Recommender Systems

COS2670 | Practical Data Science with Python

Assignment 3 | Virtual Presentation

Anandh S | s3976934

Task 1 | User-Based Collaborative Filtering | Implementation and Results

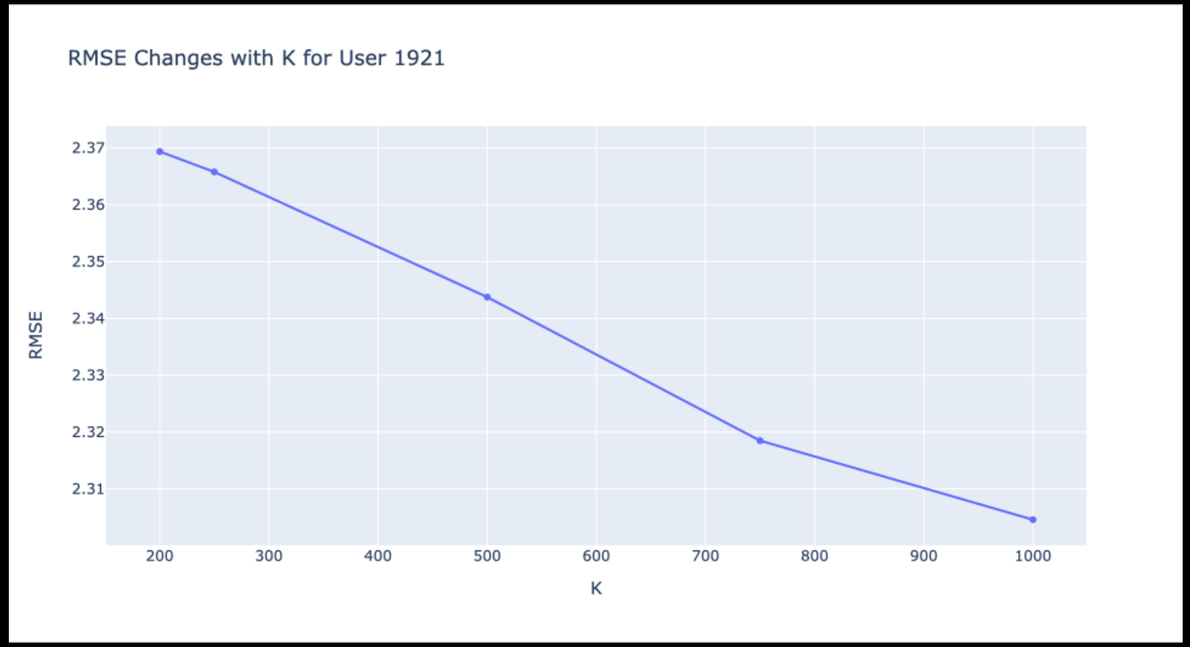
The ‘ratings.dat’ file is imported into a dataframe

Train and Test datasets are generated from the dataframe

Pearson Correlation Coefficient was picked to calculate similarities between users

A random user is picked for predicting ratings

RMSE is calculated for each value of K.



Task 2 | Item-Based Collaborative Filtering | Implementation and Results

The transposed form of the train and test sets are used in this case

Pearson Correlation Coefficients are calculated using the same process as implemented in Task 1

Cosine similarity is also implemented for comparison

A random movie is picked and the best value of K, as observed in Task 1, is selected for prediction.

```
Average RMSE for Pearson Correlation based predictions: 1.2788863407079827
```

```
Average RMSE for Cosine Similarity based predictions: 1.8979798878008276
```

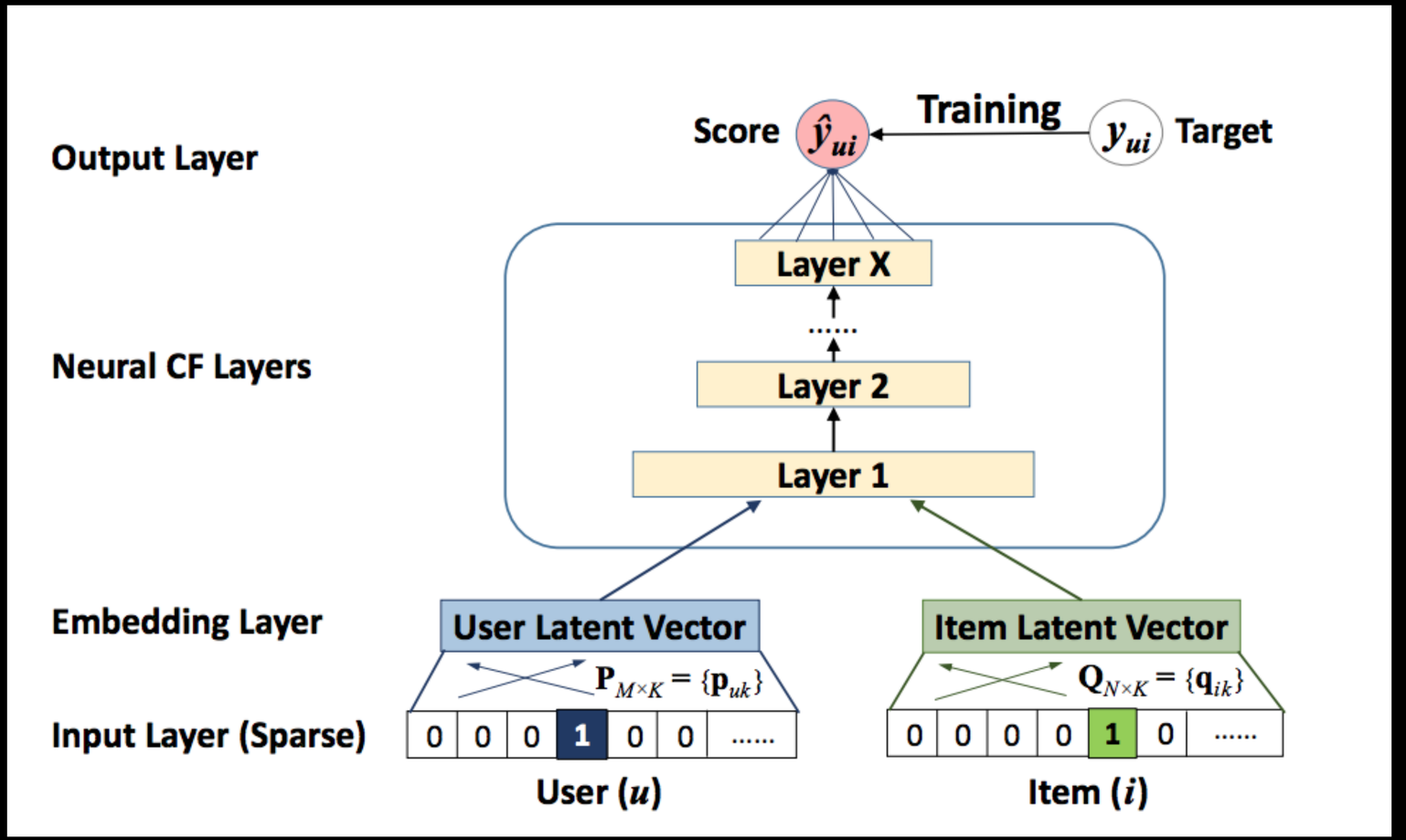
Task 3.1 | A Better Recommender | Neural Collaborative Filtering

Memory-based collaborative filtering approaches have several disadvantages that make them less suitable, especially at the current rate of information/data generation.

Matrix Factorisation was introduced as a better alternative.

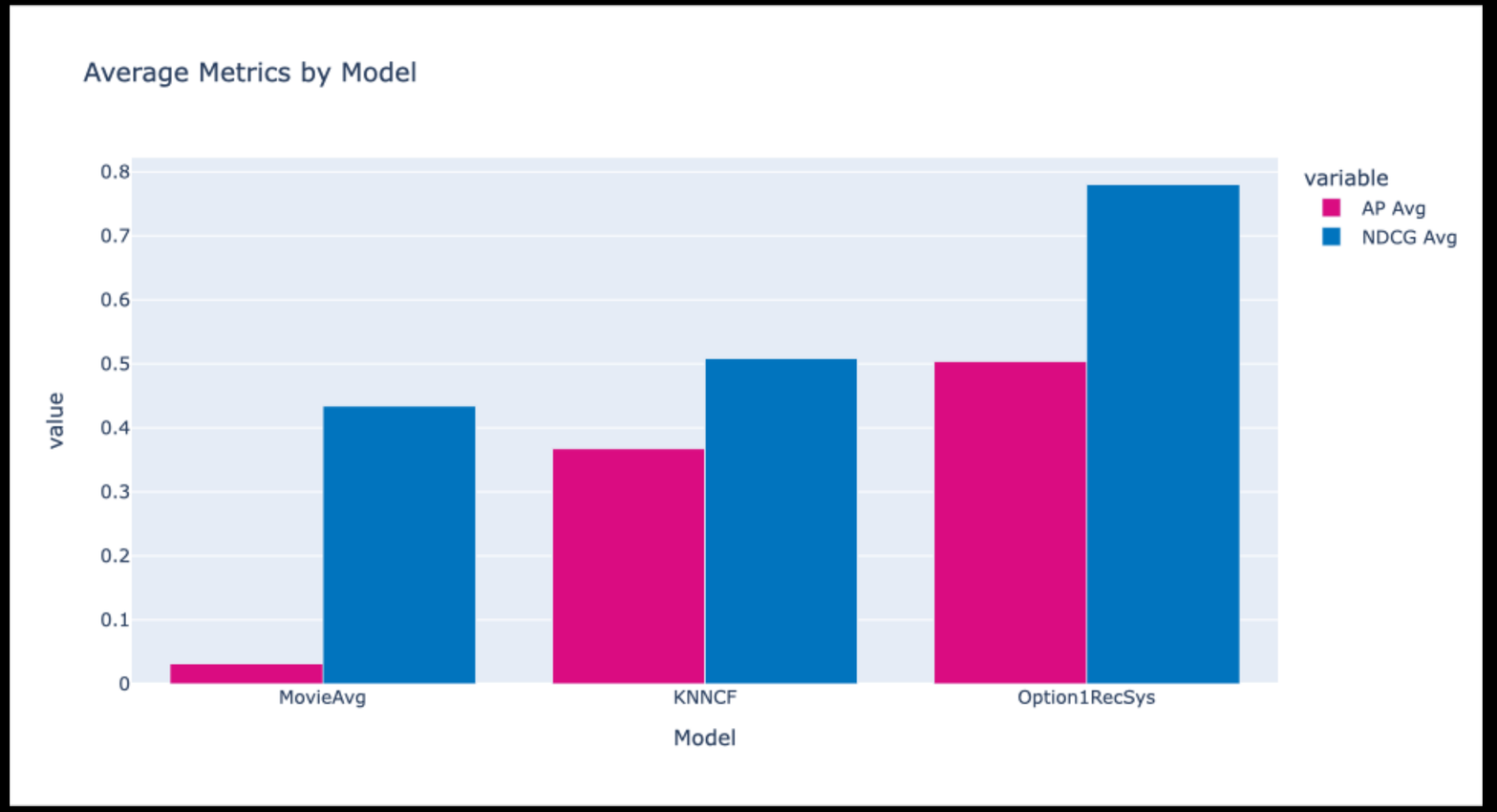
And it was further enhanced by researchers with deep neural network integration (see References)

Architecture



Source: Neural Collaborative Filtering, Xiangnan He et al.

Task 3.2 | Comparison of MovieAvg, KNNCF & NCF



Thank you.

References

Aljunid, MF & Dh, M 2020, 'An Efficient Deep Learning Approach for Collaborative Filtering Recommender System', *Procedia Computer Science*, vol. 171, pp. 829–836.

He, X, Liao, L, Zhang, H, Nie, L, Hu, X & Chua, T-S 2017, 'Neural Collaborative Filtering',.

'Neural Collaborative Filtering', viewed 27 October 2023, <https://calvinfeng.gitbook.io/machine-learning-notebook/supervised-learning/recommender/neural_collaborative_filtering>.

Sharma, A 2019, 'Neural Collaborative Filtering', *Medium*, viewed 27 October 2023, <https://towardsdatascience.com/neural-collaborative-filtering-96cef1009401>.