Movie Watch Pattern Clustering

Assessment Report

on

“Movie Watch Pattern Clustering”

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By

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Introduction

The increasing availability of user interaction data on streaming platforms enables advanced analysis of viewing habits. By clustering users based on patterns like time of watching, genre preferences, and rating behavior, platforms can personalize content delivery, improve recommendations, and enhance user engagement.

Problem Statement

The challenge is to analyze a dataset of movie watchers and identify distinct clusters of users based on:

- Time of day they usually watch movies.
- Genre preferences (e.g., Action, Comedy, Drama).
- Rating behavior (e.g., average rating, consistency in rating).

Objective

- To segment users into meaningful clusters using unsupervised learning.
- To visualize these clusters using heat maps and interpret common viewing patterns.
- To extract actionable insights that could help in designing recommendation systems.

Methodology

1. Data Preprocessing

- **Clean the dataset (handle missing values, format timestamps).**
- **Feature engineering: extract hour of the day, encode genres, normalize ratings.**

2. Clustering Technique

- **Use K-Means Clustering as the primary algorithm.**
- **Evaluate cluster quality using:**
    - **Silhouette Score**
    - **Davies-Bouldin Index**

Visualization

- **Heat maps to visualize confusion matrix for cluster label vs actual label (if available).**
- **PCA or t-SNE for 2D visualization of clusters.**

Code (Python Example)

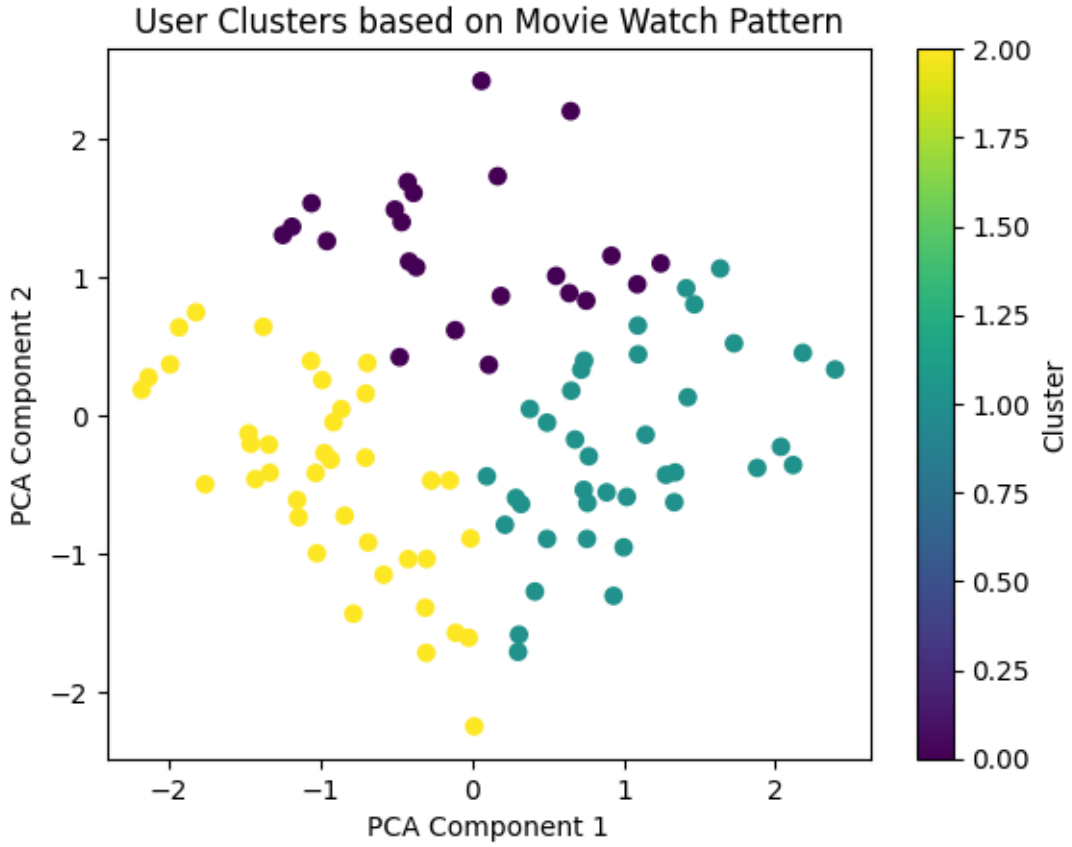
```
import pandas as pd

from sklearn.preprocessing import StandardScaler, OneHotEncoder

from sklearn.compose import ColumnTransformer

from sklearn.pipeline import Pipeline

from sklearn.cluster import KMeans

import matplotlib.pyplot as plt


# Load the data

df = pd.read_csv("//content/movie_watch (1).csv")


# Define preprocessing for numerical and categorical columns

numeric_features = ['watch_time_hour', 'avg_rating_given']

categorical_features = ['genre_preference']
```

```
# Create a column transformer
preprocessor = ColumnTransformer(
    transformers=[
        ('num', StandardScaler(), numeric_features),
        ('cat', OneHotEncoder(), categorical_features)
    ]
)

# Create a pipeline that first transforms the data then applies KMeans
pipeline = Pipeline([
    ('preprocessor', preprocessor),
    ('clusterer', KMeans(n_clusters=3, random_state=42))
])

# Fit the pipeline
pipeline.fit(df)

# Predict clusters
df['cluster'] = pipeline.predict(df)
```

```
# Display cluster assignment
print(df.head())

# Optional: Plotting (only 2D example using PCA)
from sklearn.decomposition import PCA

# Reduce dimensions for visualization
X_transformed =
pipeline.named_steps['preprocessor'].transform(df)
pca = PCA(n_components=2)
X_pca = pca.fit_transform(X_transformed)

plt.scatter(X_pca[:, 0], X_pca[:, 1], c=df['cluster'],
cmap='viridis')
plt.title("User Clusters based on Movie Watch Pattern")
plt.xlabel("PCA Component 1")
plt.ylabel("PCA Component 2")
plt.colorbar(label='Cluster')
plt.show()
```

Output

	watch_time_hour	genre_preference	avg_rating_given	cluster
0	13	action	2.037554	2
1	4	comedy	1.350365	2
2	15	thriller	1.359665	2
3	14	thriller	1.772998	2
4	14	comedy	1.202237	2



References / Credits

Dataset Source: [IMDb / Kaggle MovieLens Dataset]

Libraries used: pandas, matplotlib, seaborn, scikit-learn

Inspired by academic works in recommendation systems and behavioral clustering