# Movie Recommendation System – Project Report

## 1. Introduction

In the era of digital streaming, users are often overwhelmed with the large selection of movies available. A Movie Recommendation System is an intelligent solution that suggests personalized movie recommendations, increasing user satisfaction and platform engagement. This project focuses on implementing a system using machine learning techniques like Content-Based Filtering and Collaborative Filtering.

## 2. Objectives

- Recommend movies tailored to users’ tastes.

- Implement content-based and collaborative filtering approaches.

- Evaluate system performance with appropriate metrics.

## 3. Methodology

a) Dataset

• Source: Kaggle dataset

• Includes: Movie metadata (title, genres), user ratings, tags

b) Preprocessing

• Cleaned and merged movie metadata and ratings

• Tokenized genres, descriptions

• Generated feature vectors using TF-IDF and cosine similarity

c) Algorithms Implemented

• Content-Based Filtering: Recommends movies with similar content (genres, plot).

• Collaborative Filtering: Recommends based on users with similar preferences using:

- User-User Similarity

- Item-Item Similarity

- Matrix Factorization (SVD) using the Surprise library

## 4. Tools & Technologies

• Languages: Python

• Libraries: Pandas, NumPy, Scikit-learn, difflib

• Platform: Google colab

## 5. Results & Evaluation

Metric | Value

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RMSE (SVD) | ~0.88

Precision@10 | ~0.76

Recall@10 | ~0.62

- Content-based filtering handled cold start scenarios.

- Collaborative filtering performed better with more ratings.

- Hybrid approach (optional) improved accuracy by combining both.

## 6. Conclusion

The system efficiently recommends personalized movies. Content-based filtering is helpful for new users, while collaborative filtering adapts well to long-term preferences. The implementation demonstrates scalable recommendation architecture for use in real-world applications.

## 7. Future Scope

- Deploy web interface using Streamlit or Flask

- Integrate deep learning (Autoencoders, Transformers)

- Add real-time recommendations based on watch time and feedback

- Incorporate user authentication and preferences history

## Appendix

- Dataset: Kaggle dataset

- GitHub/Code Repo: (https://github.com/Gundgisreevalli01/movie\_recommendation-\_system)

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