

PROJECT REPORT

MOVIE RECOMMENTATION

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2024

Recommendation system

Recommendation systems are designed to predict the preferences or ratings of users for items they haven't yet interacted with, based on their past behavior or the behavior of similar users. There are two primary types:

- Collaborative Filtering: Uses the past interactions (like ratings or purchases) of users to make recommendations.
- Content-Based Filtering: Uses the features of items and users to make recommendations.

2. TensorFlow Recommenders

TensorFlow Recommenders (TFRS) is a library for building and evaluating recommender system models using TensorFlow.

OUTPUT

Step 1: Installing Necessary Libraries

Step 2: Importing Libraries

Step 3: Installing and Importing NumPy

Step 4: Loading the Dataset

Step 5: Preparing the Data

```
satisfied: tensorflow-recommenders in /usr/local/lib/python3.10/dist-packages (0.7.3)
satisfied: absl-py<0.1.6 in /usr/local/lib/python3.10/dist-packages (from tensorflow-recommenders) (1.4.0)
satisfied: tensorflow<2.9.0 in /usr/local/lib/python3.10/dist-packages (from tensorflow-recommenders) (2.15.0)
satisfied: astunparse<1.6.0 in /usr/local/lib/python3.10/dist-packages (from tensorflow<2.9.0->tensorflow-recommenders) (1.6.3)
satisfied: flatbuffers<23.5.26 in /usr/local/lib/python3.10/dist-packages (from tensorflow<2.9.0->tensorflow-recommenders) (24.3.25)
satisfied: gast<0.5.0,!0.5.1,!0.5.2,>0.2.1 in /usr/local/lib/python3.10/dist-packages (from tensorflow<2.9.0->tensorflow-recommenders) (0.6.0)
satisfied: google-pasta<0.1.1 in /usr/local/lib/python3.10/dist-packages (from tensorflow<2.9.0->tensorflow-recommenders) (0.2.0)
satisfied: h5py<2.9.0 in /usr/local/lib/python3.10/dist-packages (from tensorflow<2.9.0->tensorflow-recommenders) (3.9.0)
satisfied: libclang<13.0.0 in /usr/local/lib/python3.10/dist-packages (from tensorflow<2.9.0->tensorflow-recommenders) (18.1.1)
satisfied: ml-dtypes<0.2.0 in /usr/local/lib/python3.10/dist-packages (from tensorflow<2.9.0->tensorflow-recommenders) (0.2.0)
satisfied: numpy<2.0.0,>=1.23.5 in /usr/local/lib/python3.10/dist-packages (from tensorflow<2.9.0->tensorflow-recommenders) (1.25.2)
satisfied: opt-einsum<2.3.2 in /usr/local/lib/python3.10/dist-packages (from tensorflow<2.9.0->tensorflow-recommenders) (3.3.0)
satisfied: packaging in /usr/local/lib/python3.10/dist-packages (from tensorflow<2.9.0->tensorflow-recommenders) (24.1)
satisfied: protobuf<4.21.0,!4.21.1,!4.21.2,!4.21.3,!4.21.4,!4.21.5,<5.0.0dev,>=3.20.3 in /usr/local/lib/python3.10/dist-packages (from tensorflow<2.9.0->tensorflow-recommenders) (67.7.2)
satisfied: six<1.12.0 in /usr/local/lib/python3.10/dist-packages (from tensorflow<2.9.0->tensorflow-recommenders) (1.16.0)
satisfied: termcolor<1.1.0 in /usr/local/lib/python3.10/dist-packages (from tensorflow<2.9.0->tensorflow-recommenders) (2.4.0)
satisfied: typing-extensions<3.6.6 in /usr/local/lib/python3.10/dist-packages (from tensorflow<2.9.0->tensorflow-recommenders) (4.12.2)
satisfied: wrapt<1.15,>=1.11.0 in /usr/local/lib/python3.10/dist-packages (from tensorflow<2.9.0->tensorflow-recommenders) (1.14.1)
satisfied: tensorflow-io-gcs-filesystem<0.23.1 in /usr/local/lib/python3.10/dist-packages (from tensorflow<2.9.0->tensorflow-recommenders) (0.37.0)
satisfied: grpcio<2.0,>=1.24.3 in /usr/local/lib/python3.10/dist-packages (from tensorflow<2.9.0->tensorflow-recommenders) (1.64.1)
satisfied: tensorflow<2.16,>=2.15 in /usr/local/lib/python3.10/dist-packages (from tensorflow<2.9.0->tensorflow-recommenders) (2.15.2)
satisfied: tensorflow-estimator<2.16,>=2.15.0 in /usr/local/lib/python3.10/dist-packages (from tensorflow<2.9.0->tensorflow-recommenders) (2.15.0)
satisfied: keras<2.16,>=2.15.0 in /usr/local/lib/python3.10/dist-packages (from tensorflow<2.9.0->tensorflow-recommenders) (2.15.0)
satisfied: wheel<1.0,>=0.23.0 in /usr/local/lib/python3.10/dist-packages (from astunparse<1.6.0->tensorflow<2.9.0->tensorflow-recommenders) (0.43.0)
satisfied: google-auth<3,>=1.6.3 in /usr/local/lib/python3.10/dist-packages (from tensorflowboard<2.16,>=2.15->tensorflow<2.9.0->tensorflow-recommenders) (2.27.0)
satisfied: google-auth-oauthlib<2,>=0.5 in /usr/local/lib/python3.10/dist-packages (from tensorflowboard<2.16,>=2.15->tensorflow<2.9.0->tensorflow-recommenders) (0.9.1)
satisfied: markdown<2.6.8 in /usr/local/lib/python3.10/dist-packages (from tensorflowboard<2.16,>=2.15->tensorflow<2.9.0->tensorflow-recommenders) (3.6)
satisfied: requests<3,>=2.21.0 in /usr/local/lib/python3.10/dist-packages (from tensorflowboard<2.16,>=2.15->tensorflow<2.9.0->tensorflow-recommenders) (2.31.0)
satisfied: tensorflow-data-server<0.8.0,>=0.7.0 in /usr/local/lib/python3.10/dist-packages (from tensorflowboard<2.16,>=2.15->tensorflow<2.9.0->tensorflow-recommenders) (0.37.0)
satisfied: werkzeug<1.0.1 in /usr/local/lib/python3.10/dist-packages (from tensorflowboard<2.16,>=2.15->tensorflow<2.9.0->tensorflow-recommenders) (3.0.3)
satisfied: cachetools<6.0,>=2.0.0 in /usr/local/lib/python3.10/dist-packages (from google-auth<3,>=1.6.3->tensorflowboard<2.16,>=2.15->tensorflow<2.9.0->tensorflow-recommenders) (5.3.2)
satisfied: pyasn1-modules<0.2.1 in /usr/local/lib/python3.10/dist-packages (from google-auth<3,>=1.6.3->tensorflowboard<2.16,>=2.15->tensorflow<2.9.0->tensorflow-recommenders) (0.3.1)
satisfied: rsa<5,>=3.1.4 in /usr/local/lib/python3.10/dist-packages (from google-auth<3,>=1.6.3->tensorflowboard<2.16,>=2.15->tensorflow<2.9.0->tensorflow-recommenders) (4.9.0)
satisfied: requests-oauthlib<0.7.0 in /usr/local/lib/python3.10/dist-packages (from google-auth-oauthlib<2,>=0.5->tensorflowboard<2.16,>=2.15->tensorflow<2.9.0->tensorflow-recommenders) (1.3.1)
satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.10/dist-packages (from requests<3,>=2.21.0->tensorflowboard<2.16,>=2.15->tensorflow<2.9.0->tensorflow-recommenders) (3.3.0)
satisfied: idna<4,>=2.5 in /usr/local/lib/python3.10/dist-packages (from requests<3,>=2.21.0->tensorflowboard<2.16,>=2.15->tensorflow<2.9.0->tensorflow-recommenders) (3.6.2)
```

WARNING:tensorflow:vocab_size is deprecated, please use vocabulary_size.

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OUTPUT

```
Epoch 1/5  
25/25 [=====] - 39s 1s/step - factorized_top_k/top_1_categorical_accuracy: 1.0000e-04 - factorized_top_k/t  
Epoch 2/5  
25/25 [=====] - 34s 1s/step - factorized_top_k/top_1_categorical_accuracy: 2.2000e-04 - factorized_top_k/t  
Epoch 3/5  
25/25 [=====] - 34s 1s/step - factorized_top_k/top_1_categorical_accuracy: 6.4000e-04 - factorized_top_k/t  
Epoch 4/5  
25/25 [=====] - 36s 1s/step - factorized_top_k/top_1_categorical_accuracy: 7.7000e-04 - factorized_top_k/t  
Epoch 5/5  
25/25 [=====] - 35s 1s/step - factorized_top_k/top_1_categorical_accuracy: 8.1000e-04 - factorized_top_k/t  
<keras.src.callbacks.History at 0x7f79f9e574f0>
```

4. Building the Recommendation Model

Though not explicitly shown in the cells we viewed, a recommendation model in TFRS typically involves:

- Embedding layers for representing users and items.
- Loss functions to optimize the embeddings.
- BruteForce layer for retrieving top recommendations.

This theoretical framework includes:


- UserModel and MovieModel: Neural networks that learn embeddings for users and movies.
- Task Definition: Using FactorizedTopK to evaluate the top K recommendations.
- Model Training: Compiling and training the model on the ratings dataset.
- Prediction: Using the trained model to retrieve top movie recommendations for a given user.

```
Top 3 recommendations for user 42: [b'Rent-a-Kid (1995)' b'House Arrest (1996)'  
b'Winnie the Pooh and the Blustery Day (1968)']
```

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Summary

In theory, this notebook aims to build a collaborative filtering-based recommendation system using TensorFlow Recommenders. The steps involve data preparation, defining models for users and items, training the model, and making recommendations based on learned embeddings. This approach leverages neural networks to learn latent representations of users and items, facilitating accurate and personalized recommendations.



thank
you