



# Book recommender system

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# Agenda

Popular based recommender  
system(RS)

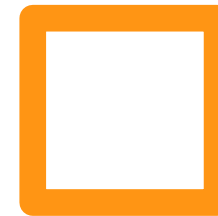
Collaborative filtering

Graph neural network RS

# Introduction

Recommendation systems are complex artificial intelligence systems that are designed to provide a prediction to users based on a preference.

Recommendation systems require large data and time to train. Recommendation systems are heavily used in everyday life. Recommendation systems are widely useful because they save users a lot of time on the search, and they can efficiently provide services to users.



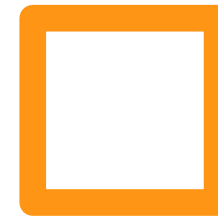


# Topic one

Popular based RS

# Popular based RS

In this popular-based approach, we will filter out data and get the top and most popular items for users. This approach often use to create a top list for users to select items they might like.



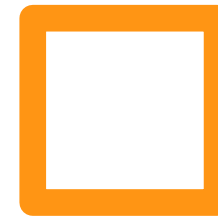


# Topic two

Collaborative Filtering RS

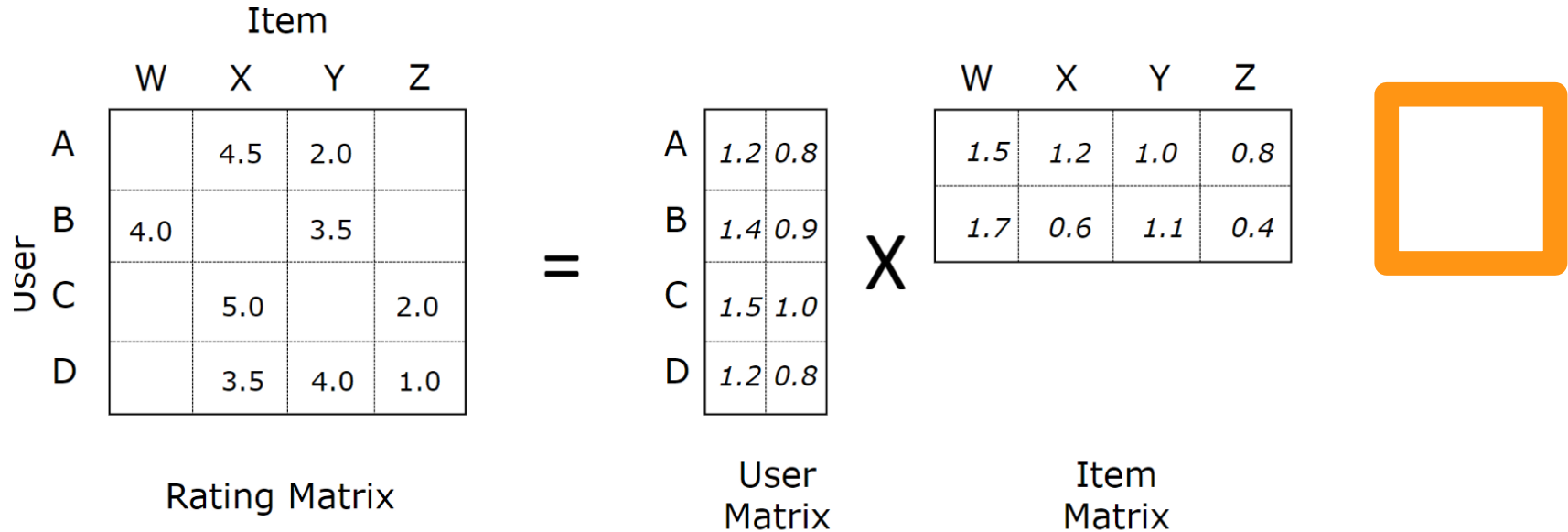
# Collaborative filtering based RS

In collaborative filtering approach, the system will filter out items that a user might like on the basis of reactions by similar users. This approach is often done by using matrix factorization.



# Matrix Factorization

Matrix factorization is a collaborative filtering algorithm to find the relationship between items and users' entities.





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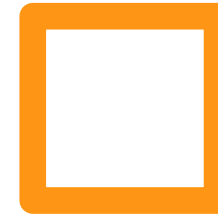
# Topic two

GNNs RS

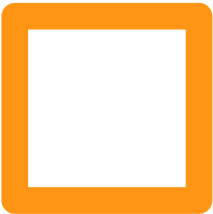
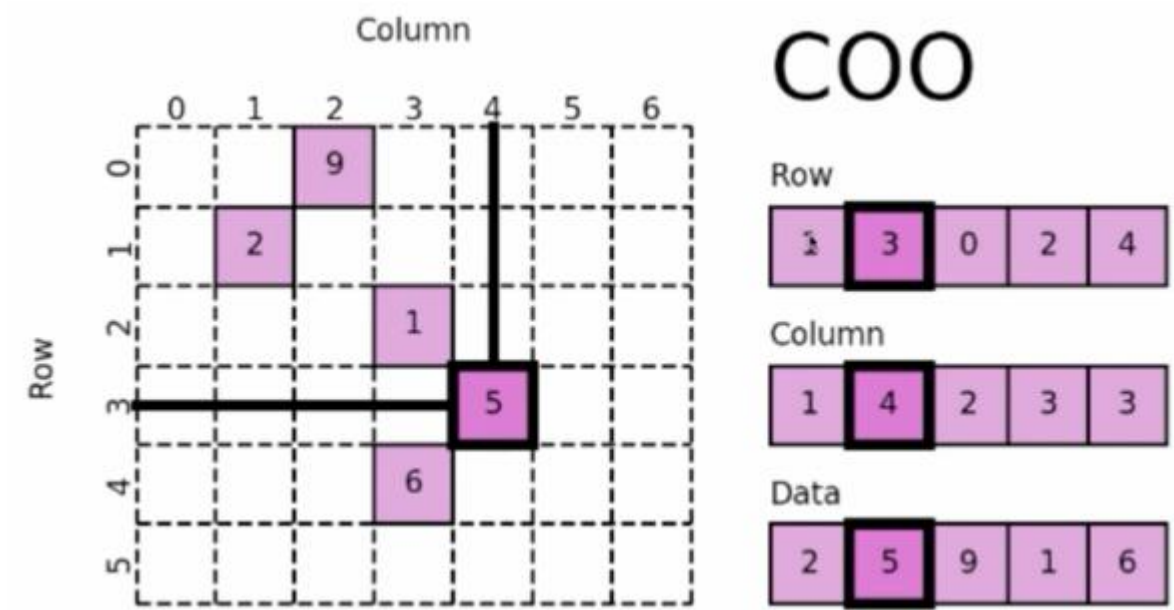
A solid purple circle located at the bottom-right edge of the blue circle.

# GNNs

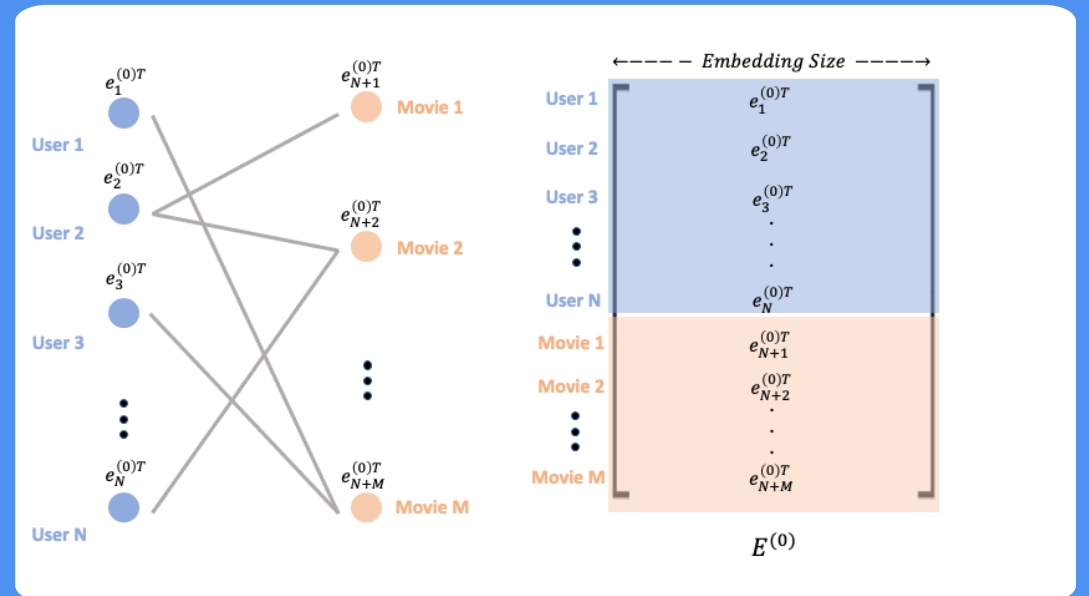
Graph neural networks allow us to easily to work with users and items. In Graph neural network (GNN) based recommendation system, where interactions of user-item are taken into consideration. Both interactions and opinions are encoded to build a user-item graph in the proposed approach.



# Coordinate List(COO)



# LightGCN



# Summary

Popular based RS:

for design top list, popular list

**Collaborative filtering RS (we selected):**

for find interaction between users and items

GNNs for RS:

to enhance collaborative filtering

# Demo

## Github:

<https://github.com/cmpe130weifeng/Master-s-Project>

# Reference

- [1] <https://medium.com/@connectwithghosh/simple-matrix-factorization-example-on-the-movielens-dataset-using-pyspark-9b7e3f567536>
- [2] <https://towardsdatascience.com/graph-neural-network-gnn-architectures-for-recommendation-systems-7b9dd0de0856#:~:text=GNNs%20for%20recom%20mendation,-Recommendation%20systems%20are&text=Recomm%20mendations%20are%20drawn%20from%20the,item%20past%20interactions.>
- [3] <https://link.springer.com/article/10.1007/s00521-020-05667-z>
- [4] <https://medium.com/stanford-cs224w/lightgcn-for-movie-recommendation-eb6d112f1e8>



Thank you