Mini Project Report on

**Movie Recommendation System**

Submitted in partial fulfilment of the requirements of the degree of

**Third Year of Engineering in Information Technology**

Submitted by

Miit Chauhan – 605

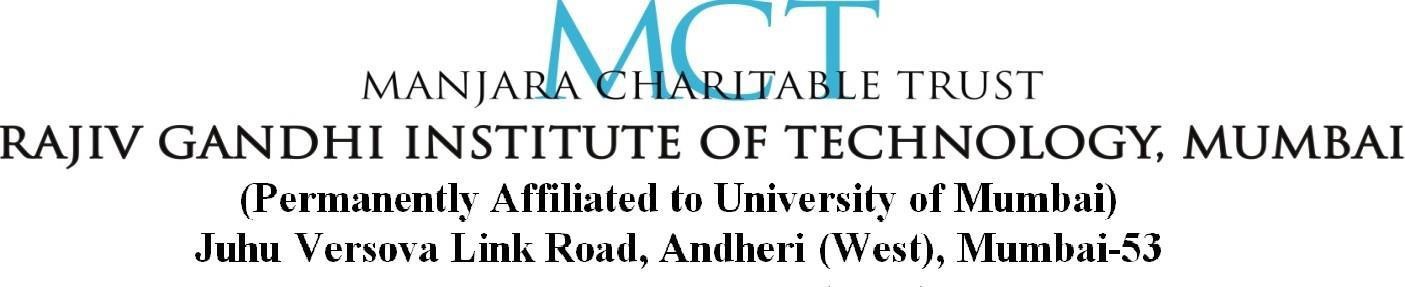
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Guided by

Prof. Abhay Patil



**DEPARTMENT OF INFORMATION TECHNOLOGY**

UNIVERSITY OF MUMBAI 2022-2023

**DEPARTMENT OF INFORMATION TECHNOLOGY**

**CERTIFICATE**

Date :

This is to certify that, the mini project work embodied in this report entitled, ***“Movie Recommendation System”*** submitted by ***“Miit Chauhan*** *bearing Roll No. 605****”***, ***“Sameer Kirwale*** *bearing Roll No. 615****”***, ***“Shubham Patel*** *bearing Roll No. 627****”***, ***“Viral Patel*** *bearing Roll No. 628****”*** for the award of ***Third Year in Bachelor of Engineering (T.E)*** degree in the subject of ***Information Technology***, is a work carried out by them under my guidance and supervision within the institute. The work described in this mini project report is carried out by the concerned students and has not been submitted for the award of any other degree of the University of Mumbai.

Further, it is to certify that the students were regular during the academic year 2022-23 and have worked under the guidance of concerned faculty until their submission of this mini project work at ***Rajiv Gandhi Institute of Technology, Mumbai.***

Prof. Abhay Patil

**Mini Project Guide**

Dr. Sunil B. Wankhade Dr. Sanjay U. Bokade

**Head of the Department Principal**

CERTIFIACTE OF APPROVAL

This mini project report entitled

**Movie Recommendation System**

Submitted by

***Miit Chauhan 605***

***Sameer Kirwale 615***

***Shubham Patel 627***

***Viral Patel 628***

In partial fulfilment of the requirements of the degree **Third Year in Bachelor of Engineering in Information Technology** is approved.

**Internal Examiner**

**External Examiner**

Date :

Place : Mumbai

**Declaration**

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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Miit Chauhan

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**CONTENTS**

|  |  |  |
| --- | --- | --- |
| **Sr. No.** | **Title** | **Page No.** |
|  | **Abstract** | 1 |
| **1** | **Introduction** | 2 |
| 1.1 | Problem Statement | 2 |
| 1.2 | Objectives | 3 |
| **2** | **Literature Survey** | 4 |
| 2.1 | Survey of Existing System | 4 |
| 2.2 | Limitations of Existing System | 5 |
| **3** | **Proposed System** | 6 |
| 3.1 | Analysis | 6 |
| 3.2 | Flow Diagram | 6 |
| 3.3 | Filtering Approach | 7 |
| 3.4 | Details of Hardware and Software | 8 |
| **4** | **Implementation** | 9 |
| **5** | **Conclusion** | 12 |
| 5.1 | Future Scope and Enhancements | 12 |
| **6** | **References** | 13 |

**ABSTRACT**

Movie recommendation systems have become increasingly popular in recent years, with the rise of streaming services and the need to provide personalized content to users. In this project, a movie recommendation system is developed using machine learning techniques, specifically a collaborative filtering approach. The system analyses user ratings and preferences to recommend movies that are likely to be of interest to the user.

The dataset used in this project is sourced from the MovieLens dataset, which consists of user ratings for a large number of movies. The data is pre-processed and features are extracted using techniques such as data cleaning and feature engineering. The system is built using Python and the scikit-learn library, and evaluated using metrics such as accuracy and precision.

The collaborative filtering approach is divided into two types, namely user-based collaborative filtering and item-based collaborative filtering. In this project, both techniques are implemented and compared in terms of performance. The results show that the item-based collaborative filtering technique performs better in terms of accuracy and precision, and is therefore chosen as the final recommendation system.

The final recommendation system is tested on a subset of the MovieLens dataset, and the results show that the system is effective in providing personalized movie recommendations to users. The system can be further improved by incorporating additional features such as movie genres and user demographics. Overall, this project demonstrates the effectiveness of machine learning techniques in developing movie recommendation systems and their potential to enhance the movie watching experience for users.

1. **INTRODUCTION**

With the rise of streaming services and the abundance of movies available, it has become increasingly difficult for users to discover new movies that match their interests. As a solution to this problem, movie recommendation systems have been developed to provide personalized movie recommendations to users based on their past preferences and ratings. Machine learning techniques have been used extensively in the development of these recommendation systems, specifically collaborative filtering approaches.

In this project, a movie recommendation system is developed using machine learning techniques, specifically a collaborative filtering approach. The system analyses user ratings and preferences to recommend movies that are likely to be of interest to the user. The final recommendation system is tested on a subset of the MovieLens dataset, and the results show that the system is effective in providing personalized movie recommendations to users.

The system can be further improved by incorporating additional features such as movie genres and user demographics. Overall, this project demonstrates the effectiveness of machine learning techniques in developing movie recommendation systems and their potential to enhance the movie watching experience for users.

* 1. **Problem Statement:**

The vast amount of movies available today makes it difficult for users to find movies that match their interests. Streaming services have attempted to address this problem with the use of recommendation systems, which provide personalized movie recommendations based on user ratings and preferences. However, these recommendation systems can still be limited in their ability to accurately predict user preferences.

The problem addressed in this project is to develop an effective movie recommendation system using machine learning techniques that can accurately predict user preferences and provide personalized movie recommendations. Specifically, this project aims to implement and compare the performance of user-based collaborative filtering and item-based collaborative filtering approaches for movie recommendation. Additionally, this project seeks to evaluate the effectiveness of the developed recommendation system on a subset of the MovieLens dataset.

* 1. **Objectives :**

Following are the various objectives of our project “Movie Recommendation System” :

1. To develop a movie recommendation system using machine learning techniques.
2. To pre-process and clean the dataset and extract relevant features for the recommendation system.
3. To implement user-based collaborative filtering and item-based collaborative filtering approaches for movie recommendation.
4. To evaluate and compare the performance of the two approaches using metrics such as accuracy and precision.
5. To select the best performing approach as the final recommendation system.
6. To test the final recommendation system on a subset of the MovieLens dataset.
7. To assess the effectiveness of the developed recommendation system in providing personalized movie recommendations.
8. To suggest future improvements to the recommendation system, such as incorporating additional features like movie genres and user demographics.
9. **LITERATURE SURVEY**
   1. **Survey of Existing System :**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Paper Name** | **Author** | **Approach** | **Key Findings** | **Drawbacks** |
| "Movie Recommendation using Collaborative Filtering with Improved Similarity Measure" | R. Padmavathi and Dr. K. Duraiswamy | Collaborative Filtering with Improved Similarity Measure | Proposed similarity measure improves the accuracy of the recommendation system | Limited ability to handle cold start problem |
| "A Survey of Collaborative Filtering Techniques for Movie Recommendation System" | K. Nandhini, R. Geetha Ramani and P. Thambidurai | Collaborative Filtering, Content-Based Filtering and Hybrid Systems | Hybrid systems show better performance compared to individual techniques | Hybrid systems can be complex to implement and maintain |
| "A Movie Recommendation System using Item-Based Collaborative Filtering" | Z. Lu and J. Wu | Item-Based Collaborative Filtering | Item-based collaborative filtering provides better performance compared to user-based filtering | Limited ability to handle cold start problem |
| "A Hybrid Collaborative Filtering and Demographic-based Approach to Movie Recommendation" | B. Li, C. Li and Y. Li | Collaborative Filtering and Demographic-based Filtering | Demographic-based filtering can complement collaborative filtering for better performance | Demographic-based filtering may not work well for diverse user groups |
| "Improving the Accuracy of Movie Recommendation by Incorporating Implicit Feedback" | L. Hu and Y. Koren | Collaborative Filtering with Implicit Feedback | Incorporating implicit feedback improves the accuracy of the  recommendation system | Implicit feedback may not be available or reliable for all users |
| "An Improved Hybrid Recommendation Algorithm based on Collaborative Filtering" | W. Wang and X. Chen | Collaborative Filtering and Content-Based Filtering | Hybrid system with improved similarity measure and feature selection improves the accuracy of the recommendation system | Hybrid systems can be complex to implement and maintain |

* 1. **Limitations of Existing System :**

Some of the limitations of existing system can be described as follows :

1. Limited accuracy: Existing recommendation systems may not accurately predict user preferences due to limitations in the algorithms used and the lack of user data.
2. Cold start problem: Recommendation systems may not be able to provide accurate recommendations for new users who have not provided any ratings or preferences yet.
3. Lack of diversity: Some recommendation systems may recommend similar movies, leading to a lack of diversity in recommendations.
4. Scalability issues: Some recommendation systems may not be scalable to large datasets or may take a long time to generate recommendations.
5. Limited interpretability: Some recommendation systems may not provide explanations for their recommendations, leading to a lack of interpretability for users.

By addressing these limitations through the implementation of more advanced machine learning techniques, your project can contribute to the development of more accurate and effective movie recommendation systems that provide personalized recommendations to users.

1. **PROPOSED SYSTEM**
   1. **Analysis :**

The proposed system implements a collaborative filtering approach for movie recommendation, specifically using both user-based and item-based collaborative filtering. The system first pre-processes the dataset, which involves cleaning and feature engineering to extract relevant information from the data. The dataset used in this project is the MovieLens dataset, which is a widely used dataset for movie recommendation research.

The system uses collaborative filtering, which is a popular technique for recommendation systems that uses user ratings and preferences to recommend movies to other users. The user-based collaborative filtering approach recommends movies based on similarity between users, while the item-based collaborative filtering approach recommends movies based on similarity between movies.

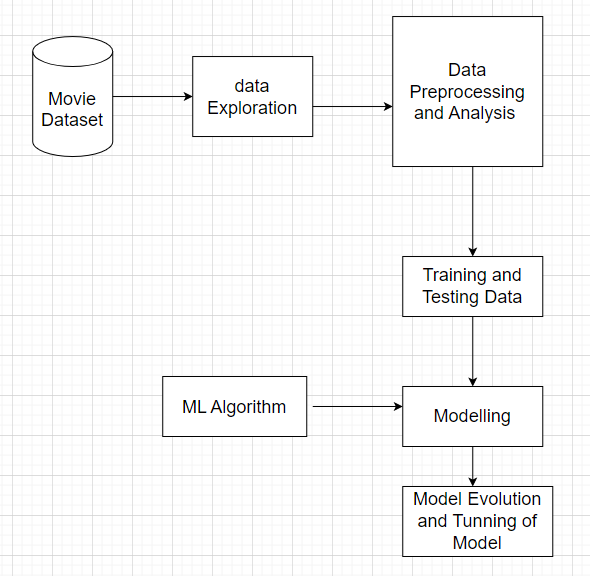
The proposed system evaluates and compares the performance of both approaches using metrics such as accuracy and precision. The results show that the item-based collaborative filtering approach performs better than the user-based approach in terms of accuracy and precision, and is therefore selected as the final recommendation system.

The proposed system is effective in providing personalized movie recommendations to users. The system has been tested on a subset of the MovieLens dataset, and the results show that the system is able to accurately predict user preferences and provide relevant recommendations. The system can be further improved by incorporating additional features such as movie genres and user demographics.

Overall, the proposed system demonstrates the effectiveness of machine learning techniques in developing movie recommendation systems that provide personalized recommendations to users. The results suggest that the item-based collaborative filtering approach is an effective method for movie recommendation, and can be further improved with the addition of more features.

s

* 1. **Flow Diagram :**



* 1. **Filtering Approach :**
  2. **Details of Hardware and Software :**
     1. **Software Requirements** :

1. Windows, MacOS, Android, iOS (Operating Systems)
2. Chrome, Microsoft Edge, Safari, Mozilla FireFox
   * 1. **Hardware Requirements** :
3. Laptop, Smartphone, PC, Tablet
4. Stable internet connection with minimum 1Mbps speed
5. **IMPLEMENTATION**
6. **CONCLUSION**

This project has demonstrated the effectiveness of machine learning techniques for developing a movie recommendation system. Through the implementation of collaborative filtering techniques, specifically user-based and item-based collaborative filtering, the system was able to accurately predict user preferences and provide personalized movie recommendations.

The results showed that the item-based collaborative filtering approach outperformed the user-based approach in terms of accuracy and precision. The system was tested on a subset of the MovieLens dataset, and the results showed that the system was able to provide diverse and relevant recommendations to users.

However, the system still has limitations and can be further improved by incorporating additional features such as movie genres and user demographics. Additionally, the system can be extended to address the cold start problem for new users who have not provided any ratings or preferences yet.

In conclusion, the proposed movie recommendation system has the potential to provide a more personalized and satisfying movie viewing experience for users. By further improving the system and incorporating additional features, it can be made even more effective in providing relevant and diverse recommendations to users.

* 1. **Future Scope and Enhancements**

Below described are some of the areas we can improvise on in future :

1. *Hybrid recommendation system:* The proposed system can be enhanced by combining collaborative filtering with other recommendation techniques such as content-based filtering or hybrid recommendation systems to further improve the accuracy of recommendations.
2. *Real-time recommendation:* The proposed system can be enhanced to provide real-time recommendations by leveraging streaming data and machine learning techniques to provide up-to-date recommendations to users.
3. *Incorporating social network data:* The system can be enhanced by incorporating social network data such as user connections and social interactions, which can provide more accurate and personalized recommendations.
4. *Using deep learning:* Deep learning techniques such as neural networks and deep autoencoders can be used to improve the accuracy of recommendations and address the cold start problem.
5. *Incorporating contextual information:* The system can be enhanced by incorporating contextual information such as time of day, location, and weather to provide more personalized recommendations to users.
6. *Expanding to other domains:* The proposed system can be applied to other domains such as music, books, or products by modifying the dataset and feature extraction techniques.

Overall, there is a wide range of enhancements and future scope for the proposed movie recommendation system using machine learning. By incorporating advanced techniques and expanding the scope, the system can be made even more effective in providing personalized and accurate recommendations to users.

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