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import pandas as pd
from sklearn.feature_extraction.text import TfidfVectorizer
from sklearn.metrics.pairwise import cosine_similarity

# Step 1: Define the dataset of movies and their features
movies = pd.DataFrame({
    'movie_id': [1, 2, 3, 4, 5],
    'title': ['Inception', 'The Matrix', 'Interstellar', 'The Dark Knight', 'Memento'],
    'genre': ['Sci-Fi', 'Sci-Fi', 'Sci-Fi', 'Action', 'Thriller'],
    'director': ['Christopher Nolan', 'The Wachowskis', 'Christopher Nolan', 'Christopher Nolan', 'Christopher Nol
    'lead_actor': ['Leonardo DiCaprio', 'Keanu Reeves', 'Matthew McConaughey', 'Christian Bale', 'Guy Pearce']
})

# Step 2: User preferences (the movies they liked)
liked_movies = ['Inception', 'Interstellar']

# Step 3: Combine relevant features (genre, director, lead_actor) into one string for each movie
movies['features'] = movies['genre'] + ' ' + movies['director'] + ' ' + movies['lead_actor']

# Step 4: Use TfidfVectorizer to convert the text data into numerical data (vectors)
tfidf_vectorizer = TfidfVectorizer(stop_words='english')
tfidf_matrix = tfidf_vectorizer.fit_transform(movies['features'])

# Step 5: Calculate cosine similarity between the liked movies and all other movies
# First, get the indices of the liked movies
liked_movie_indices = [movies[movies['title'] == movie].index[0] for movie in liked_movies]

# Calculate similarity for all movies with the liked ones
cosine_similarities = cosine_similarity(tfidf_matrix[liked_movie_indices], tfidf_matrix)

# Step 6: Recommend movies based on similarity scores
# Aggregate the similarities for all liked movies and sum them
similarity_scores = cosine_similarities.sum(axis=0)

# Get the indices of the movies sorted by similarity score in descending order
recommended_movie_indices = similarity_scores.argsort()[::-1]

# Step 7: Display the recommended movies
recommended_movies = []
for idx in recommended_movie_indices:
    if movies['title'][idx] not in liked_movies:
        recommended_movies.append(movies['title'][idx])

print("Recommended Movies for you based on your preferences:")
for movie in recommended_movies:
    print(movie)
```

```
Recommended Movies for you based on your preferences:
The Matrix
Memento
The Dark Knight
```