PROJECT REPORT – MOVIE RECOMMENDATION SYSTEM

1. Introduction
This project presents "CineFlow" – an AI-driven Movie Recommendation System built using Machine Learning and modern data-processing tools. The primary objective is to recommend movies based on user preferences by integrating content-based filtering, collaborative filtering, and hybrid recommendation logic. The system is deployed with an interactive Streamlit interface to enhance user experience.

2. Abstract
The Movie Recommendation System utilizes the MovieLens dataset to analyze user ratings, movie metadata, and genre information. TF-IDF–based content similarity and SVD-based collaborative filtering are used to generate accurate movie suggestions. A hybrid approach combines both models to improve personalization. The interface allows users to choose movies or categories and instantly receive recommendations along with analytics.

3. Tools and Technologies Used
• Python
• Pandas, NumPy
• Scikit-learn (TF-IDF, Cosine Similarity, SVD)
• Streamlit for UI
• Plotly for data visualization
• MovieLens dataset

4. Steps Involved in Building the Project
Dataset Loading & Preprocessing: MovieLens data was cleaned, genre fields normalized, missing values handled, and additional attributes such as release year and rating statistics were generated.

Content-Based Filtering: TF-IDF Vectorizer extracts features from movie genres and computes cosine similarity between movies to recommend similar titles.

Collaborative Filtering: User–movie rating matrix processed using Truncated SVD to identify latent factors and compute similarity between movies based on rating patterns.

Hybrid Recommendation Engine: A combined score from both models improves accuracy. Genre-based filtering is also supported optionally.

Frontend with Streamlit: Provides two modes – movie-based search and category-based search. Visual displays include recommendation cards, similarity charts, rating distribution, and genre frequency analysis.

5. Conclusion
The Movie Recommendation System successfully implements ML-driven personalization, supporting multiple filtering techniques and a modern UI. This project demonstrates strong practical understanding of data processing, similarity modeling, collaborative systems, and interactive application development. It can be extended further using deep learning, sentiment analysis, and real-time user profiling.

End of Report