HYBRID MOVIE RECOMMENDATION SYSTEM BY USING SENTIMENTAL ANALYSIS

A Project Report Submitted

in the Partial fulfilment for the award of Degree of

Bachelor of Technology
In
Computer Science and Engineering
By

P.RAHUL	**(U16CS102)**
DEEPAK BHOLA	**(U16CS106)**
CHITTALA HARIKA	**(U16CS109)**
BODAKUNTIL AKHIL	**(U16CS111)**

Under Guidance of

Mrs.C.Anuradha

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
SCHOOL OF COMPUTING

BHARATH INSTITUTE OF HIGHER EDUCATION AND RESEARCH
(Deemed to be University Est du/s3 of UGCAct,1956)

CHENNAI,600073,TAMILNADU,INDIA

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BHARATH INSTITUTE OF SCIENCE AND TECHNOLOGY
No.173, Agharam Road, Selaiyur, Chennai - 600 073.

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

BONAFIDE CERTIFICATE

This is to Certify that this Project Report Titled "HYBRID MOVIE RECOMMENDATIONSYSTEM BY USING SENTIMENTAL ANALYSIS" is the Bonafide Work of P.RAHUL(U16CS102),DEEPAK BHOLA(U16CS106), CHITTALA HARIKA(U16CS109),BODAKUNTIL AKHIL(U16CS111)of Final Year B.Tech. (CSE) who carried out the major project work under my supervision Certified further, that to the best of my knowledge the work reported here in does not form part of any other project report or dissertation on basis of which a degree or award conferred on an earlier occasion by any other candidate.

PROJECT GUIDE **HEAD OF THE DEPARTMENT**

Submitted for the Project Viva-Voce held on 23.06.2020

INTERNAL EXAMINER **EXTERNAL EXAMINER**

DECLARATION

We declare that this project report titled **"HYBRID MOVIE RECOMMENDATION SYSTEM BY USING SENTIMENTAL ANALYSIS"** submitted in partial fulfillment of the degree of **B. Tech in (Computer Science and Engineering)** is a record of original work carried out by us under the supervision of **Mrs.C.Anuradha** and has not formed the basis for the award of any other degree or diploma, in this or any other Institution or University. In keeping with the ethical practice in reporting scientific information, due acknowledgements have been made wherever the findings of others have been cited.

P.RAHUL	**(U16CS102)**
DEEPAK BHOLA	**(U16CS106)**
CHITTALA HARIKA	**(U16CS109)**
BODAKUNTIL AKHIL	**(U16CS111)**

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P.RAHUL **(U16CS102)**

DEEPAK BHOLA **(U16CS106)**

CHITTALA HARIKA **(U16CS109)**

BODAKUNTIL AKHIL **(U16CS111)**

ABSTRACT

Recommendation era is an essential part of Internet of Things (IoT) services that improve user revel in and help users get admission to data whenever, anywhere. However, traditional recommendation algorithms cannot fulfill the fast and accurate recommended person requirements inside the IoT environment. In the face of big statistics, the neighborhood search approach through evaluating all consumer information outcomes in terrible recommendations. In addition, the traditional authoring device ignores the inherent idea between users' possibilities and time. For benefit adjustments with time. The recommendation gadget have to offer customers with accurate and short time modifications. To remedy this trouble, we proposed a new author's version based totally at the temporal correlation coefficient and advanced cuckoo search K-mode (CSK-mode) known as TCCF. The linking approach can join similar users for in addition brief and accurate pointers. In addition, an effective and personalized choice-based advice model (PTCCF) is designed to improve the first-class of TCCF. It can offer higher first-rate hints through reading person behavior. Extensive trying out become executed on actual-global datasets, MovieLens and Douban, and the accuracy of our version advanced by way of about 5.2% compared to the MCoC version. Systematic experimental consequences have proven that our TCCF and PTCCF models are powerful.

Key Words: Recommendation Systems, Collaborative Filtering, Content Based Filtering, Sentiment Analysis.

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LIST OF ABBREVATIONS

S.NO	ABBREVATION	EXPANSION
1	KNN	K-Nearest Neighbor
2	RMSE	Root Mean Square Error
3	SRS	Software Requirement Specification
4	CF	Collaborative Filtering
5	MCOC	Multi Criteria Optimization Classifier
6	TCCF	Tier Certificate of Constructed Facilities
7	PTCCF	Preference Pattern Tier Certificate of Constructed Facilities

CHAPTER 1

INTRODUCTION

A recommendation system or recommendation engine is a model used for information filtering where it tries to predict the preferences of a user and provide suggests based on these preferences. These systems have become increasingly popular nowadays and are widely used today in areas such as movies, music, books, videos, clothing, restaurants, food, places and other utilities. These systems collect information about a user's preferences and behavior, and then use this information to improve their suggestions in the future. Movies are a part and parcel of life.

There are different types of movies like some for entertainment, some for educational purposes, some are animated movies for children, and some are horror movies or action films. Movies can be easily differentiated through their genres like comedy, thriller, animation, action etc. Other way to distinguish among movies can be either by releasing year, language, director etc. Watching movies online, there are a number of movies to search in our most liked movies .

Movie Recommendation Systems helps us to search our preferred movies among all of these different types of movies and hence reduce the trouble of spending a lot of time searching our favorable movies. So, it requires that the movie recommendation system should be very reliable and should provide us with the recommendation of movies which are exactly same or most matched with our preferences.

A large number of companies are making use of recommendation systems to increase user interaction and enrich a user's shopping experience. Recommendation systems have several benefits, the most important being customer satisfaction and revenue. Movie Recommendation system is very powerful and important system. But, due to the problems associated with pure collaborative approach, movie recommendation systems also suffers with poor recommendation quality and scalability issues.

Movie suggestions for users depend on Web-based portals. Movies can be easily differentiated through their genres, such as comedy, thriller, animation, and action. Another possible way to categorize the movies based on its metadata, such as release year, language, director, or cast. Most online video-streaming services .

The main motto of the current recommendation system is formulated the basic fact that “share” and “learn”. The process of sharing and witnessing each other’s opinions is considered as the heart of the recommending system . Because of its ability to provide. The concept of machine learning had emerged as early as the late 19th century .

One of the main reasons we need a recommender system is that in modern times, with the help of the internet, we have far too many options for everything! Because of the revolution in the entertainment industry, the source of entertainment has grown rapidly in today's world. To test recommendation algorithms, you'll need data including a collection of objects as well as a set of individuals who responded to certain movies.

A recommendation system or recommendation engine is a model used for information filtering where it tries to predict the preferences of user and provide suggests based on these preferences. The recommendation system is mostly used in digital entertainment platforms like Netflix, Prime Video, and IMDB, as well as e-commerce platforms like Amazon, Flipkart, and eBay. Enhanced entertainment, a movie recommendation is becoming increasingly popular as a part of our social lives.

1.1 AIM AND OBJECTIVE

1. The main aim would be to develop a hybrid recommender system which incorporates and enhances properties of existing recommendation systems along with a new approach in order to decrease system runtime and to reveal latent user and item relations with great accuracy.

2. Developing a popularity score which will help users judge the movie in a better way and success prediction for movies before release will provide better feedback to movie makers.

3. To find a general way to make recommendation methods more effective in a broader range of applications.

4. Although our experiments merely focus on one specific dataset, we desire to develop a universal model that can be applied to any other problem domain.

5. The important intention can be to increase a hybrid recommender device that contains and complements the houses of existing recommender structures, as well as a new technique to reduce machine time and reveal hidden person relationships with tremendous care.

6. Promoting famous ratings to better help customers choose movies, and predicting the success of films before they're released, will offer higher feedback to filmmakers.

7. Generally, you may discover a way to extend the persuasive strategies extra effectively throughout a wider variety of applications.

8. Since our experiments are simply centered on one unique data set, we need to expand a model that can be carried out to every other challenge.

1.2 PURPOSE

The purpose of this document is to develop a hybrid recommender system which incorporates and enhances properties of existing recommendation systems along with a new approach in order to decrease system runtime and to reveal latent user and item relations with great accuracy. In detail, this document will provide a general description of our project, including user requirements, product perspective, and overview of requirements, general constraints. In addition, it will also provide the specific requirements and functionality needed for this project - such as interface, functional requirements and performance requirements.

1.3 SCOPE

The scope of this software requirements specification document persists for the entire life cycle of the project. This document defines the final state of the software requirements agreed upon by the customers and designers. Finally at the end of the project execution all the functionalities may be traceable from the SRS to the product. Specification of the software's answers to all feasible types of input data in all accessible conditions. The document describes the functionality, performance, constraints, interface, correctness, right level of abstraction and reliability for the entire life cycle of the project.

CHAPTER 2

LITERATURE SURVEY

Over the years, many recommender systems were advanced the usage of collaborative, content material, or hybrid filtering strategies. These systems are powered with the aid of diverse big data and system getting to know algorithms.

[1] Movie Recommendation System by K-Means Clustering AND K-Nearest Neighbor:

Authors are Rishabh Ahuja, Arun Solanki, Anand Nayyar / 2019.

The proposed work deals with the introduction of various concepts related to machine learning and recommendation system. In this work, various tools and techniques have been used to build recommender systems. Various algorithms such as K-Means Clustering, KNN, Collaborative Filtering, Content-Based Filtering have been described in detail. Further, after studying different types of machine learning algorithms, there is a clear picture of where to apply which algorithm in different areas of industries such as recommender systems, e-commerce, etc. Then there is an illustration of how implementations and working of the proposed system are used for the implementation of the movie recommender system. Various building blocks of the proposed system such as Architecture, Process Flow, Pseudo Code, Implementation and Working of the System is described in detail. Finally, in this work for different cluster values, different values of Root Mean Squared Error are obtained. In this proposed work as the no of clusters decreases, the value of RMSE also decreases. The best value of RMSE obtained is 1.081648.

Advantages:

The results given by the proposed system are better than the existing technique on the basis of RMSE value.

Disadvantages:

Limited Content Analysis Over Specialization.

[2] A Review on Movie Recommendation System Using Machine Learning: Authors are N Smitha, D Anusha, C Chaithanya, J Sindhu, R Tanuja, H S Hemanth Kumar / 2021.

System which gives recommendations usually filters the given data using various methodology and suggests the relevant one to the customer benefit. In day-to-day life people usually use a powered recommendation system in many areas like movies, books, music, news, items etc. In this paper a wide range of work is reviewed in the field of a recommender system for movies where dataset source, methods used and accuracy are compared to deduce best one and future scope for improvement in this area are analyzed.

Advantages:

The scalability is higher.

Disadvantages:

It totally depends on human ratings sparsity, scalability, ignore the social relationships and Low Accuracy.

[3] Movie Recommender System Using Collaborative Filtering: Authors are Meenu Gupta, Aditya Thakkar, Aashish, Vishal Gupta, Dhruv Pratap Singh Rathore / 2020.

The aim of this paper is to improve the accuracy and performance of a regular filtering technique. Although varieties of methods are used to implement a recommendation system, Content-based filtering is the simplest method. Which takes input from the users, rechecks his/her history/past behaviour, and recommends a list of similar movies. In this paper, to prove the effectiveness, K-NN algorithms and collaborative filtering are used to mainly focus on enhancing the accuracy of results as compared to content-based filtering. This approach is based on cosine similarity using k-nearest neighbour with the help of a collaborative filtering technique, at the same time removing the drawbacks of the content-based filtering. Although using Euclidean distance is preferred, cosine similarity is used as the accuracy of cosine angle and the equidistance of movies remain almost the

same.

Advantages:

The model can assist users in discovering new interests.

Disadvantages:

Content-based filtering has some drawbacks and a lack of accuracy and preciseness. So the proposed system is the collaborative filtering recommendation system using nearest neighbours.

[4] Products And Movie Recommendation System For Social Networking Sites: Authors are Debajit Datta, T. M. Navamani, Rajvardhan Deshmukh / 2020.

The data scientists of every company design some algorithm that studies the information from the social network and clusters the data. There can be a single algorithm for classification like k-Means clustering or Hidden Markov model or can be done by bagging and boosting techniques. With this technique of displaying the movies or products into the profile of a particular customer, they not only increase their business but also enhances the customer experiences but there are several issues related to the standard techniques like the cold start problem, shrill attack, etc. thereby increasing the scope of research in this field. This work deals with both Collaborative Filtering and Content-Based Filtering to form a product and movie recommendation system for the social networking sites that shows the effectiveness of collaborative filtering and portrays the challenges faced by content-based filtering. Limitations are out of these techniques.

Advantages:

It works most effectively

Disadvantages:

The main disadvantage of the Bayesian networks is that they cannot be applied for the systems in which the information and data from which the system is extracting the preferences is frequently changing.

[5] An Intelligent Movie Recommendation System based on user priorities: Authors are Guguloth Ravinder, B. Venkataramana, K. Helini / 2020.

Today's web and app users request modified experiences. They anticipate the apps, news sites,

social networks they engage with to evoke who they are and what they're fascinated in and make related, adjusted, and accurate recommendations for new content and new goods based on their earlier deeds. This can be done using Recommended Systems in Machine Learning. In this paper we use Recommender System to recommend movies based on his previous ratings on movie he came across.

Advantages:

Good modified experiences

Disadvantages:

1. Limitation is Low Accuracy.
2. Requires the Highest runtime.

Recommendation systems are an integral part of information filtering system in data science, that are widely used in order to identify the pattern a user would likely choose on the basis of the previous choices of the user as well as from studying the pattern in which others have chosen. For a fact, the recommendation can never be a cent percent correct at providing recommendations to the user but can be close enough to please them to a certain extent. Thus, the same is widely used in the industries these days to get higher profit and have a good hold in the market.

CHAPTER 3

SYSTEM ANALYSIS

System analysis is a detailed examination of the processes involved in the development of a model. Emphasis on the people within the system, as well as compassion for those who use it, can give knowledge for resolving problems or strategy for advancement or modifications in processes.

3.1 EXISTING SYSTEM:

Gharbi Alshammari and Stelios Kapetanakis (July 2019) proposed a method that proposes gradings and location-based in combination of attributes with CF with a problem of sparsity. Also, this method stated similarities in large data set with no pre-operations. This used 1 million data set from movie lens. They also applied methods like Random Forest, KNN. As a conclusion performance is improved when Hybrid method is combined with location-based approach.

Disadvantages

1. Large data set is used with no pre-operations.
2. This method proposed gradings and location-based in combination of attributes with CF with a problem of sparsity.
3. The precision of the MCOC model is very low.

3.2 PROPOSED SYSTEM:

They proposed a movie recommendation system using collaborative filtering that focuses on the ratings given by the users to provide recommendations. The proposed system is built using machine learning algorithm to sort the movies according to the ratings. In one paper the authors propose a fully content-based movie recommendation system to recommend movies. The proposed system makes use of a neural network with the content information of the movies to obtain features and learn the similarities between movies. The authors implement a recommendation system that combines both user-based and item-based collaborative filtering approach. The system is built using machine learning technique and develop a new algorithm that unifies used based and item-based recommendations. Based on the research we conducted, collaborative filtering was found to be one of the popularly used approaches to build recommendation systems. The proposed system will be a website that will contain a database consisting many movies. New users will have to sign up using the user interface provided on the website. The users will be asked to provide feedback on certain movies and movie genre.

Advantages

1. The main advantage of this project is to improve the quality of TCCF.
2. The precision of our model have improved about 5.2% compared with the MCOC model.
3. Systematic experimental results have demonstrated our models TCCF and PTCCF are effective.
4. Our model is easy to use and efficient.

3.2.1 ALGORITHM:

Matrix factorization is a collaborative filtering approach for determining the relationship between the entities of objects and users. To detect similarities and produce a prediction based on both object and user entities, latent features, the relationship between people and movie matrix structures, are determined.

Users	Movie 1	Movie 2	Movie 3	Movie 4
User 1	5		4	5
User 2		4	1	
User 3	3			3
User 4	4		2	
User 5		1		3

Matrix Factorization

The sentiment labels are:

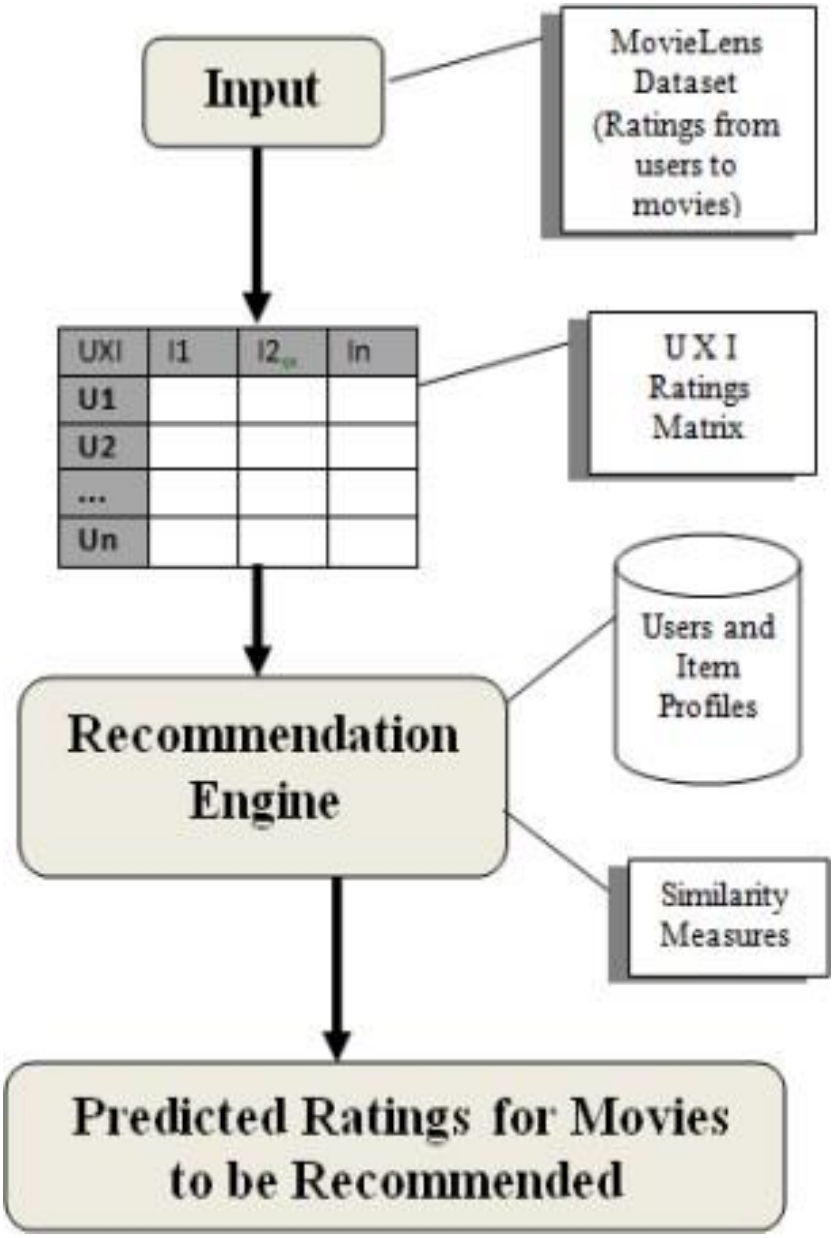
1 - Bad
2 - somewhat bad
3 - neutral
4 - somewhat good
5 - Good

Here based on the ratings given by users on different movies we predict the movies to be recommended for the user.

When two distinct types of entities are multiplied, matrix factorization is used to produce underlying features. Collaborative filtering is the use of matrix factorization to determine the relationship among the entities of objects and users. We'd want to forecast how customers would like the item based on the input of user ratings, so consumers may obtain recommendations based on the prediction.

3.2.2 SYSTEM ARCHITECTURE

The system architecture diagram depicts the system structure visually. It depicts the relationships between the system's numerous components and identifies what functions each component performs. The general system representation depicts the system's primary operations as well as the links between the different system components.



3.4 UML DIAGRAMS

UML stands for Unified Modeling Language. UML is a standardized general-purpose modeling language in the field of object-oriented software engineering. The standard is managed, and was created by, the Object Management Group.

The goal is for UML to become a common language for creating models of object oriented computer software. In its current form UML is comprised of two major components: a Meta-model and a notation. In the future, some form of method or process may also be added to; or associated with, UML.

The Unified Modeling Language is a standard language for specifying, Visualization, Constructing and documenting the artifacts of software system, as well as for business modeling and other non-software systems.

The UML represents a collection of best engineering practices that have proven successful in the modeling of large and complex systems.

The UML is a very important part of developing objects oriented software and the software development process. The UML uses mostly graphical notations to express the design of software projects.

1. UML is an acronym for Unified Modelling Language.

2. UML is distinct from other mainstream programming languages such as C++, Java, COBOL, and so on.

3. UML is a graphical language that is used to create software designs.

4. UML is a general-purpose visual modelling language used to visualize, design, build, and document software systems.

5. Although UML is commonly used to model software systems, it is not limited to this. It is also used to simulate non-software systems. For example, consider the process flow in a manufacturing unit.

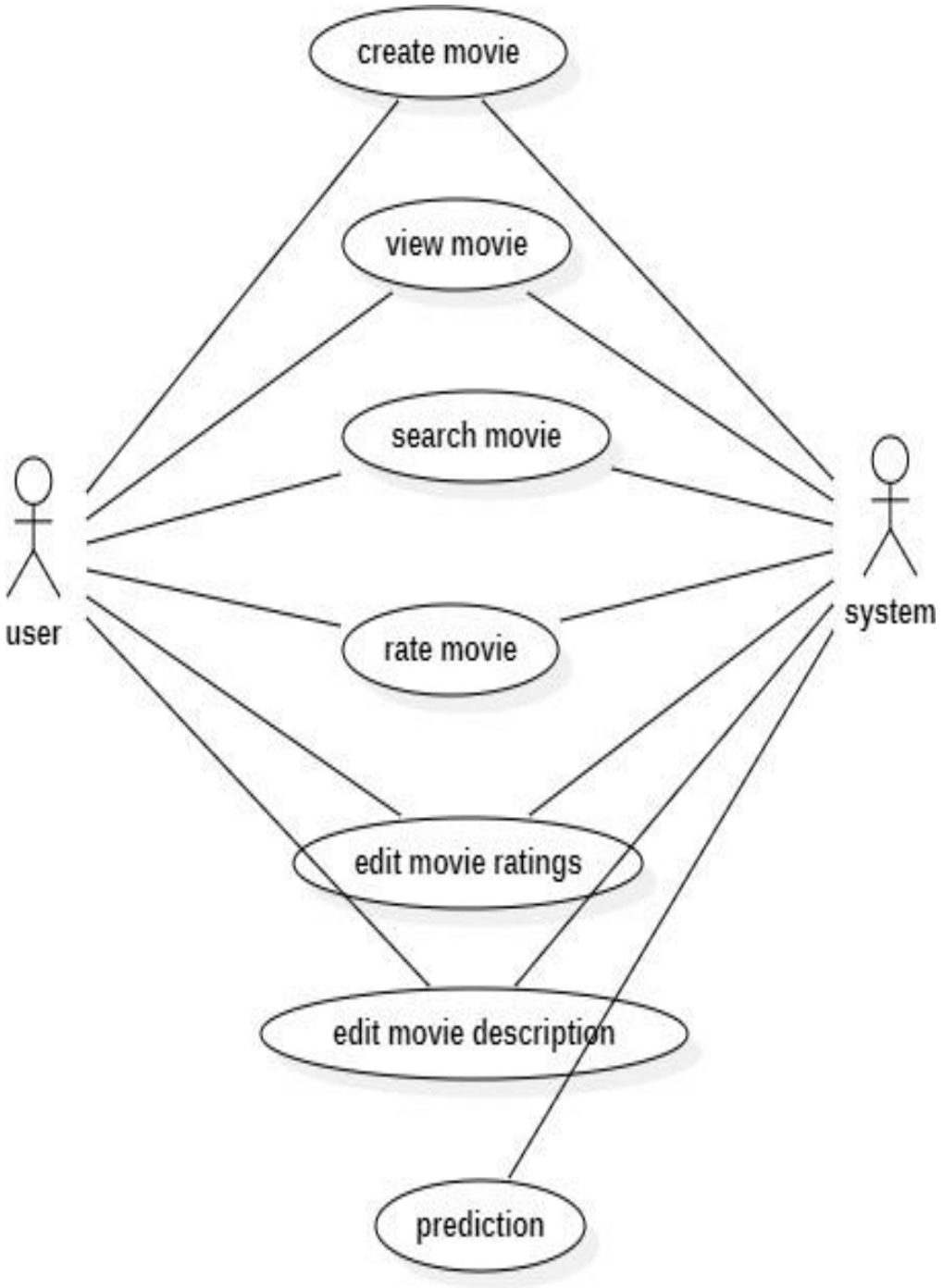
GOALS:

The Primary goals in the design of the UML are as follows:

1. Provide users a ready-to-use, expressive visual modeling Language so that they can develop and exchange meaningful models.
2. Provide extendibility and specialization mechanisms to extend the core concepts.
3. Be independent of particular programming languages and development process.
4. Provide a formal basis for understanding the modeling language.
5. Encourage the growth of OO tools market.
6. Support higher level development concepts such as collaborations, frameworks, patterns and components.
7. Integrate best practices.

3.4.1 USE CASE DIAGRAM:

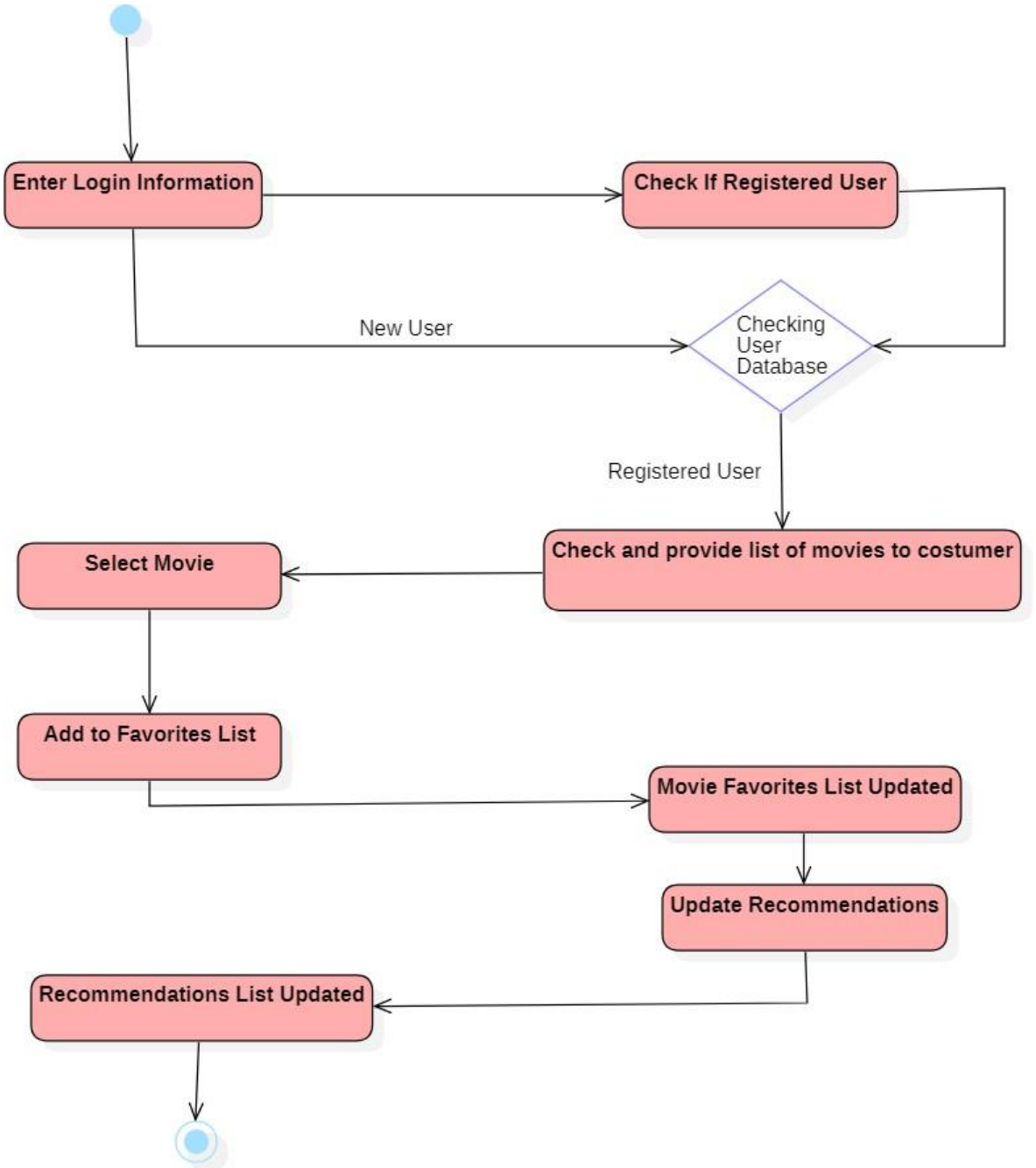
A use case diagram in the Unified Modeling Language (UML) is a type of behavioral diagram defined by and created from a Use-case analysis. Its purpose is to present a graphical overview of the functionality provided by a system in terms of actors, their goals (represented as use cases), and any dependencies between those use cases. The main purpose of a use case diagram is to show what system functions are performed for which actor. Roles of the actors in the system can be depicted.



USE CASE DIAGRAM

3.4.2 ACTIVITY DIAGRAM :

Activity diagrams are graphical representations of workflows of stepwise activities and actions with support for choice, iteration and concurrency. In the Unified Modeling Language, activity diagrams can be used to describe the business and operational step-by-step workflows of components in a system. An activity diagram shows the overall flow of control.



ACTIVITY DIAGRAM

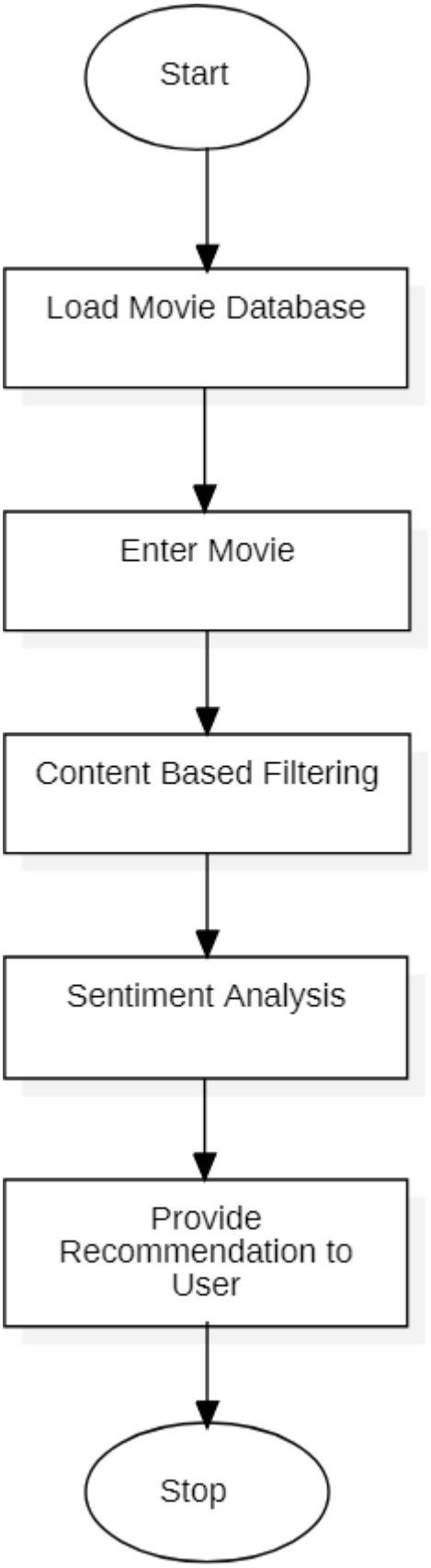
3.5 DATA FLOW DIAGRAM

Data Flow Diagram (DFD) is a two-dimensional diagram that describes how data is processed and transmitted in a system. The graphical depiction recognizes each source of data and how it interacts with other data sources to reach a mutual output. In order to draft a data flow diagram one must

- Identify external inputs and outputs
- Determine how the inputs and outputs relate to each other
- Explain with graphics how these connections relate and what they result in.

Role of DFD:

- It is a documentation support which is understood by both programmers and nonprogrammers. As DFD postulates only what processes are accomplished not how they are performed.
- A physical DFD postulates where the data flows and who processes the data.
- It permits analyst to isolate areas of interest in the organization and study them by examining the data that enter the process and viewing how they are altered when they leave.



DATA FLOW DIAGRAM

3.6 REQUIREMENT ANALYSIS

Requirement analysis, also called requirement engineering, is the process of determining user expectations for a new modified product. It encompasses the tasks that determine the need for analyzing, documenting, validating and managing software or system requirements. The requirements should be documentable, actionable, measurable, testable and traceable related to identified business needs or opportunities and define to a level of detail, sufficient for system design.

3.6.1 FUNCTIONAL REQUIREMENTS

It is a technical specification requirement for the software products. It is the first step in the requirement analysis process which lists the requirements of particular software systems including functional, performance and security requirements. The function of the system depends mainly on the quality hardware used to run the software with given functionality.

1. Usability

It specifies how easy the system must be use. It is easy to ask queries in any format which is short or long, porter stemming algorithm stimulates the desired response for user.

2. Robustness

It refers to a program that performs well not only under ordinary conditions but also under unusual conditions. It is the ability of the user to cope with errors for irrelevant queries during execution.

3. Security

The state of providing protected access to resource is security. The system provides good security and unauthorized users cannot access the system there by providing high security.

4. Reliability

It is the probability of how often the software fails. The measurement is often expressed in MTBF (Mean Time Between Failures). The requirement is needed in order to ensure that the processes work correctly and completely without being aborted. It can handle any load and survive and survive and even capable of working around any failure.

5. Compatibility

It is supported by version above all web browsers. Using any web servers like localhost makes the system real-time experience.

6. Flexibility

The flexibility of the project is provided in such a way that is has the ability to run on different environments being executed by different users.

7. Safety

Safety is a measure taken to prevent trouble. Every query is processed in a secured manner without letting others to know one's personal information.

3.6.2 NON-FUNTIONAL REQUIREMENTS

1. Portability

It is the usability of the same software in different environments. The project can be run in any operating system.

2. Performance

These requirements determine the resources required, time interval, throughput and everything that deals with the performance of the system.

3. Accuracy

The result of the requesting query is very accurate and high speed of retrieving information. The degree of security provided by the system is high and effective.

4. Maintainability

Project is simple as further updates can be easily done without affecting its stability. Maintainability basically defines that how easy it is to maintain the system. It means that how easy it is to maintain the system, analyze, change and test the application. Maintainability of this project is simple as further updates can be easily done without affecting its stability.

CHAPTER 4

SYSTEM DESIGN

4.1 GENERAL

In this system design, we will analyze the modules in the project which are Data collection, Data preprocessing, Recommendation and Evaluation module. The last module includes the similarity measures of the movie ratings by users.

4.2 LIST OF MODULES

There are four modules in this model they are:

- Data Collection Module
- Data Pre-Processing Module
- Recommendation Module
- Evaluation Module

4.3 MODULES DESCRIPTION

This section will detail the main modules in this model and how they function to collect data from the dataset and analyze the data using similarity measures to produce accurate outcomes.

Data Collection Module

Data collection is the process of gathering data for official statistics. In this model we collect all the required data set from a website called Kaggle website. Many Data scientists use Kaggle to get information. Users can use Kaggle to obtain datasets to use in constructing AI models, post datasets and use it to create a model. In this project we require various csv files such as movie.csv, ratings.csv, users.csv.

Data Pre-Processing Module

we preprocess the datasets into a proper format and transform these dataframe of ratings to a suitable format for our model. We want the data to be in an mXn matrix, where m and n gives number of movies and users. The modifications that we apply to our data before providing it to the algorithm are referred to as pre-processing. Data preprocessing is a technique for converting raw data into a clean data collection. Overall, the datasets are converted into matrix format for further analysis of the data.

Recommendation Module

A recommendation module sorts through the data using various algorithms and suggests the most relevant items to costumers. In this Module, we have modeled different collaborative filters to predict ratings for users and the distance between the targeted items and other items is obtained by similarity measure, which gives us the top machine learning and finally predicting the required recommended list of movies with decreasing order of distance.

Evaluation Module

Evaluation is done based on the actual ratings and predicted ratings comparison of the user which were already seen and present in remaining dataset and similar process is repeated with other similarity measures. Evaluation module evaluates and compare the models which are further used for reporting in a more standardized way.

Raw data sets are pre-processed and divided into training and testing sets. The pre-processed data is used to train a matrix factorization algorithm and it is used to predict the recommendations based on the similarity measures from the last evaluation module.

4.4 INPUT AND OUTPUT DESIGN

INPUT DESIGN

The input design is the link between the information system and the user. It comprises the developing specification and procedures for data preparation and those steps are necessary to put transaction data in to a usable form for processing can be achieved by inspecting the computer to read data from a written or printed document or it can occur by having people keying the data directly into the system. The design of input focuses on controlling the amount of input required, controlling the errors, avoiding delay, avoiding extra steps and keeping the process simple. The input is designed in such a way so that it provides security and ease of use with retaining the privacy. Input Design considered the following things:

- What data should be given as input?
- How the data should be arranged or coded?
- The dialog to guide the operating personnel in providing input.
- Methods for preparing input validations and steps to follow when error occur.

OBJECTIVES

1. Input Design is the process of converting a user-oriented description of the input into a computer-based system. This design is important to avoid errors in the data input process and show the correct direction to the management for getting correct information from the computerized system.

2. It is achieved by creating user-friendly screens for the data entry to handle large volume of data. The goal of designing input is to make data entry easier and to be free from errors. The data entry screen is designed in such a way that all the data manipulates can be performed. It also provides record viewing facilities.

3. When the data is entered it will check for its validity. Data can be entered with the help of screens. Appropriate messages are provided as when needed so that the user will not be in maize of instant. Thus the objective of input design is to create an input layout that is easy to follow

OUTPUT DESIGN

A quality output is one, which meets the requirements of the end user and presents the information clearly. In any system results of processing are communicated to the users and to other system through outputs. In output design it is determined how the information is to be displaced for immediate need and also the hard copy output. It is the most important and direct source information to the user. Efficient and intelligent output design improves the system's relationship to help user decision-making.

1. Designing computer output should proceed in an organized, well thought out manner; the right output must be developed while ensuring that each output element is designed so that people will find the system can use easily and effectively. When analysis design computer output, they should Identify the specific output that is needed to meet the requirements.

2. Select methods for presenting information.

3. Create document, report, or other formats that contain information produced by the system.
The output form of an information system should accomplish one or more of the following objectives.

- Convey information about past activities, current status or projections of the
- Future.
- Signal important events, opportunities, problems, or warnings.
- Trigger an action.
- Confirm an action.

CHAPTER 5

SYSTEM SPECIFICATIONS

5.1 GENERAL

System requirements, such as those for hardware and software, as well as technical specifications, such as those for the modules we used in our project code, such as Numpy, Pandas, Sklearn, and flask, as well as the tools we used, will be analyzed in system specifications.

5.2 SYSTEM REQUIREMENTS:

5.2.1 HARDWARE REQUIREMENTS:

System : Pentium Dual Core
Hard Disk : 120 GB
Monitor : 15'' LED
Input Devices : Keyboard, Mouse
Ram : 4 GB

5.2.2 SOFTWARE REQUIREMENTS:

Operating system : Windows 7/10
Coding Language : Python
Web : HTML, Javascript
Spreadsheet : Excel

5.3 TECHNICAL SPECIFICATIONS

5.3.1 NUMPY

NumPy (Numerical Python) is a Python programming language open-source library. It is utilized in scientific computing and array manipulation. It is a Python-based array-processing library. It includes a high-performance multidimensional array object as well as utilities for manipulating these arrays. It is the core Python library for scientific computing. It is free and open-source software. It is a Python extension module built primarily in C. It has a number of routines that can

do numerical computations at a rapid rate.

NumPy has a number of strong data structures, including multi-dimensional arrays and matrices. These data structures are utilised for the most efficient computations with arrays and matrices.
The following are the benefits of using NumPy for data analysis.

1. NumPy is an array-oriented programming language.
2. It implements multidimensional arrays efficiently.
3. It carries out scientific computations.
4. It can conduct the Fourier Transform and reshape data contained in multidimensional arrays.
5. NumPy includes routines for linear algebra and random number creation.

INSTALLATION

PREREQUISITES:

- Access to terminal window or command line
- A user account
- Python Installed on your system

Step-1: Check Python version : A version of python2 or python3 is recommended
Command to check python version : Python -v

Step-2 : Install Pip: Pip is the most convenient way to install NumPy. Pip is a Python package manager that allows you to install and manage Python software packages.
Command to install pip: sudo apt install python-pip

Step-3: Install Numpy: By using pip you can install numpy.
Command to install numpy: pip install numpy

Step-4: Verify the installation: Check whether the numpy is installed successfully or not.
Command: pip show numpy

Step-5: Import the numpy package: Final step to import the numpy and use.
Command to import numpy: import numpy as np

NumPy in Python provides capability equivalent to MATLAB since they are both interpreted,[20] and they both allow the user to construct fast programmes as long as most operations operate on arrays or matrices rather than scalars. In comparison, MATLAB has a plethora of extra toolboxes, most notably Simulink, but NumPy is inextricably linked with Python, a more current and comprehensive programming language. Furthermore, there are complementary Python packages; SciPy is a library that adds more MATLAB-like functionality, and Matplotlib is a plotting package that provides MATLAB-like plotting functionality. For efficient linear algebra computations, both MATLAB and NumPy rely on BLAS and LAPACK.

1. Lists in Python serve the same purpose as arrays, although they are slower to process.

2. NumPy strives to produce array objects that are up to 50 times quicker than typical Python lists.

3. The array object in NumPy is named ndarray, and it comes with a slew of helper methods that make dealing with ndarray a breeze.

4. Arrays are often utilised in data science, where speed and resources are critical.

NumPy arrays are used to store and act on data in the Python bindings of the widely used computer vision library OpenCV. Because images with multiple channels are simply three-dimensional arrays, indexing, slicing, or masking with other arrays are very efficient methods of accessing specific pixels in an image. The use of the NumPy array as a universal data structure in OpenCV for pictures, extracted feature points, filter kernels, and many other things greatly simplifies programming and debugging.

5.3.2 PANDAS

Python Pandas is an open-source toolkit for high-performance data processing in Python. This course is intended for both beginners and experienced users. Pandas is an open-source library designed primarily for dealing with relational or labelled data in an easy and straightforward manner. It offers a number of data structures and methods for manipulating numerical data and time series. This library is based on the NumPy library. Pandas is quick, with great performance and productivity for users.

Key Features:

1. It includes a quick and efficient DataFrame object with both default and custom indexing.
2. Data sets are reshaped and pivoted using this tool.
3. For aggregations and transformations, group by data.
4. It is used for data alignment and missing data integration.
5. Time Series functionality is provided.

INSTALLATION

PREREQUISITES:

- Access to terminal window or command line
- A user account
- Python Installed on your system

Step-1: Check Python version : A version of python2 or python3 is recommended
Command to check python version : Python -v

Step-2 : Install Pip: Pip is the most convenient way to install pandas. Pip is a Python package manager that allows you to install and manage Python software packages.
Command to install pip: sudo apt install python-pip

Step-3: Install pandas: By using pip you can install pandas.
Command to install pandas: pip install pandas

Step-4: Verify the installation: Check whether the pandas is installed successfully or not.
Command: pip show pandas

Step-5: Import the pandas package: Final step to import the pandas and use.
Command to import pandas: import pandas as pd

Pandas is mostly used for data analysis and tabular data manipulation in DataFrames. Pandas supports data input from a variety of file formats, including comma-separated values, JSON, Parquet, SQL database tables or queries, and Microsoft Excel. Pandas supports a variety of data manipulation tasks, including merging, reshaping, selecting, as well as data cleansing and wrangling. Many similar features of working with DataFrames that were established in the R programming language were introduced into Python with the development of pandas. The pandas

library is based on the NumPy library, which is aimed on effectively working with arrays rather than the characteristics of working with DataFrames.

5.3.3 SKLEARN

Scikit-learn (Sklearn) is Python's most usable and robust machine learning package. It offers a set of fast tools for machine learning and statistical modelling, such as classification, regression, clustering, and dimensionality reduction, via a Python interface. This mostly Python-written package is based on NumPy, SciPy, and Matplotlib.

Scikit-learn is an open source data analysis package and the Python ecosystem's gold standard for Machine Learning (ML). The following are key concepts and features: Algorithmic decision-making techniques, such as: Classification is the process of discovering and categorising data based on patterns.

INSTALLATION

PREREQUISITES:

- Access to terminal window or command line
- A user account
- Python Installed on your system

Step-1: Check Python version : A version of python2 or python3 is recommended
Command to check python version : Python -v

Step-2 : Install Pip: Pip is the most convenient way to install sklearn. Pip is a Python package manager that allows you to install and manage Python software packages.
Command to install pip: sudo apt install python-pip

Step-3: Install scikit-learn: By using pip you can install scikit-learn.
Command to install scikit-learn: pip install scikit-learn

Step-4: Import the scikit-learn package: Final step to import the scikit-learn and use.
Command to import scikit-learn: import scikit-learn

5.3.4 FLASK

Flask is a Python-based web framework. It is characterized as a microframework since it doesn't require the usage of any specific tools or libraries. It lacks a database abstraction layer, form validation, and other components where third-party libraries offer common functionalities.

Flask is a Python web application framework that is built on Werkzeug and Jinja2. The Flask framework has the following benefits: a built-in development server and a quick debugger. Compact. Flask is regarded more Pythonic than the Django web framework since the corresponding Flask web application is more clear in most instances. Flask is very straightforward to learn as a newbie since there is little boilerplate code required to get a small project up and running.

Flask is fundamentally a Python module. It is a web-development framework that only works with Python. It is made up of libraries and modules. Frameworks are used to create web platforms. Flask is an example of a web application framework. It is entirely developed in the Python programming language. It is written entirely in Python, as opposed to Django. Flask will be used as a new user. Because it is easier to manage.

INSTALLATION

PREREQUISITES:

- Access to terminal window or command line
- A user account
- Python Installed on your system

Step-1: Check Python version : A version of python2 or python3 is recommended
Command to check python version : Python -v

Step-2 : Install Pip: Pip is the most convenient way to install flask. Pip is a Python package manager that allows you to install and manage Python software packages.
Command to install pip: sudo apt install python-pip

Step-3: Install flask: By using pip you can install flask.
Command to install flask: pip install flask

Step-4: Import flask: Final step to import flask and use.

Command to import flask: import flask

CHAPTER 6

SYSTEM STUDY

6.1 FEASIBILITY STUDY

The feasibility of the project is analyzed in this phase and business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis the feasibility study of the proposed system is to be carried out. This is to ensure that the proposed system is not a burden to the company. For feasibility analysis, some understanding of the major requirements for the system is essential.

Three key considerations involved in the feasibility analysis are

- ECONOMICAL FEASIBILITY
- TECHNICAL FEASIBILITY
- SOCIAL FEASIBILITY

6.2 ECONOMICAL FEASIBILITY

This study is carried out to check the economic impact that the system will have on the organization. The amount of fund that the company can pour into the research and development of the system is limited. The expenditures must be justified.

Thus the developed system as well within the budget and this was achieved because most of the technologies used are freely available. Only the customized products had to be purchased. Economic feasibility refers to the project's ability to provide economic advantages. A cost-benefit analysis is required.

Furthermore, breakeven analysis can be used to assess a project's economic feasibility. The tangible and intangible aspects of a project must be converted into economic terms to provide a consistent basis for evaluation. Even if the idea is not for profit, economic feasibility is crucial.

6.3 TECHNICAL FEASIBILITY

This study is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources.

This will lead to high demands on the available technical resources. This will lead to high demands being placed on the client. The developed system must have a modest requirement, as only minimal or null changes are required for implementing this system. The technical feasibility of the project considers the engineering feasibility.

Certain important engineering aspects are covered that are required for project design, such as civil, structural, and other relevant aspects. The technical capacity of the anticipated technologies, as well as the capabilities of the project staff, are taken into account.

Technology transfer between cultures and geographical locations should be examined in some cases, particularly when initiatives are located in third-world nations. As a result of changes in fuel supply, location, terrain, infrastructural support, and other issues, productivity gain (or loss) and other repercussions are known.

6.4 SOCIAL FEASIBILITY

The aspect of study is to check the level of acceptance of the system by the user. This includes the process of training the user to use the system efficiently. The user must not feel threatened by the system, instead must accept it as a necessity.

The level of acceptance by the users solely depends on the methods that are employed to educate the user about the system and to make him familiar with it. His level of confidence must be raised so that he is also able to make some constructive criticism, which is welcomed, as he is the final user of the system. The social feasibility examines the impact that a proposed project may have on the social system in the project environment. As a result of the prevailing social system, a certain group of employees may be scarce or unavailable.

The project's impact on the social standing of the participants should be assessed to ensure compatibility. It must be recognized that personnel in distinct industries may have specific status symbols in society.

A certain kind of feasibility study is social feasibility, which considers people's acceptability of the product to be released.

1. It outlines the impact of the new system on users, taking into account whether or not the employees will need to be retrained.

2. It explains how you intend to achieve user cooperation before implementing changes.

3. Social impact study significantly minimizes the total risks of the project by reducing opposition, strengthening broad support, and allowing for a more full knowledge of the project's costs and benefits.

CHAPTER 7
SYSTEM TESTING

The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionality of components, sub assemblies, assemblies and/or a finished product It is the process of exercising software with the intent of ensuring that the Software system meets its requirements and user expectations and does not fail in an unacceptable manner. There are various types of test. Each test type addresses a specific testing requirement.

TYPES OF TESTS

7.1 UNIT TESTING

Unit testing involves the design of test cases that validate that the internal program logic is functioning properly, and that program inputs produce valid outputs. All decision branches and internal code flow should be validated. It is the testing of individual software units of the application .it is done after the completion of an individual unit before integration. This is a structural testing, that relies on knowledge of its construction and is invasive. Unit tests perform basic tests at component level and test a specific business process, application, and/or system configuration. Unit tests ensure that each unique path of a business process performs accurately to the documented specifications and contains clearly defined inputs and expected results. Unit testing is a software testing approach in which individual pieces of software, such as groups of computer programme modules, usage processes, and operating procedures, are examined to assess suitability. It is a testing approach in which the developer tests each individual module to see whether there is a problem. It is connected to the separate modules' functional soundness. Unit testing is a sort of software testing in which individual programme components are tested. During the development of an application, unit testing of the software product is performed. An individual component might be either a single function or a single method. The developer is usually in charge of unit testing.

7.2 INTEGRATION TESTING

Integration tests are designed to test integrated software components to determine if they actually run as one program. Testing is event driven and is more concerned with the basic outcome of screens or fields. Integration tests demonstrate that although the components were individually satisfaction, as shown by successfully unit testing, the combination of components is correct and consistent. Integration testing is specifically aimed at exposing the problems that arise from the combination of components.

7.3 FUNCTIONAL TEST

Functional tests provide systematic demonstrations that functions tested are available as specified by the business and technical requirements, system documentation, and user manuals.
Functional testing is centered on the following items:

Valid Input : identified classes of valid input must be accepted.
Invalid Input : identified classes of invalid input must be rejected.
Functions : identified functions must be exercised.
Output :
identified classes of application outputs must be exercised.
Systems/Procedures: interfacing systems or procedures must be invoked.

Organization and preparation of functional tests is focused on requirements, key functions, or special test cases. In addition, systematic coverage pertaining to identify Business process flows; data fields, predefined processes, and successive processes must be considered for testing. Before functional testing is complete, additional tests are identified and the effective value of current tests is determined.

7.4 SYSTEM TEST

System testing ensures that the entire integrated software system meets requirements. It tests a configuration to ensure known and predictable results. An example of system testing is the configuration oriented system integration test. System testing is based on process descriptions and flows, emphasizing pre-driven process links and integration points. System testing is a sort of

software testing that is conducted on a whole integrated system to assess the system's compliance with the associated requirements. Integration testing passed components are used as input in system testing. The purpose of integration testing is to discover any discrepancies between the components that are being integrated together. System testing finds flaws in both integrated modules and the entire system. The observed behavior of a component or system when tested is the result of system testing. System testing is performed on the entire system in the context of either system requirement specifications, functional requirement specifications, or both. System testing examines the system's design and behavior.

7.5 WHITE BOX TESTING

White Box Testing is a testing in which in which the software tester has knowledge of the inner workings, structure and language of the software, or at least its purpose. It is purpose. It is used to test areas that cannot be reached from a black box level. White box testing is a type of application testing in which the tester is given entire knowledge of the programme under test, including access to source code and design papers. Because of this enhanced visibility, white box testing can detect flaws that grey and black box testing cannot.

7.6 BLACK BOX TESTING

Black Box Testing is testing the software without any knowledge of the inner workings, structure or language of the module being tested. Black box tests, as most other kinds of tests, must be written from a definitive source document, such as specification or requirements document, such as specification or requirements document. It is a testing in which the software under test is treated, as a black box .you cannot “see” into it. The test provides inputs and responds to outputs without considering how the software works. In this approach, the tester picks a function and provides an input value to assess its functioning, and then determines whether or not the function produces the intended result. If the function returns proper results, it passes testing; otherwise, it fails. The test team communicates the results to the development team before moving on to the next function. If there are major difficulties after testing all functionalities, it is returned to the development team for rectification.

The black box test is based on the specification of requirements, it is examined first.

The tester then develops a positive and negative test scenario by picking valid and invalid input

data to ensure that the programme is processing them correctly or incorrectly.

The tester creates numerous test cases in the third stage, such as a decision table, all pairs test, equivalent division, error estimation, cause-effect graph, and so on.

The fourth phase consists of running all test cases.

The fifth stage involves the tester comparing the predicted output to the actual result.

If there is a defect in the programme, it is corrected and tested again in the sixth and final phase.

7.7 UNIT TESTING:

Unit testing is usually conducted as part of a combined code and unit test phase of the software lifecycle, although it is not uncommon for coding and unit testing to be conducted as two distinct phases.

Test strategy and approach

Field testing will be performed manually and functional tests will be written in detail.

Test objectives

- All field entries must work properly.
- Pages must be activated from the identified link.
- The entry screen, messages and responses must not be delayed.

Features to be tested

- Verify that the entries are of the correct format
- No duplicate entries should be allowed
- All links should take the user to the correct page.

7.8 INTEGRATION TESTING

Software integration testing is the incremental integration testing of two or more integrated software components on a single platform to produce failures caused by interface defects.

The task of the integration test is to check that components or software applications, e.g.

components in a software system or – one step up – software applications at the company level – interact without error. Integration testing, often known as integration and testing (I&T), is a sort of software testing that involves evaluating the many units, modules, or components of a software programme. These modules, however, may have been coded by different programmers.

The goal of integration testing is to verify the interfaces between modules and identify any flaws that may occur when these components are integrated and must communicate with one another.

Integration testing example:

Consider a mobile video-streaming application.

Its main characteristics are as follows:

- Sign up or log in.
- View various monthly and yearly subscription plans.
- Select customized plans.
- View streaming video.

Test Results: All the test cases mentioned above passed successfully. No defects encountered.

7.9 ACCEPTANCE TESTING

User Acceptance Testing is a critical phase of any project and requires significant participation by the end user. It also ensures that the system meets the functional requirements.

Acceptance testing is a type of testing used to verify whether or not a software system meets the requirements specifications. The primary goal of this test is to assess the system's compliance with business requirements and to confirm that it meets the criteria for delivery to end users.

ADVANTAGES

1. It involves users in testing, this testing allows the project team to learn about additional requirements directly from the users.
2. Test execution is automated.
3. Clients gain confidence and pleasure since they are actively involved in the testing process.
4. It is simpler for the user to explain their needs.
5. It just covers the Black-Box testing method, thus the product's whole functionality will be evaluated.

DISADVANTAGES

1. Users should have a fundamental understanding of the product or application.
2. Users may refuse to engage in the testing procedure at times.
3. Feedback for testing takes a long time since it involves numerous users, and opinions may change from one user to the next.
4. The development team did not take part in this testing procedure.

Test Results: All the test cases mentioned above passed successfully. No defects encountered.

CHAPTER 8

CONCLUSION AND FUTURE ENHANCEMENT

8.1 CONCLUSION

According to the information provided, the movie recommender system is extremely important in our lives since it saves us time and makes it easier to find a certain movie that the user desires. This research paper will be built for movie recommendation based on user sentiment analysis, and we will utilize several ML algorithms in this article, such as Collaborative filtering Algorithm using KNN algorithm. I assessed and tested the operation of our system using a huge dataset that has to be utilized for movie suggestion for the user; it works really well. This article will discuss and provide fundamental concepts for a movie recommender system based on user sentiment.

8.2 FUTURE ENHANCEMENTS:

Future work includes keeping a track of movies searched by users in nearby location to recommend trending movies. We can try to combine the watch history of the user with the watch history of geographically contextual users (those living nearby) to give more ‘location relevant’ recommendations. Furthermore, using user ratings of movies on websites like Rotten tomatoes, Metacritic, IMDb etc. opens up the possibility of combining collaborative filtering techniques with our method into a hybrid model to get the best out of both approaches.

APPENDIX-1

SOURCECODE:

MODEL.PY:

```
import pandas as pd
import numpy as np
from sklearn.feature_extraction.text import CountVectorizer
from sklearn.metrics.pairwise import cosine_similarity


def get_title_from_index(index):

        return df[df.index == index]["title"].values[0]

def get_votes(names):
   df = pd.read_csv("./data/movie_dataset.csv")


def get_index_from_title(title):
        return df[df.title.str.lower() == title.lower()]["index"].values[0]

def combine_features(row):
        try:
                return row['keywords'] +" "+row['cast']+" "+row["genres"]+" "+row["director"]
        except:
                print ("Error:", row     )
```

APP.PY:

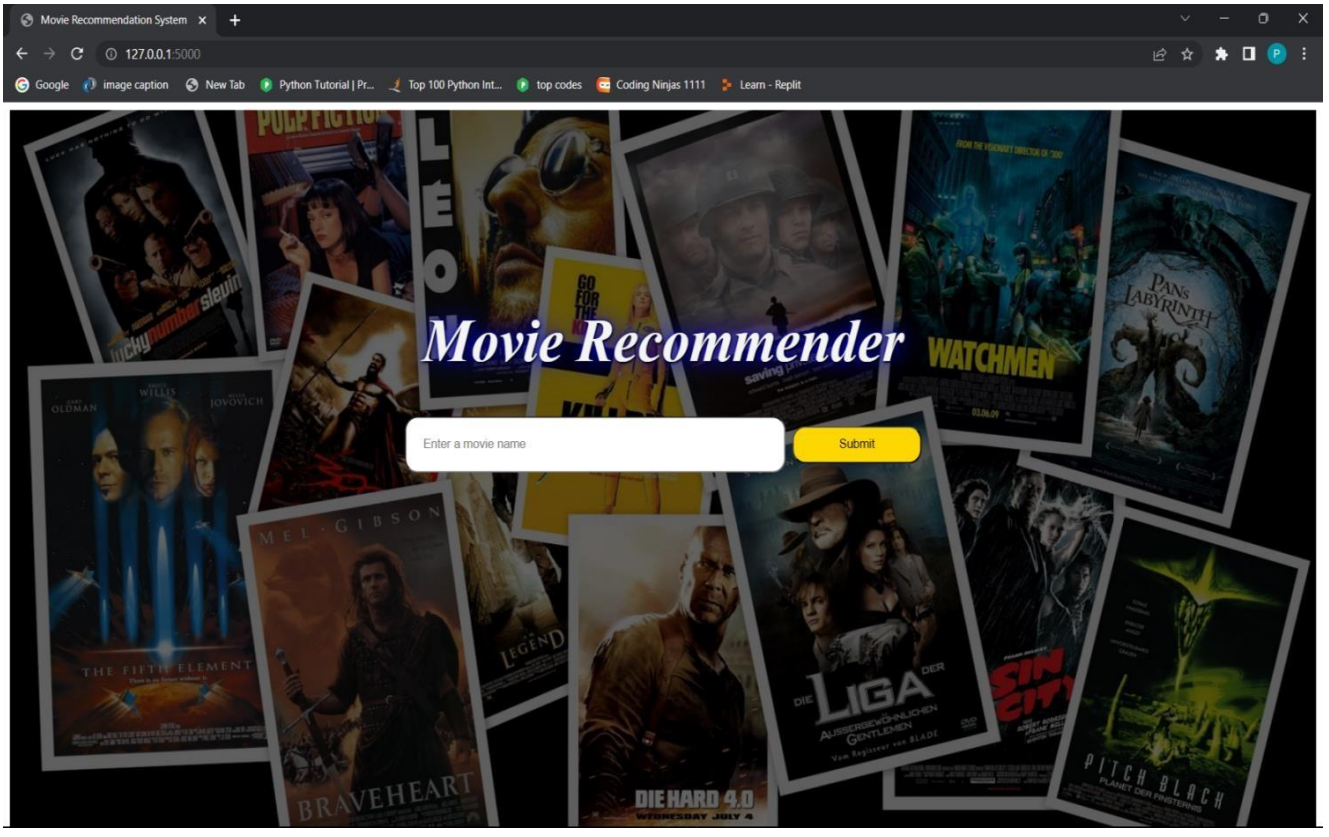
```
import flask
from model.model import check_movie, get_recommendations,all_movies

app = flask.Flask(__name__, template_folder='templates')

@app.route('/', methods=['GET', 'POST'])

if flask.request.method == 'POST':
        m_name = flask.request.form['movie_name'].lower()
        if not check_movie(m_name):
            return(flask.render_template('notfound.html',name=m_name))
```

8.2 RESULT ANALYSIS:

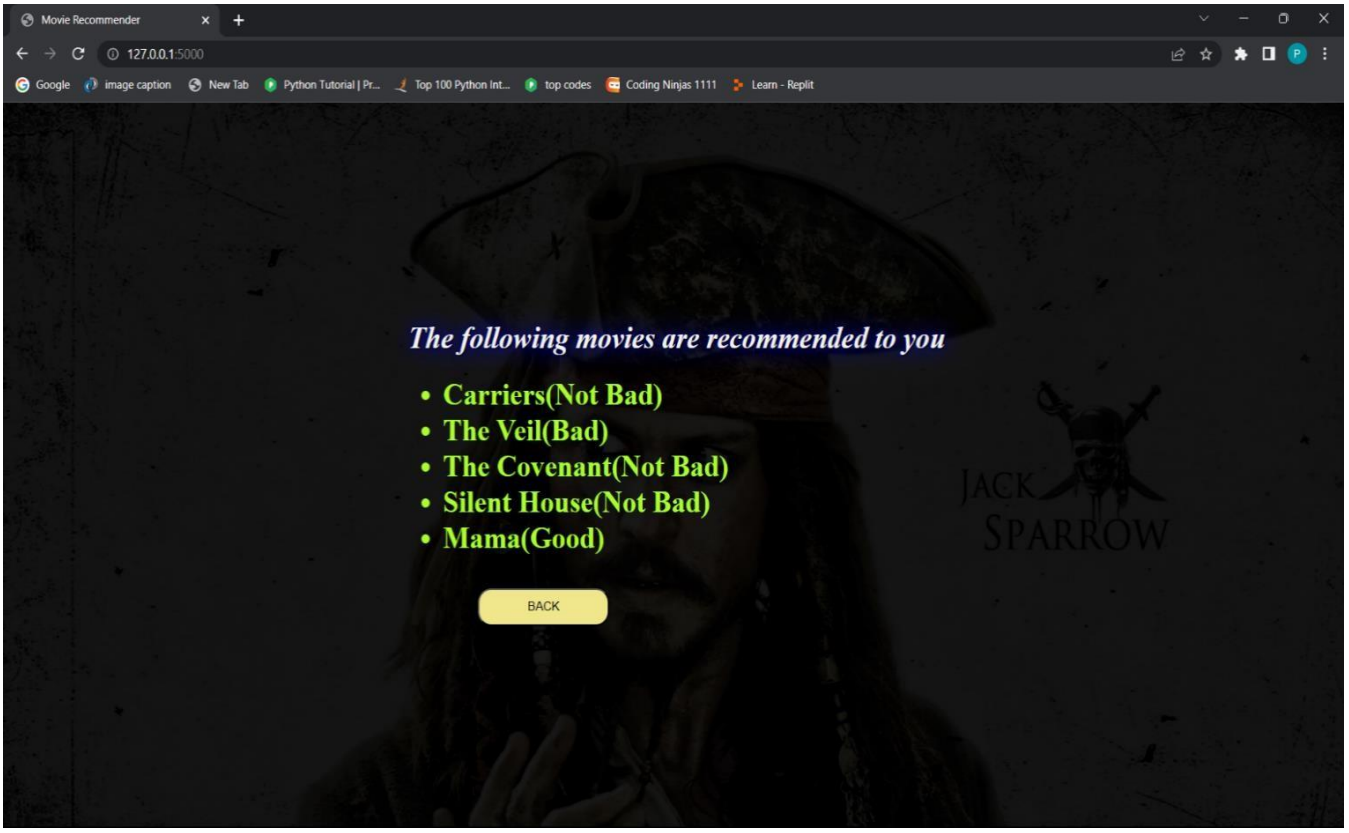
We got a accuracy of 90.7% on test set

APPENDIX-2

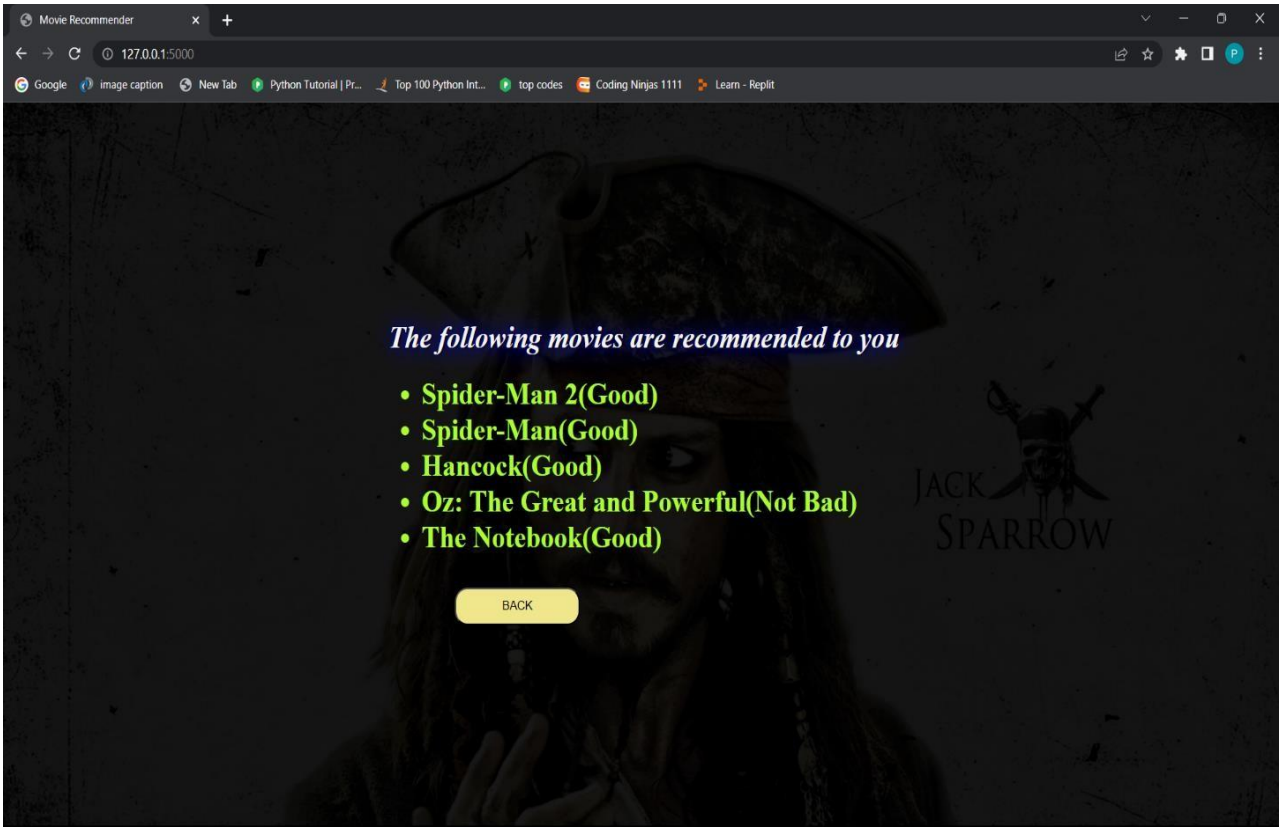
SCREENSHOTS



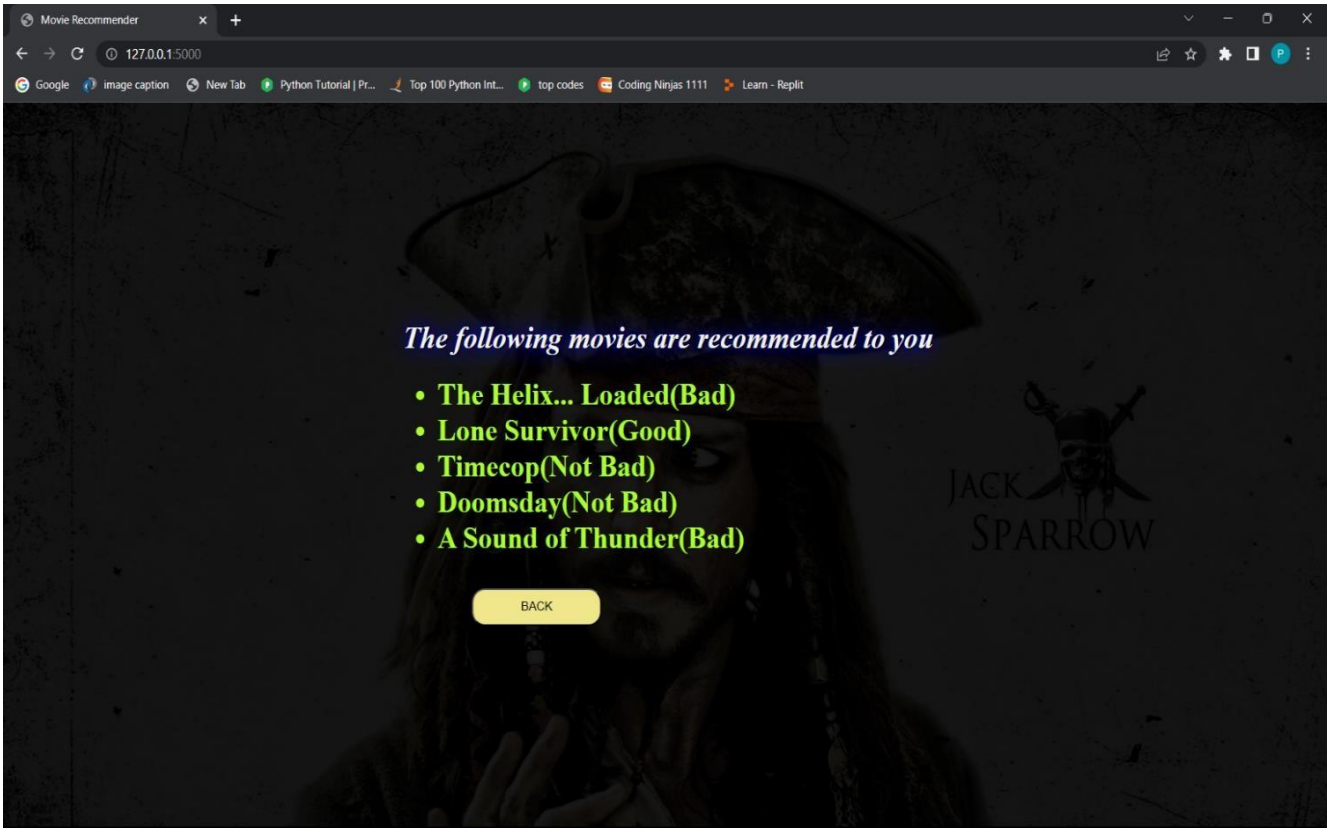
Sample Output 1



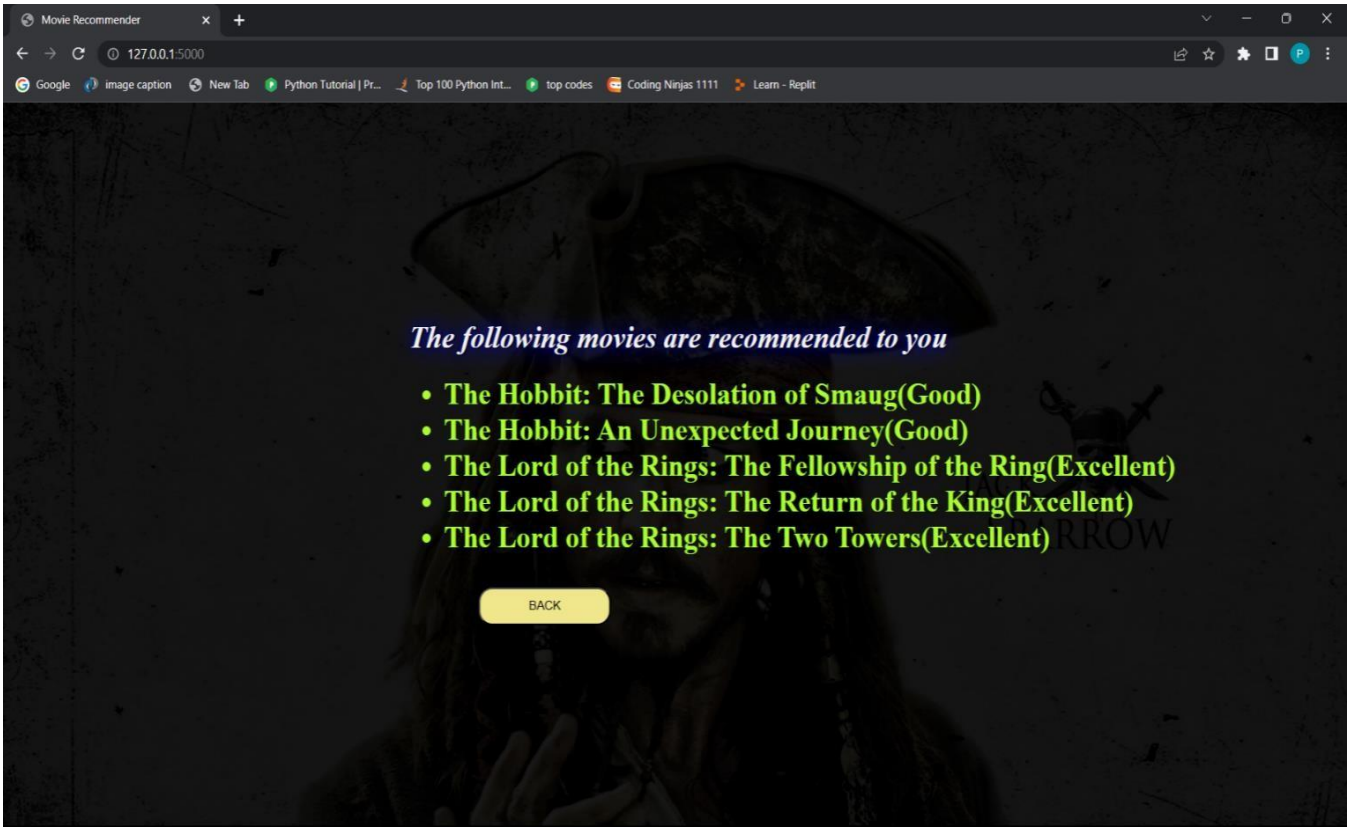
Sample Output 2



Sample Output 3



Sample Output 4



Sample Output 5

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