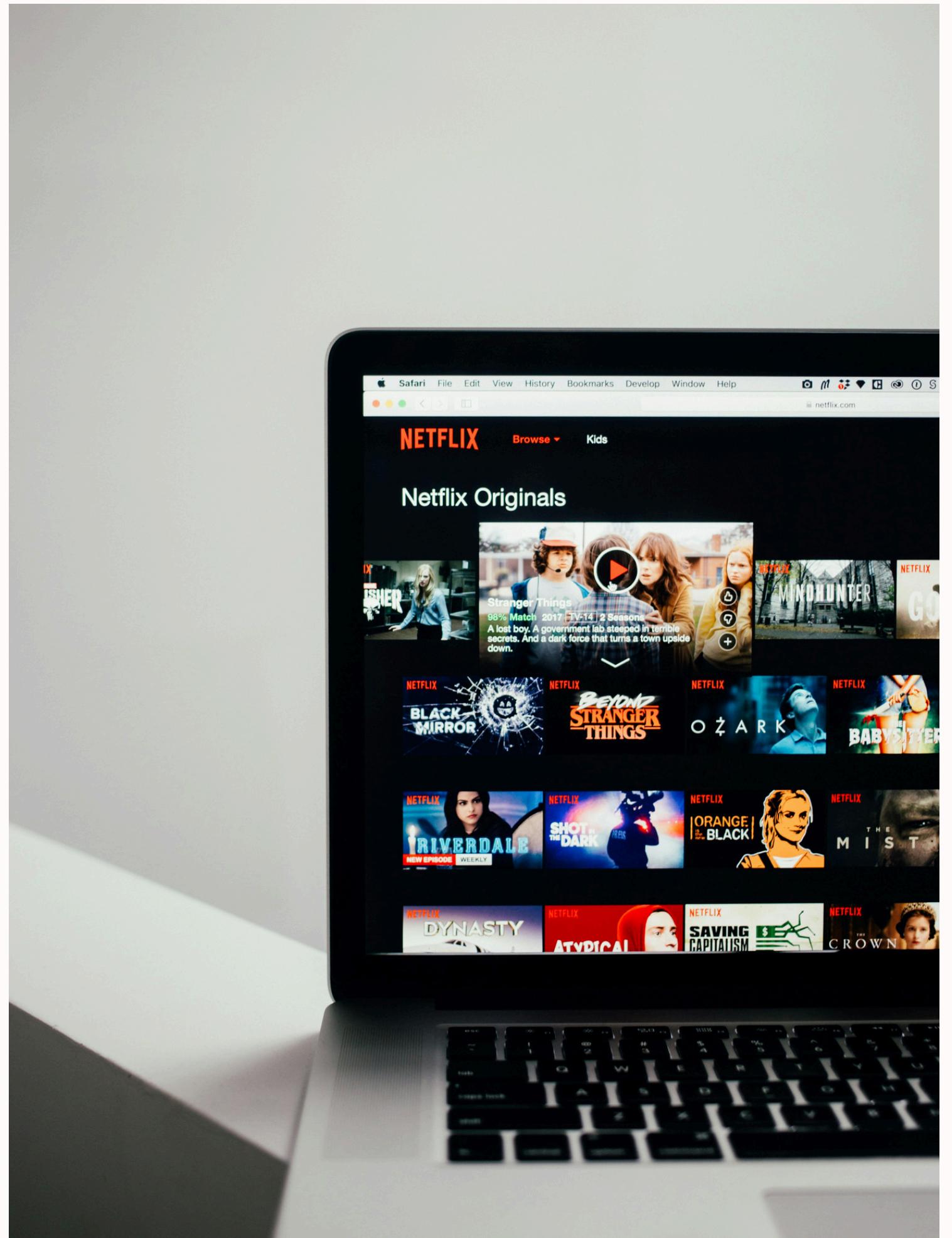


Movie Recommendation System

Group 8

2024-10-05





BUSINESS PROBLEM

Streaming services struggle to deliver accurate movie recommendations that resonate with users, leading to decreased engagement.

Goals:

- Increased viewership
- Subscription renewals
- A competitive edge in the entertainment industry

DATA UNDERSTANDING

MovieLens Dataset

Contains 100,000 user ratings in these files:

- movies.csv - titles, release yr, genre
- ratings.csv - user id, movie id, rating
- tags.csv - user id, movie id, tags, timestamps



Modeling Approaches

Collaborative Filtering

- Used Surprise library for collaborative filtering, exploring various similarity metrics and models to assess model performance.

Content-Based Filtering

- Built a neural network using TensorFlow and Keras, incorporating embedding layers & fully connected layers.
- Implemented early stopping & dropout to mitigate overfitting.

Hybrid Approach

- Combined collaborative & Content-Based filtering.
- Uses both user behaviour & movie attributes for a more robust implementation.

Model Evaluation



1 Cross-Validation

Model validation was conducted using cross-validation to assess the model's generalization ability.

2 Train-Test Split

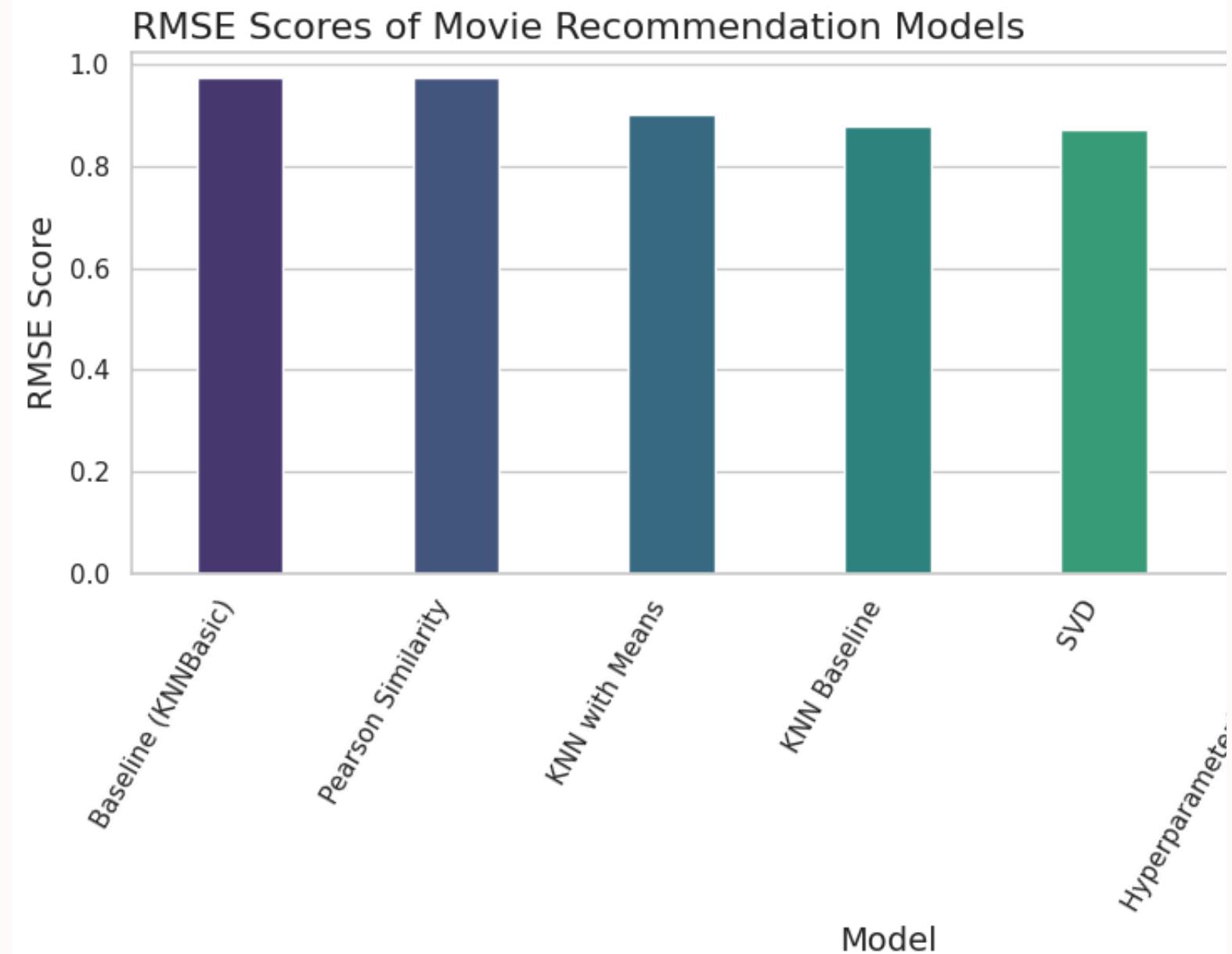
An 80-20 train-test split was employed for performance validation, evaluating the model's accuracy on unseen data.

3 RMSE

The final model achieved a Root Mean Squared Error (RMSE) of 0.8592, indicating reasonably accurate movie prediction

Model Performance Comparison

MODEL	RMSE
Baseline Model (KNNBasic)	0.9736
Pearson Similarity Model	0.9742
KNN with Means	0.9017
KNN Baseline	0.8792
SVD Model	0.8732
Hyperparameter-Tuned SVD	0.8693
Neural Network	0.8876





Model Insights

- The models showed a clear progression in performance, with hyperparameter tuning of the SVD model yielding the best results.
- This highlights the importance of optimization in collaborative filtering tasks.
- Neural network performance was competitive but not superior to traditional methods.

A photograph of a man with dark hair and a beard, wearing glasses and a white lab coat, sitting at a wooden desk. He is looking towards the camera with a slight smile. On the desk, there is a computer monitor, a keyboard, and a small yellow desk lamp. In the background, there is a whiteboard titled "Classification Problems" with various sticky notes and a graph. The setting appears to be a modern office or research laboratory.

Future Recommendations

- Explore further regularization techniques, such as weight decay.
- Use a simpler model architecture, to generalize better to unseen data.
- Incorporate additional features such as gender, geographical location, movie director information, actors, release dates.

A photograph of a young African American couple sitting on a dark-colored couch in a dimly lit room. The woman, in the foreground, has short brown hair and is wearing a light brown hoodie, smiling broadly while holding a large glass bowl filled with popcorn. The man, seated behind her, is wearing a maroon turtleneck sweater and is also smiling. They appear to be watching something on a screen that is not visible in the frame. In the background, there's a white shelf with some books and plants.

THANKS!

Do you have any questions?

Contact details [here](#)