# Recommender Systems

# Recommender Systems

Introduction

- information filtering system
- predicts user preferences and recommends items

- Inputs:

Item

  - previous purchases
  - search history

User

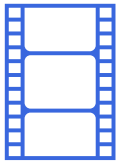
  - demographic information, age, sex, income, …

- Output:
  - recommend items to buy/consume
  - helps to discover new items

# Recommender Systems

Applications

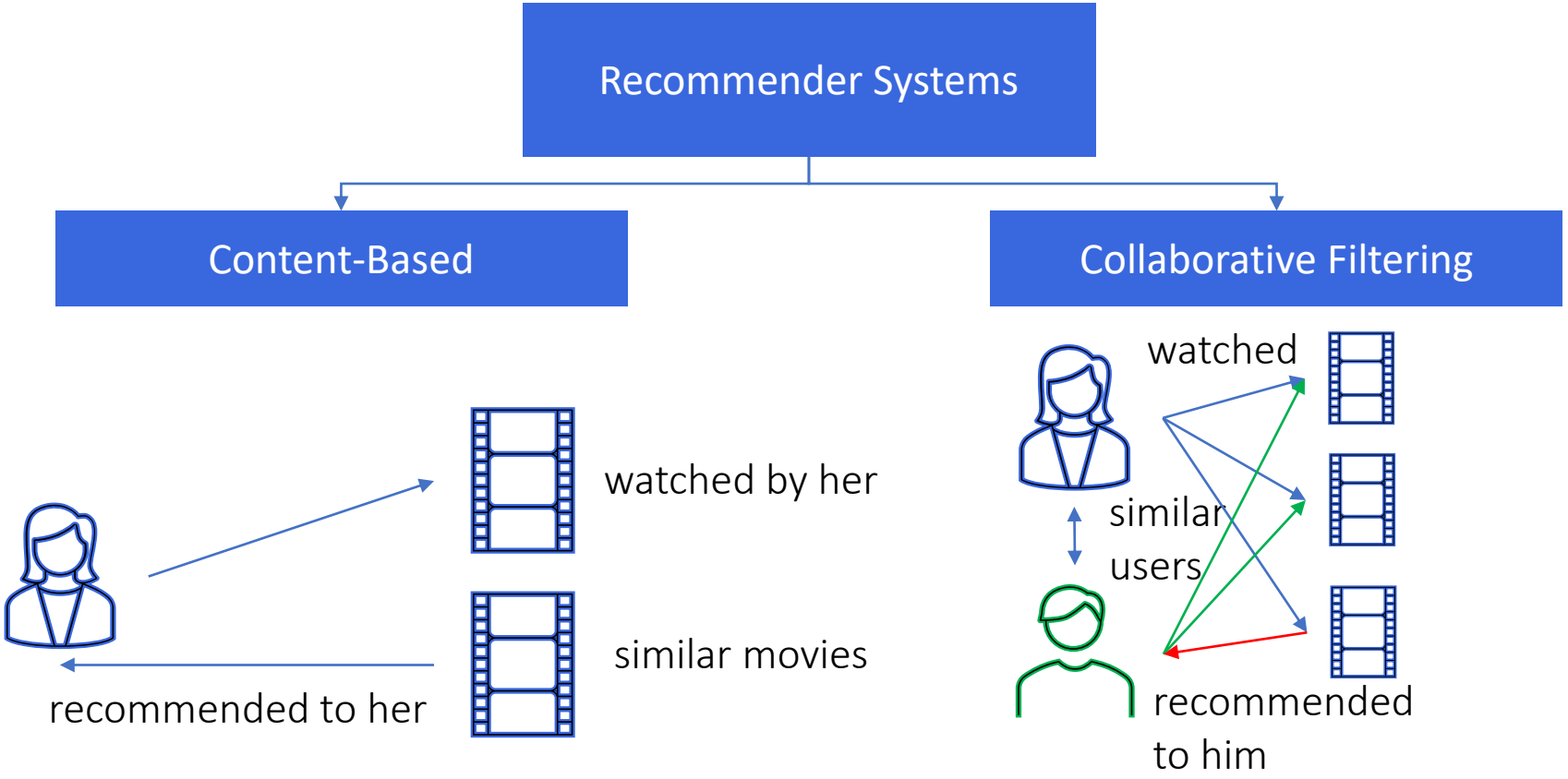
Personalized
Sales,
e.g. E-Commerce



Personalized
Content,
e.g. streaming platforms

# Recommender Systems

Content-Based vs Collaborative Filtering



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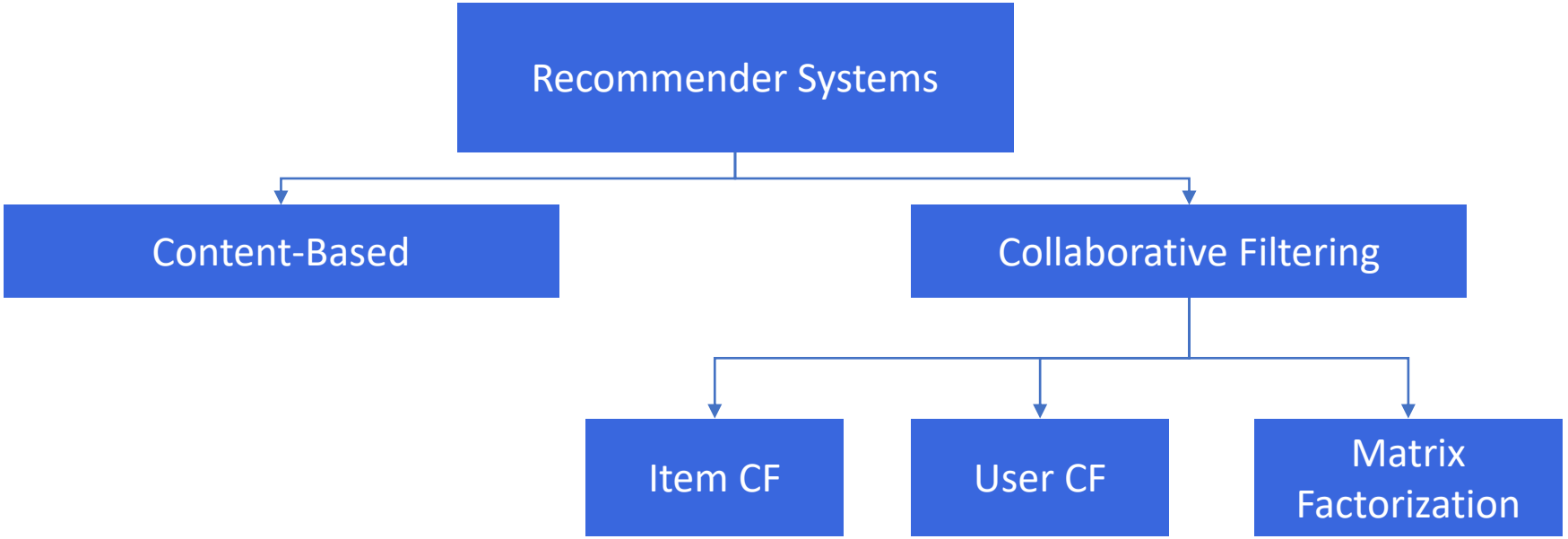
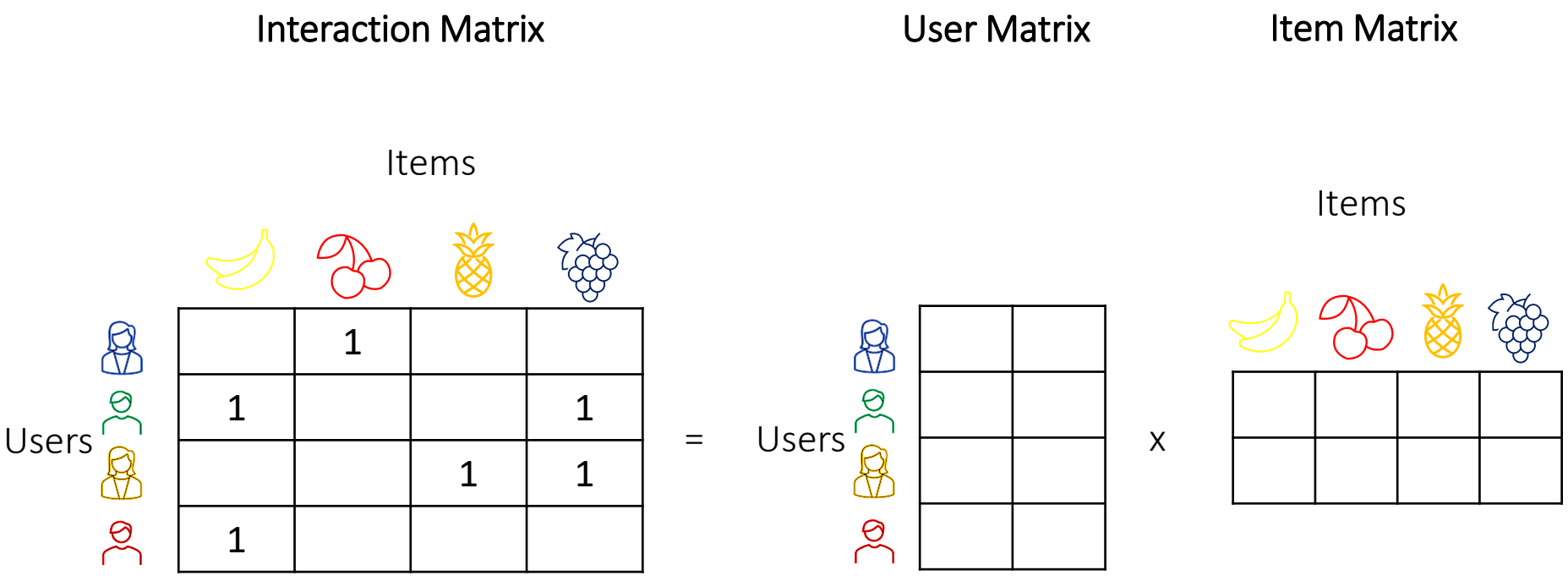


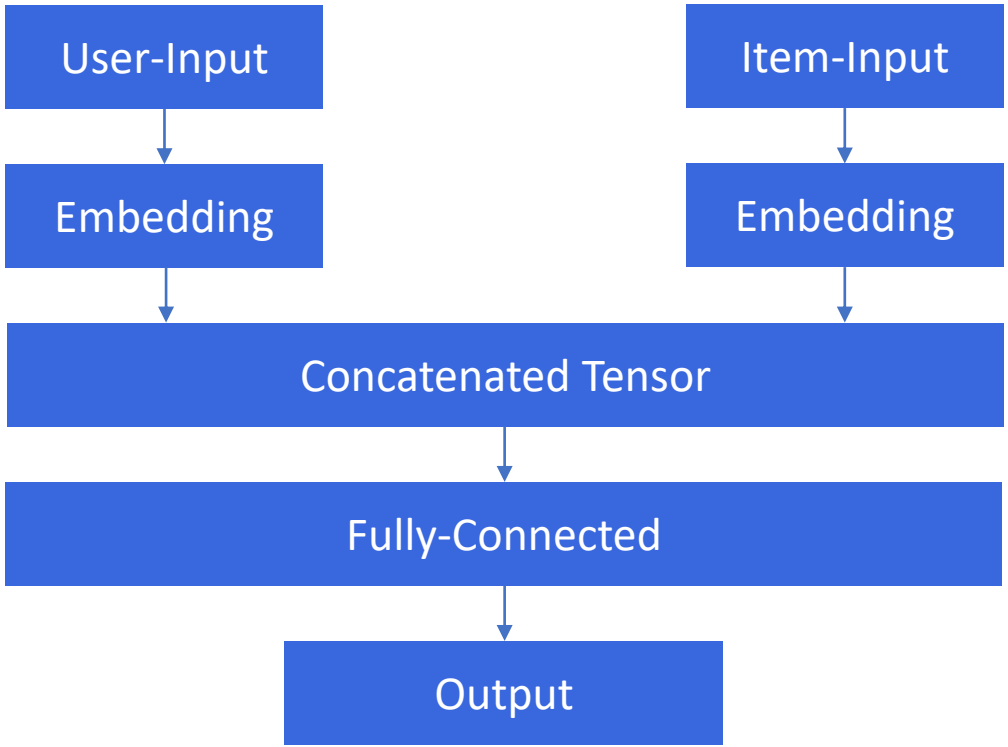
# Recommender Systems

## Matrix Factorization



# Recommender Systems

Neural Collaborative Filtering Network



# Recommender Systems

## Evaluation Metrics

**Precision@k**

$$= \frac{\#\text{relevant recommendations}}{\#\text{ recommended items}}$$

measures ability to recommend all relevant items

**Recall@k**

$$= \frac{\#\text{relevant recommendations}}{\#\text{ all possible relevant items}}$$

measures ability to reject non-relevant items

# Recommender Systems

## Data

- MovieLens Dataset
- personalized movie recommendations
- Small dataset used
- 100,000 ratings
- 3,600 tag applications
- 9,000 movies
- 600 users
- Last updated 9/2018


### MovieLens

GroupLens Research has collected and made available rating data sets from the MovieLens web site (https://movielens.org). The data sets were collected over various periods of time, depending on the size of the set. Before using these data sets, please review their README files for the usage licenses and other details.

**Seeking permission?** If you are interested in obtaining permission to use MovieLens datasets, please first read the terms of use that are included in the README file. Then, please fill out this form to request use. We typically do not permit public redistribution (see Kaggle for an alternative download location if you are concerned about availability).

Source: https://grouplens.org/datasets/movielens/