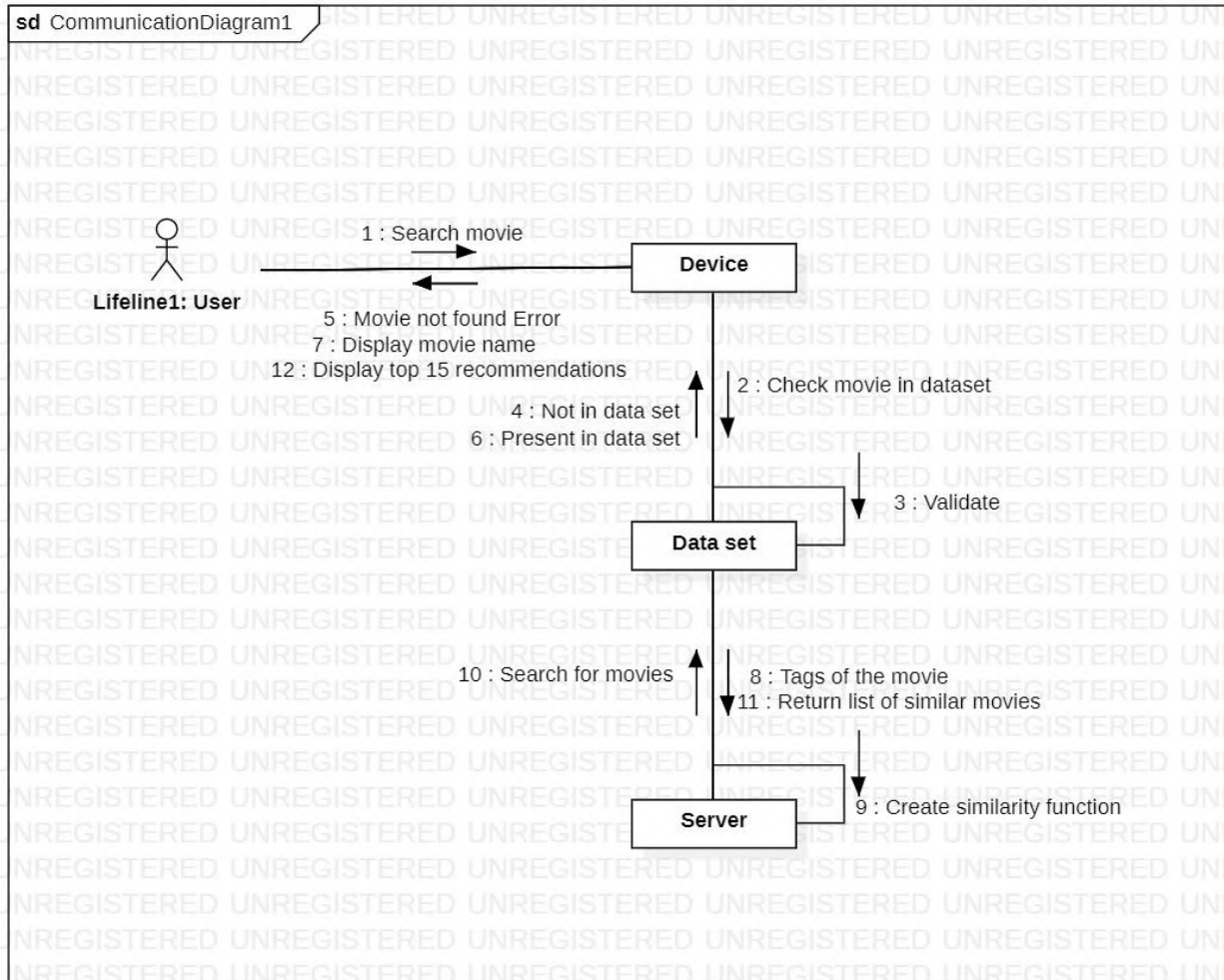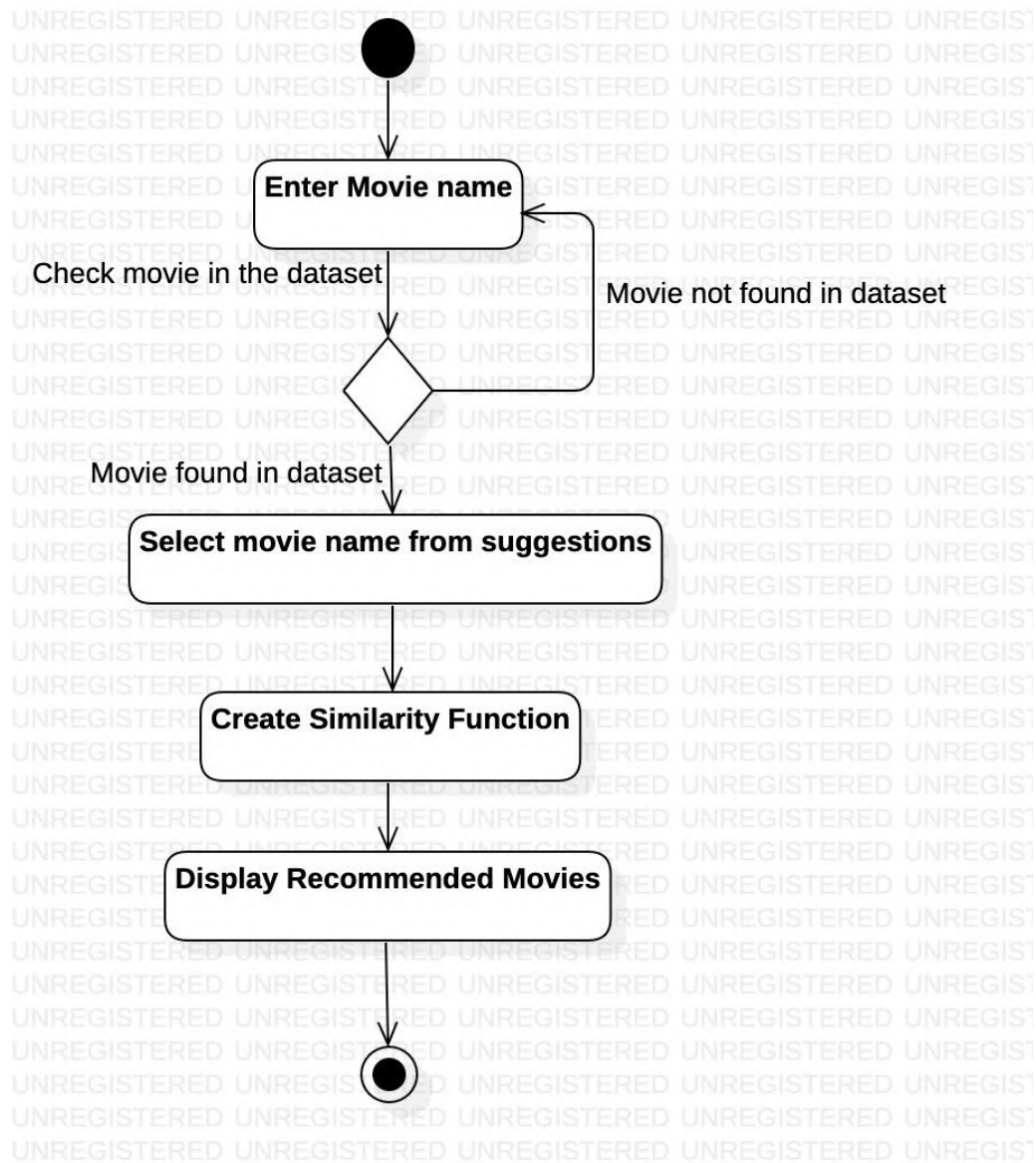# Object Diagram

Class Diagram

User

+movieName: String

+SelectMovieName(): void

MovieDataset

-director_name: String
-actor_1_name: String
-actor_2_name: String
-actor_3_name: String
-genres: String
-movie_title: String
-comb: String

-GetSuggestions(): String

1   0..*

RecommendationSystem

-movie_title: String

-CreateSimilarity(): void
-Recommend(): String
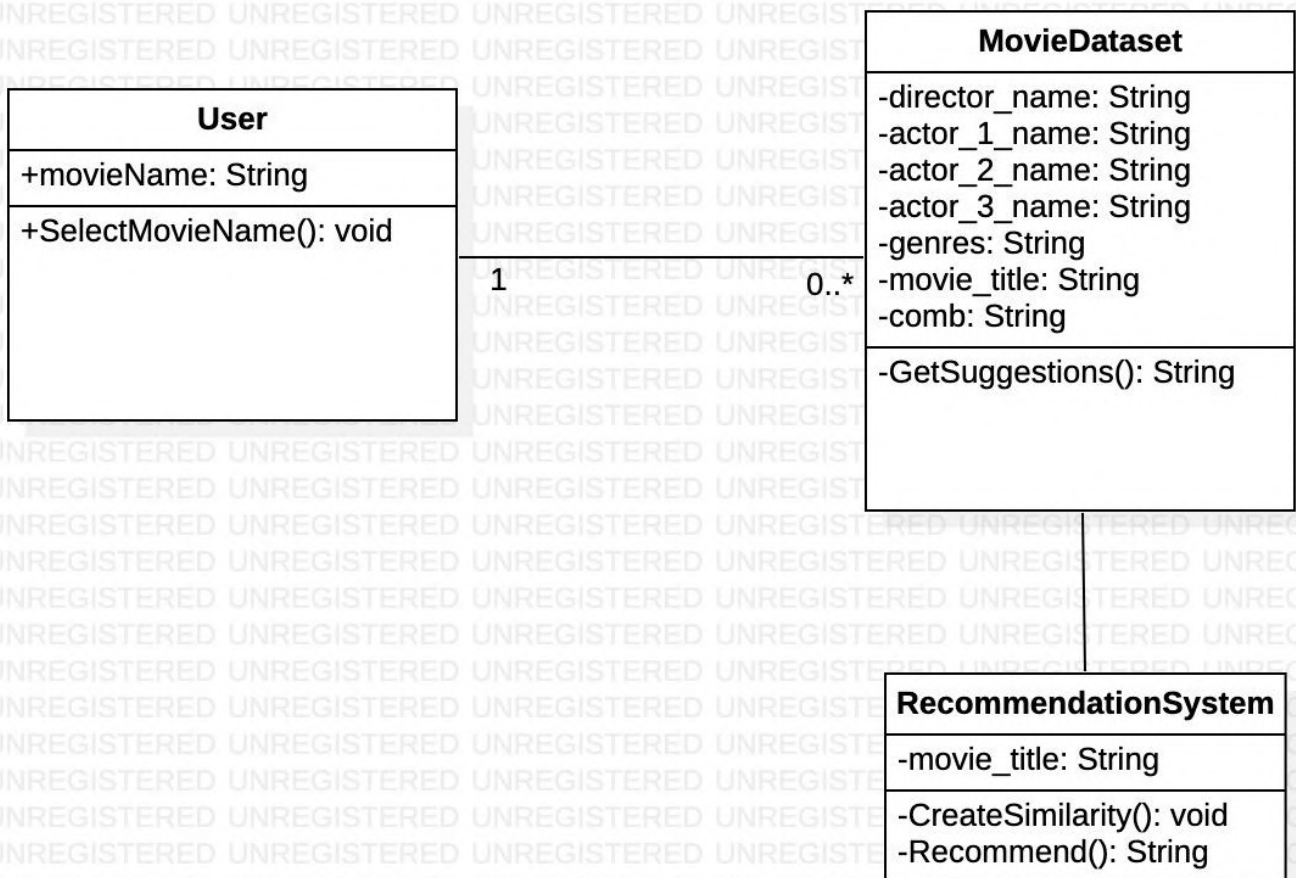
Sequence Diagram

Collaboration Diagram

sd CommunicationDiagram1

Lifeline1: User

1 : Search movie

Device

5 : Movie not found Error
7 : Display movie name
12 : Display top 15 recommendations

2 : Check movie in dataset

4 : Not in data set
6 : Present in data set

3 : Validate

Data set

10 : Search for movies

8 : Tags of the movie
11 : Return list of similar movies

9 : Create similarity function

Server

12

Activity Diagram

Statechart Diagram

Enter Movie Name ← Movie not found in the dataset

Movie found in the dataset

Select Movie name from Suggestions

Tags of the selected movie

Create similarity function

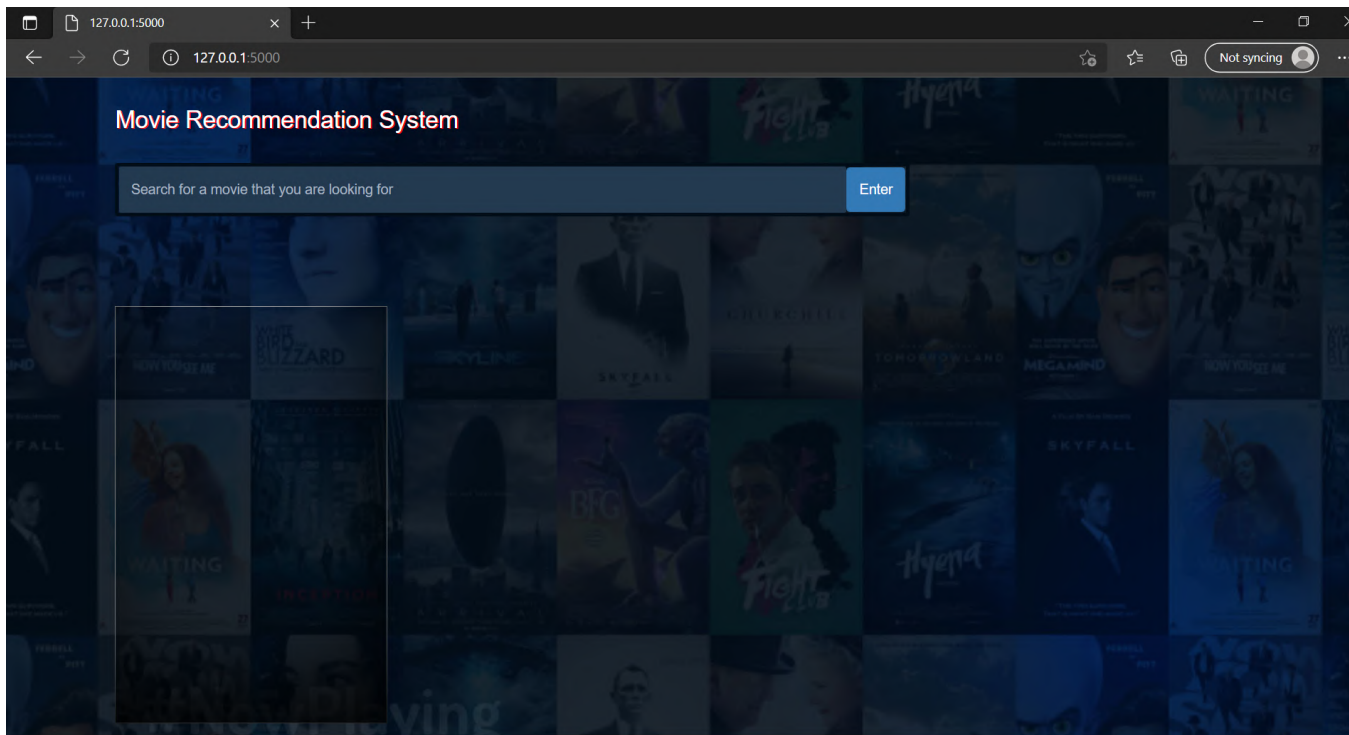Get recommendations

Display Recommended Movies
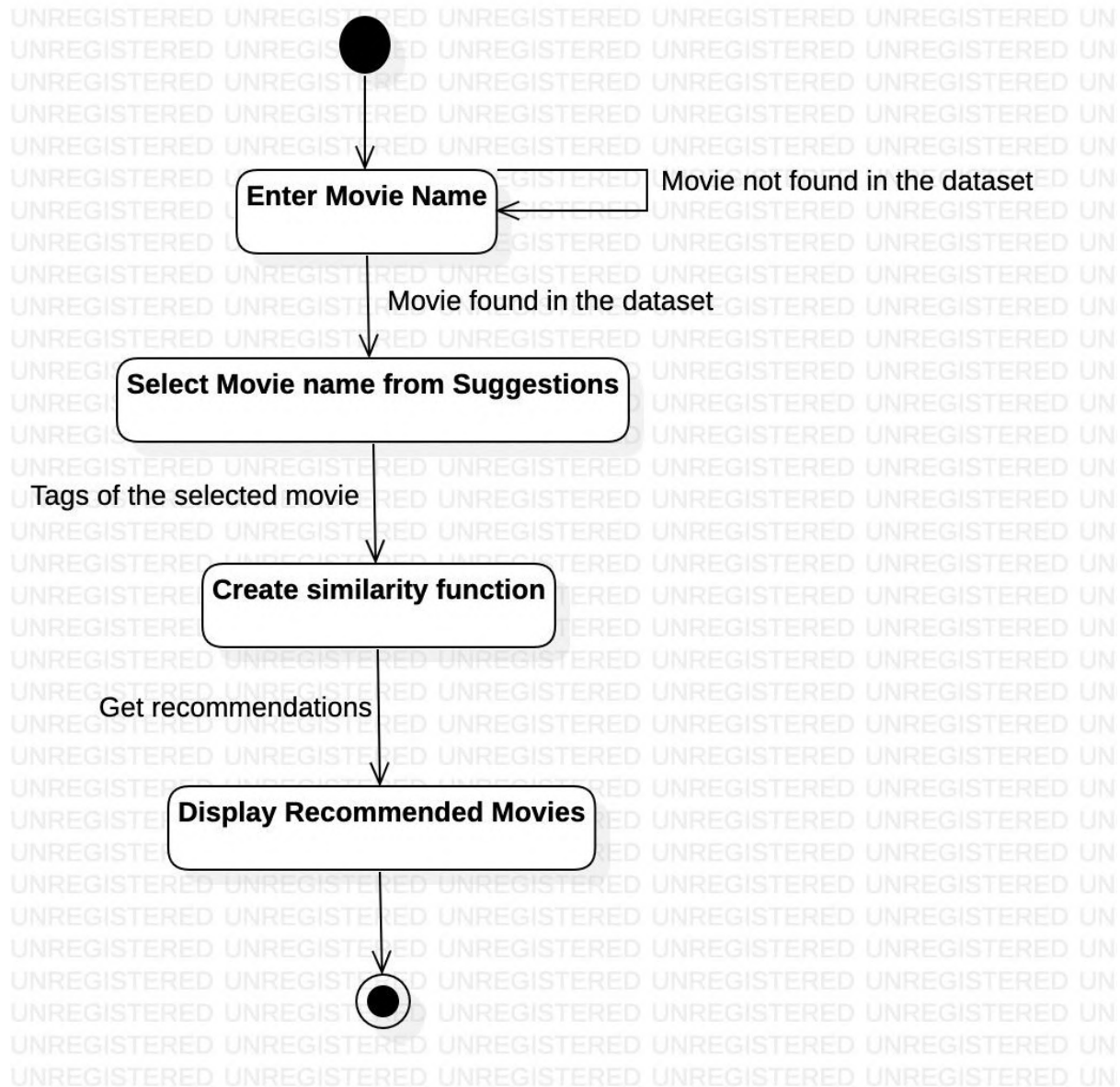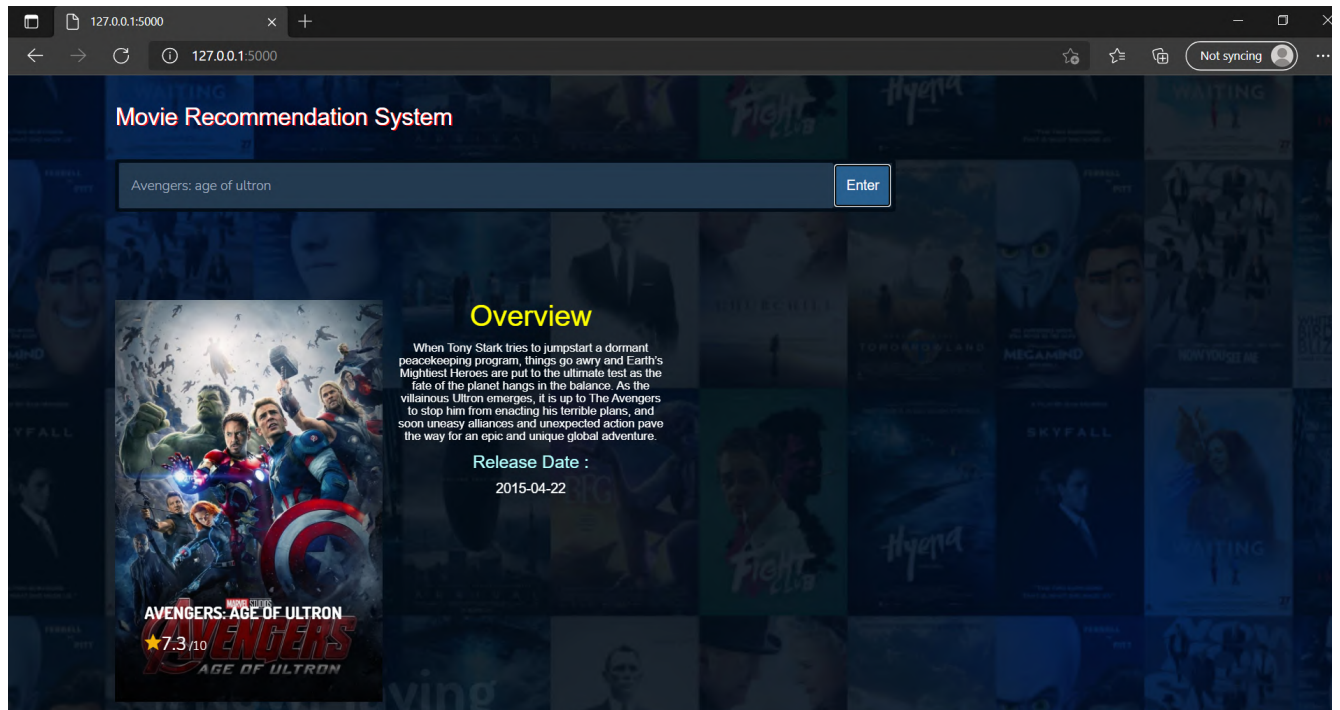
Component Diagram
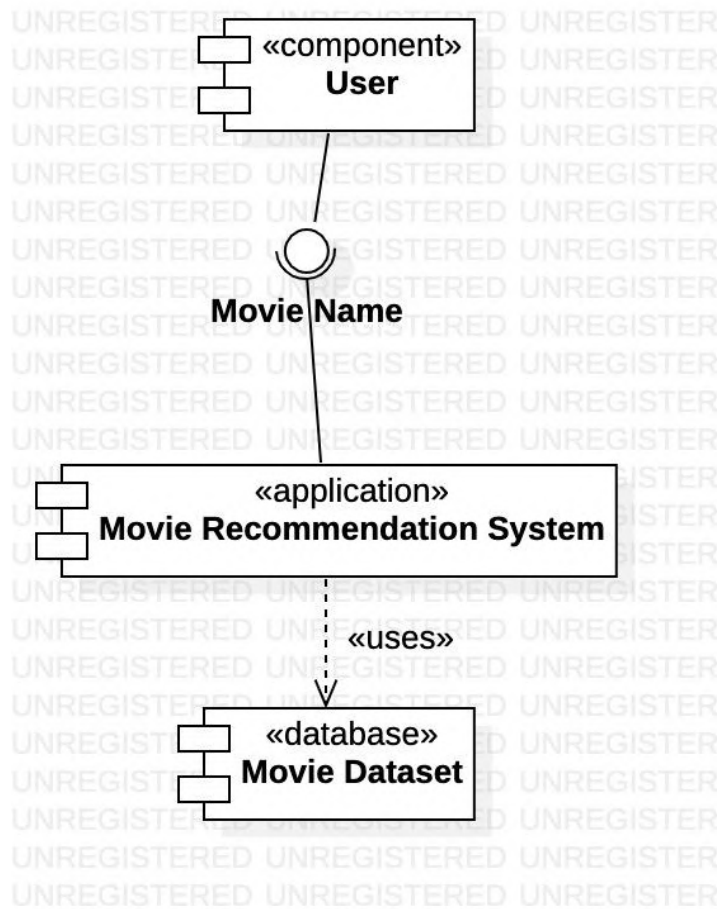
Deployment Diagram
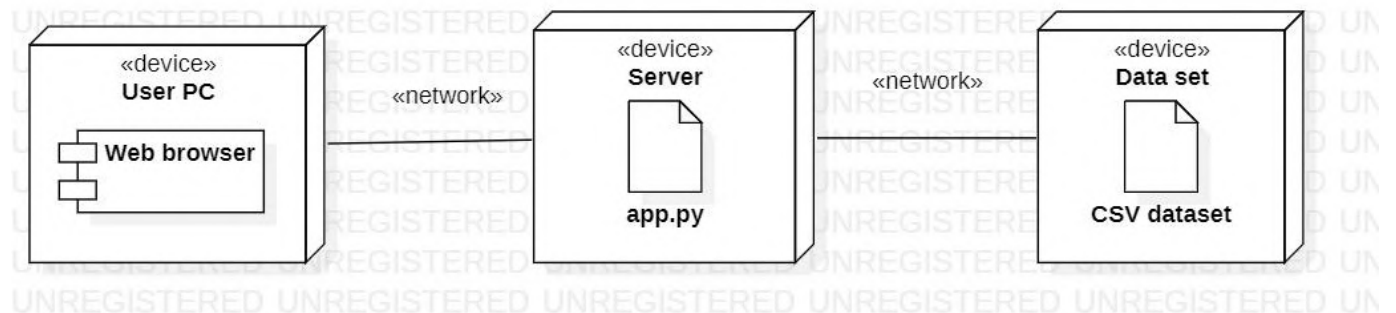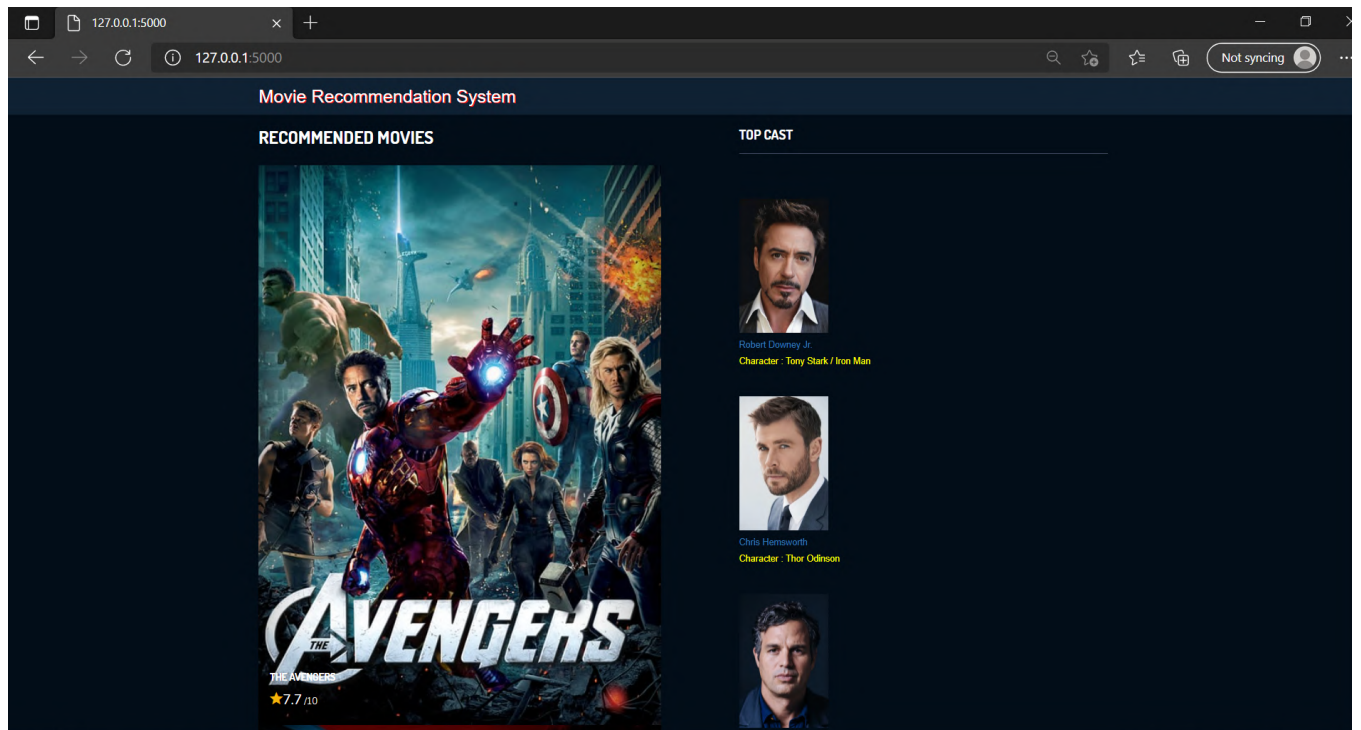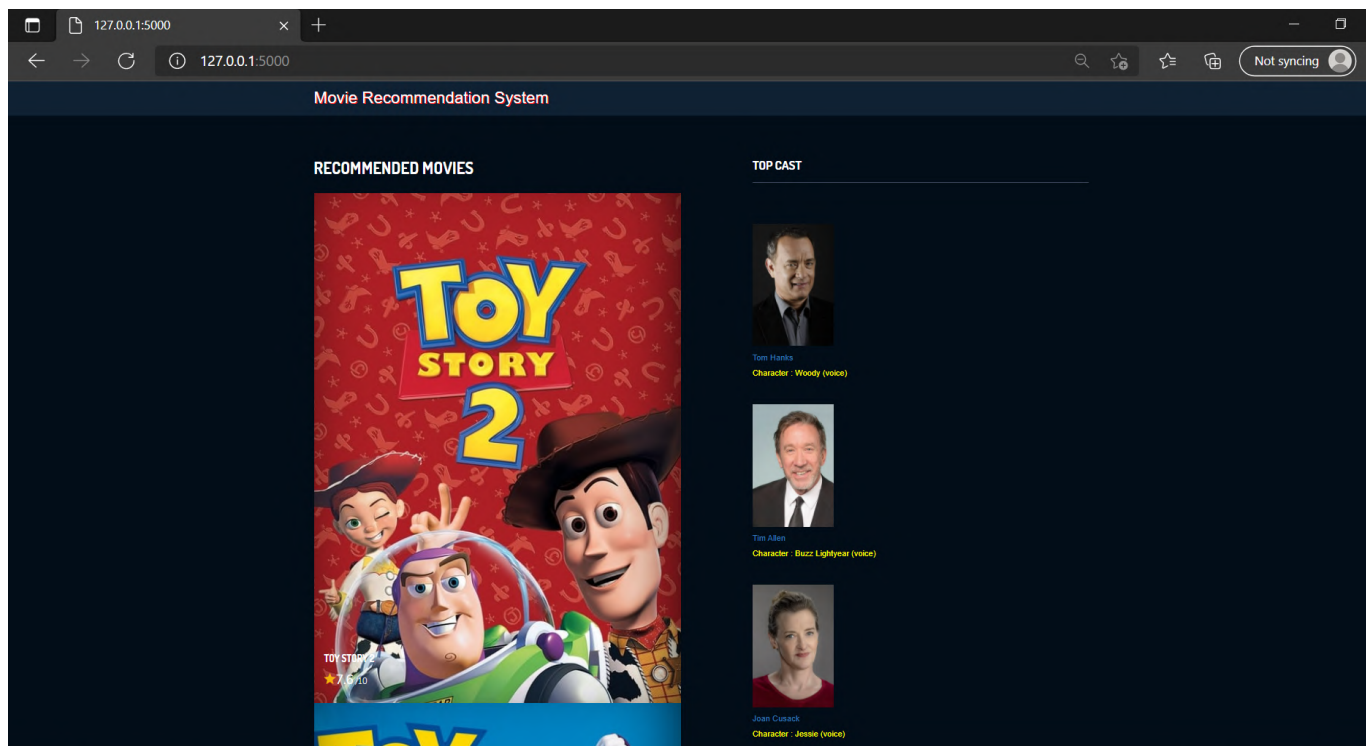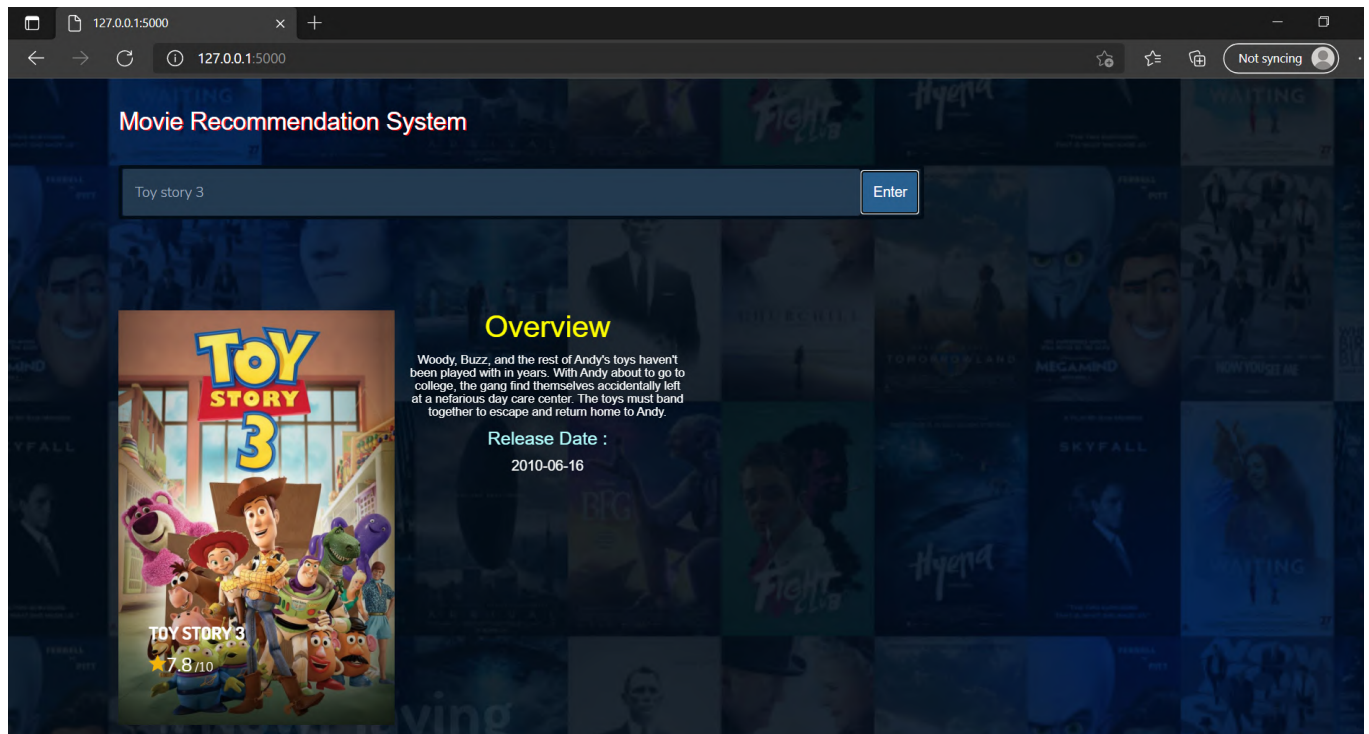
RESULT ANALYSIS

Home page
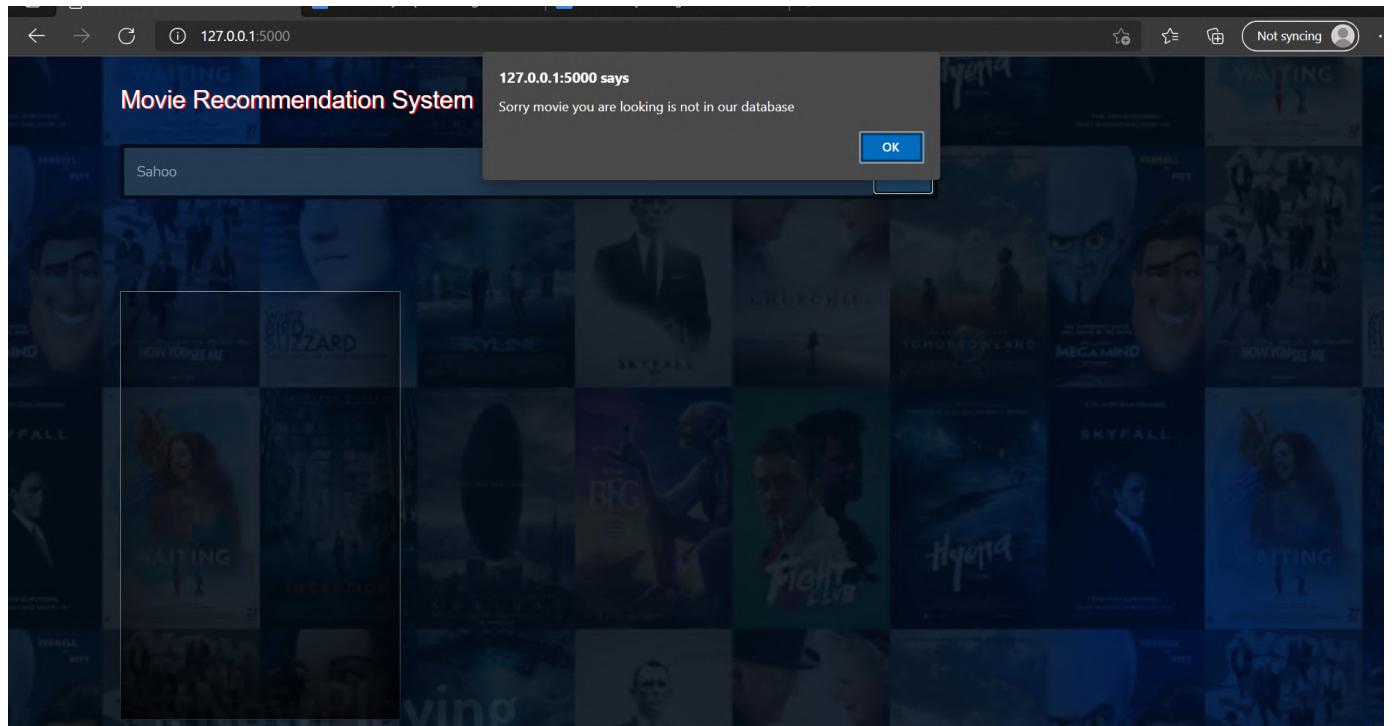
Result of the searched movie

Recommendations based on the searched movie

One of the movie recommendations(details)

Searching for a movie that's not in the dataset

CONCLUSION AND DISCUSSION

Movie recommender systems are a powerful new technology for extracting additional value for a streaming website from its user databases. These systems help users find movies/TV series they want to watch from a streaming website. With the help of the recommendation system, the user will be provided with a vast range of recommendations that are similar to their interests, thereby saving the time of the user. The user may also come across new movies/TV series that were previously unknown to them. This way the streaming websites will be able to boost their revenues and ensure high customer satisfaction and retention. This application can be implemented using other techniques such as collaborative filtering and knowledge based filtering. With the help of those techniques, the recommendation system will automatically recommend movies to the user based on their watch history, but for this, we need to implement user login/registration. The project can be further expanded using the above mentioned techniques with the help of a large dataset of the user's preferences for more accurate recommendations.

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