

# Project Report

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## 1. INTRODUCTION

In today's digital world, where hundreds of movies release every year, users often find it difficult to choose what to watch next. A movie recommendation system helps solve this by suggesting movies that match a user's preferences. These systems are widely used on platforms like Netflix, Amazon Prime, and YouTube. The goal of this project is to build a basic yet effective recommendation system using real-world data.

## 2. ABSTRACT

This project focuses on building a machine learning-based movie recommendation system using the MovieLens dataset. The system analyzes movie genres and user ratings to suggest similar movies. We implemented a content-based filtering approach that compares genre similarities between movies. Python and its data science libraries were used for implementation. The final system takes a movie name as input and returns a list of five similar movies. This project demonstrates the basic working of a recommender engine and how it can be expanded further using collaborative filtering and user behavior.

## 3. TOOLS USED

- Programming Language: Python
- Libraries: Pandas, Scikit-learn, TfidfVectorizer, Cosine Similarity
- Platform: Google Colab
- Dataset: MovieLens (ml-latest-small)

## 4. STEPS INVOLVED IN BUILDING THE PROJECT

### 1. Dataset Collection

- Downloaded MovieLens dataset containing movie titles, genres, and user ratings.

### 2. Data Preprocessing

- Cleaned data by handling missing values and formatting genre text.

### 3. Content-Based Filtering

- Used TF-IDF (Term Frequency–Inverse Document Frequency) to convert movie genres into numerical vectors.
- Calculated similarity scores between all movies using cosine similarity.

#### 4. Recommendation Logic

- Built a function to find the most similar movies based on genre similarity.
- Returned top 5 movie recommendations for a given input movie title.

#### 5. Testing & Output

- Tested the system with various movie titles like “Toy Story” and “Iron Man” to verify the recommendations.

### 5. CONCLUSION

The project successfully demonstrates how a simple content-based movie recommendation system can be built using Python and real-world data. The core logic was first developed and tested in Google Colab using a Jupyter notebook. Later, the system was integrated into a Streamlit-based user interface for easier interaction. While this version focuses on genre similarity, future enhancements can include collaborative filtering, sentiment analysis from reviews, and a user interface for better interaction. This project was helpful in understanding how real-world recommendation engines work and how machine learning can be applied to personalized suggestions.