***Report: Movie Recommendation System***

**1. Introduction**

The objective of this project is to develop a basic movie recommendation system for a new streaming platform that competes with giants like Netflix and Amazon Prime. The system will analyze user behavior, recommend personalized movies, and evaluate the recommendations' accuracy.

**2. Data Exploration**

**2.1 Dataset Overview**

A movie rating dataset from Kaggle has been used for this project. It contains user ratings for various movies, along with metadata about the movies, including genres.

**2.2 Exploratory Data Analysis (EDA)**

Key steps in data exploration:

* **Ratings Distribution**: Analyze how user ratings are distributed across movies.
* **Popular Genres**: Identify the most-watched and highest-rated genres.
* **User Preferences**: Examine individual user behavior, focusing on preferred genres and frequently watched types of movies.

**3. Building the Recommendation Model**

**3.1 Collaborative Filtering Approach**

We used **collaborative filtering**, specifically:

* **User-based Filtering**: Recommends movies based on similarities between users’ watching habits.
* **Item-based Filtering**: Recommends movies based on similarities between movies that users rate highly.

**3.2 Model Construction**

* **Similarity Metric**: Cosine similarity or Pearson correlation is used to calculate the similarity between users or items.
* **Matrix Factorization**: Using techniques like singular value decomposition (SVD) for dimensionality reduction.

**4. Recommendation Process**

For each user, a recommendation list is generated based on the highest predicted ratings for movies they haven't yet watched. These ratings are predicted using collaborative filtering.

**5. Evaluation**

**5.1 Evaluation Metrics**

* **Mean Absolute Error (MAE)**: Measures the average absolute error between the predicted ratings and the actual user ratings.
* **Root Mean Square Error (RMSE)**: Provides insight into the magnitude of prediction errors.

**5.2 Comparison with Actual Data**

The recommendations were compared against movies that users had already watched and rated to evaluate accuracy.

**6. Conclusion**

The movie recommendation system successfully identified user preferences and recommended relevant movies. The model’s accuracy, measured using MAE and RMSE, provided an indication of its reliability for practical use on a streaming platform.