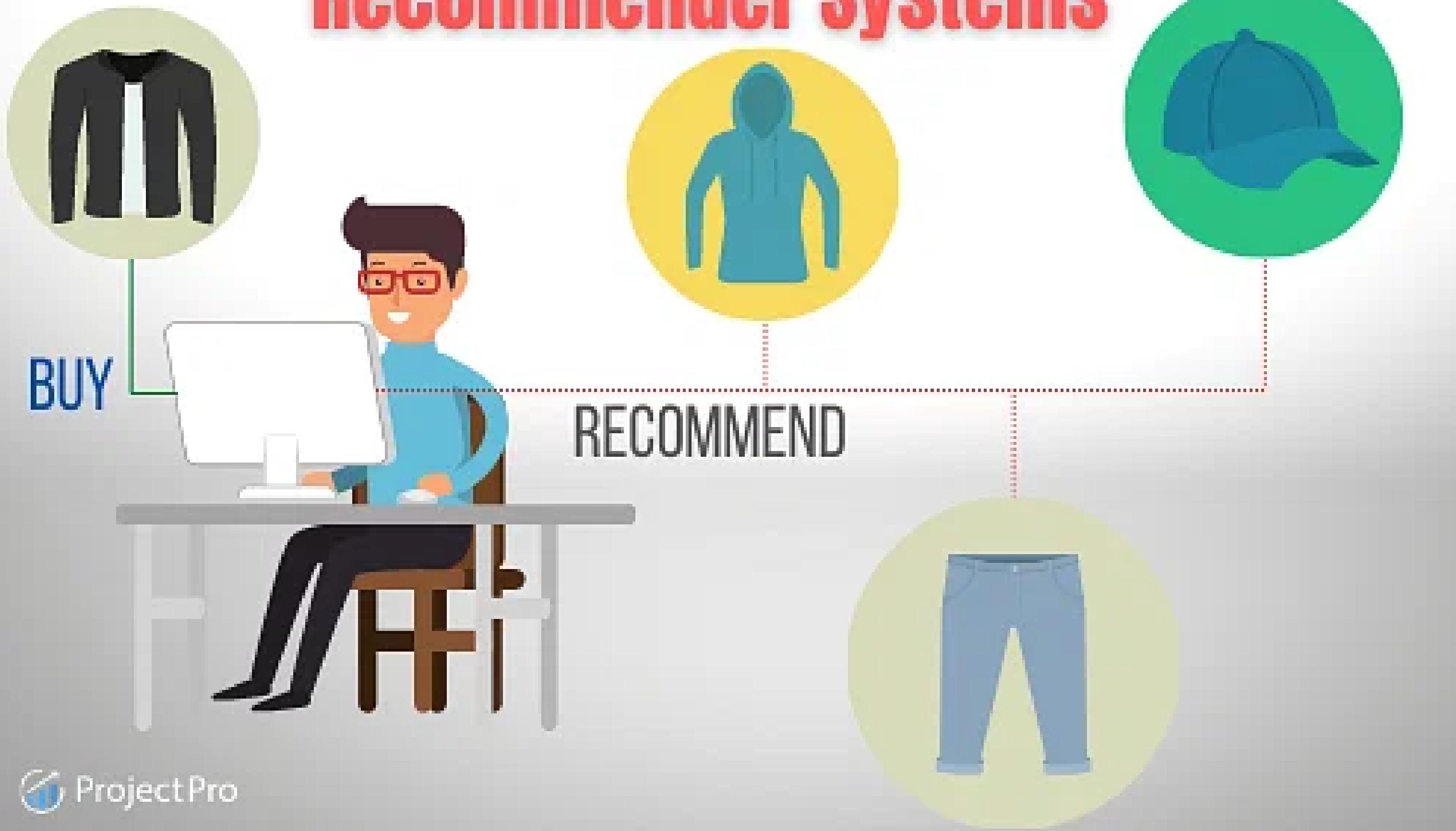


# Introduction to recommender systems

HUYINIT

# Recommender Systems





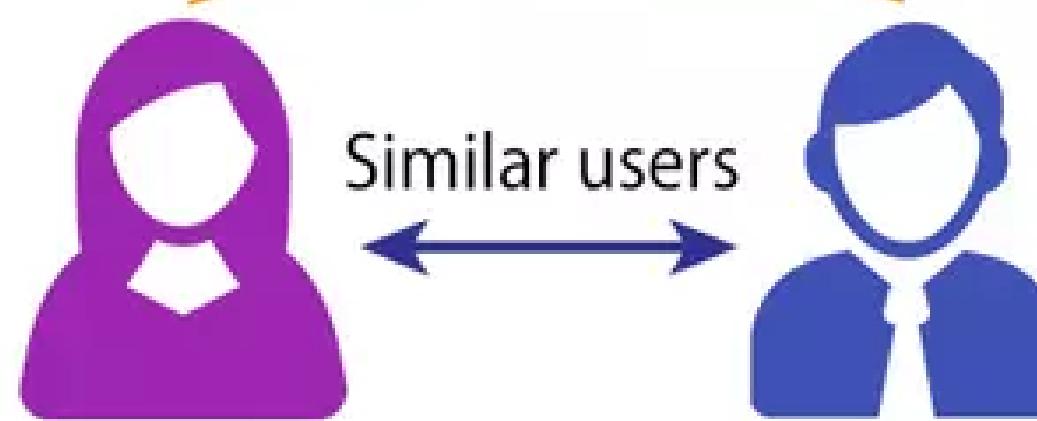
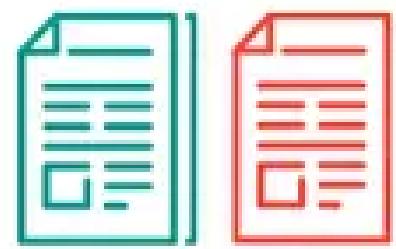
# NETFLIX

## The Netflix Prize



## COLLABORATIVE FILTERING

Read by both users



Read by her,  
recommended to him!

## CONTENT-BASED FILTERING

Read by user

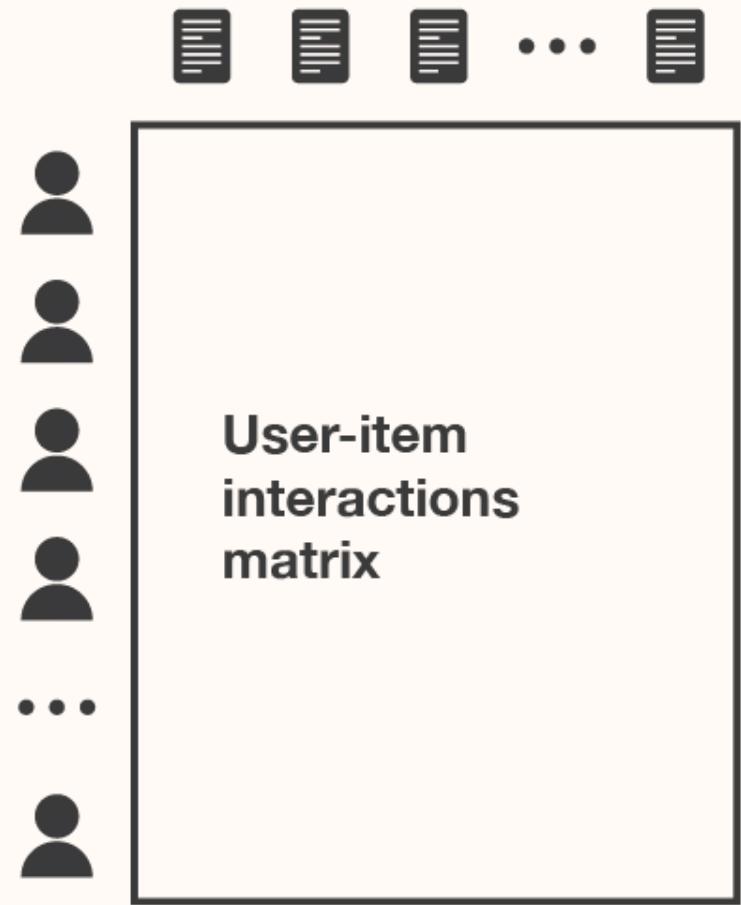
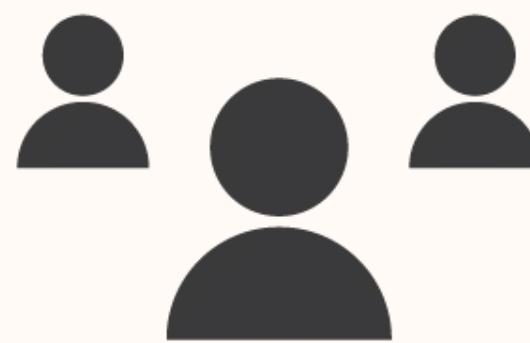


Similar articles



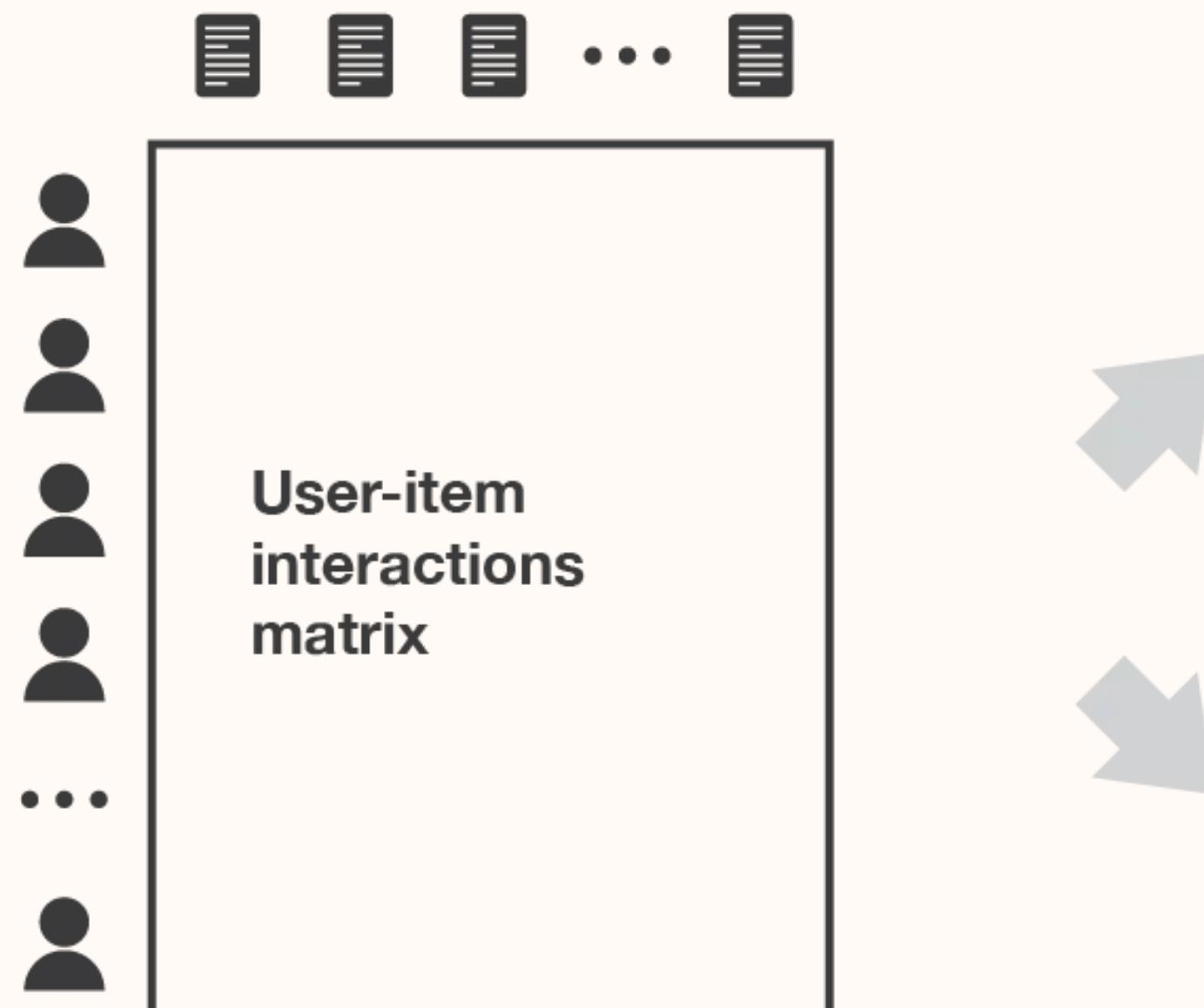
Recommended  
to user

# Collaborative filtering methods



Users	User-item interactions matrix	Items
suscribers	rating given by a user to a movie (integer)	movies
readers	time spent by a reader on an article (float)	articles
buyers	product clicked or not when suggested (boolean)	products

• • •

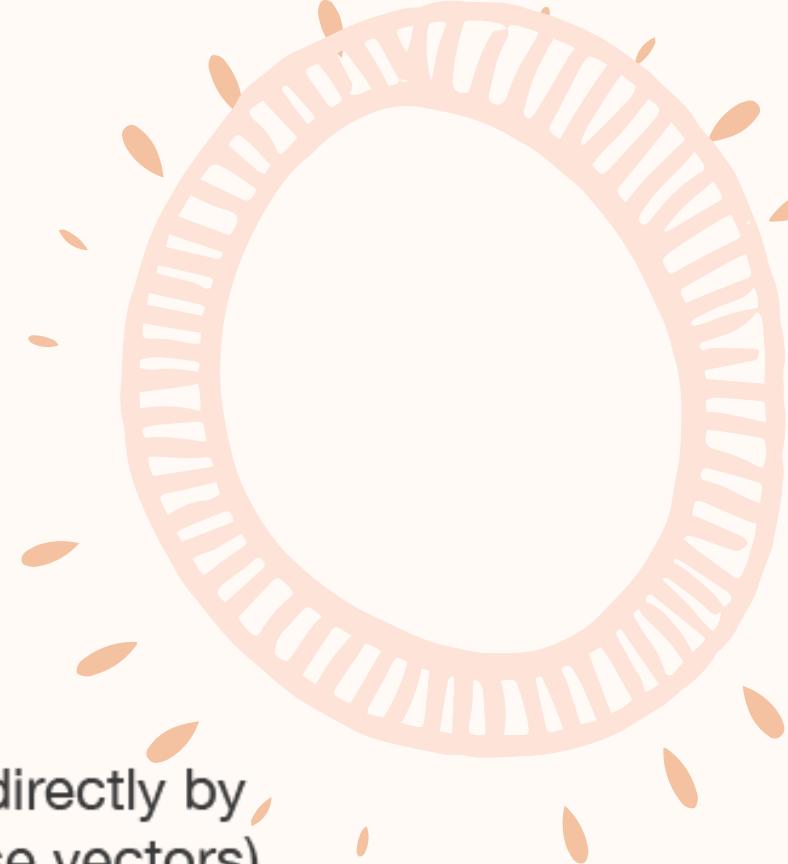


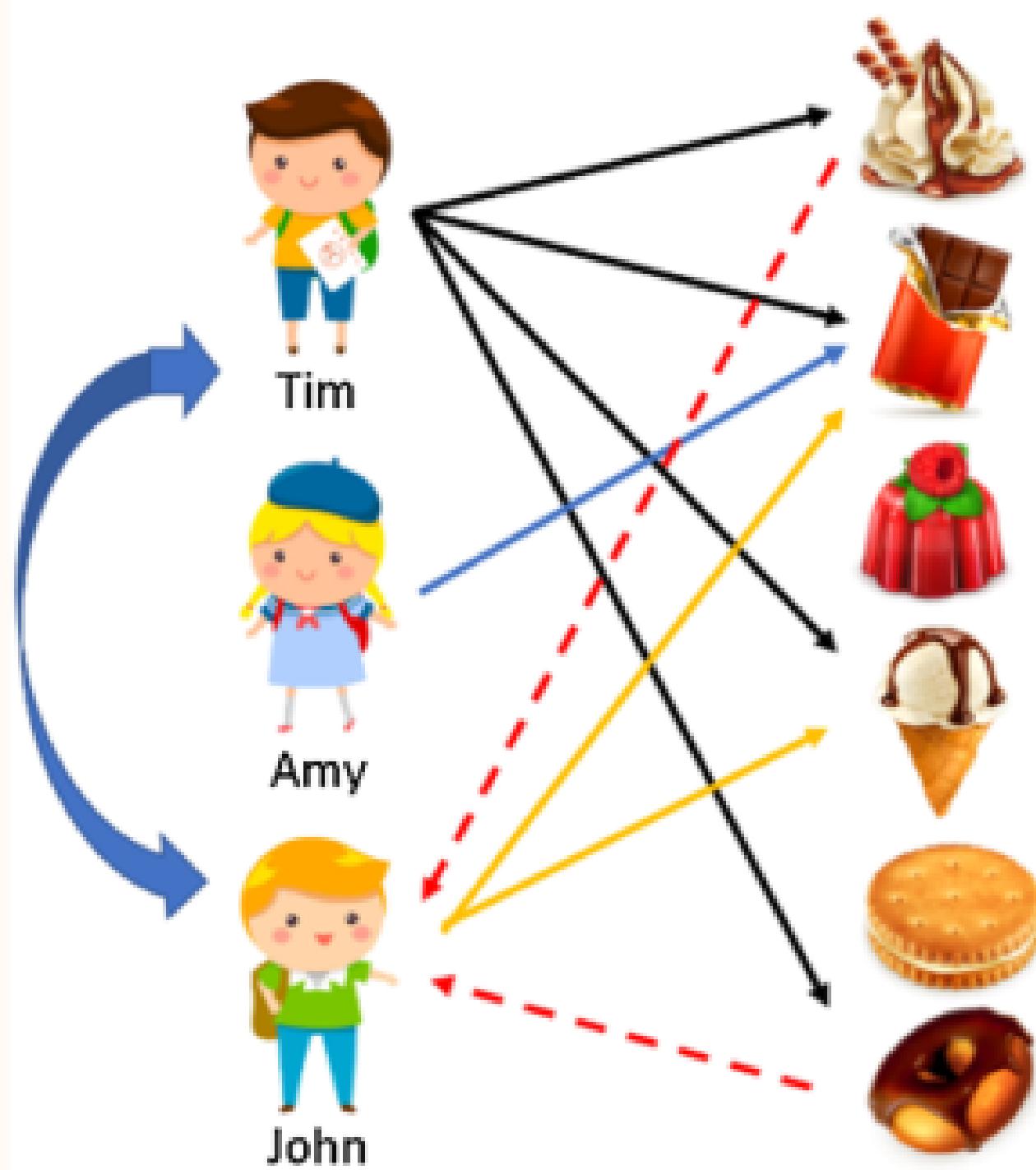
### No Model

- users and items are represented directly by their past interactions (large sparse vectors)
- recommendations are done following nearest neighbours information

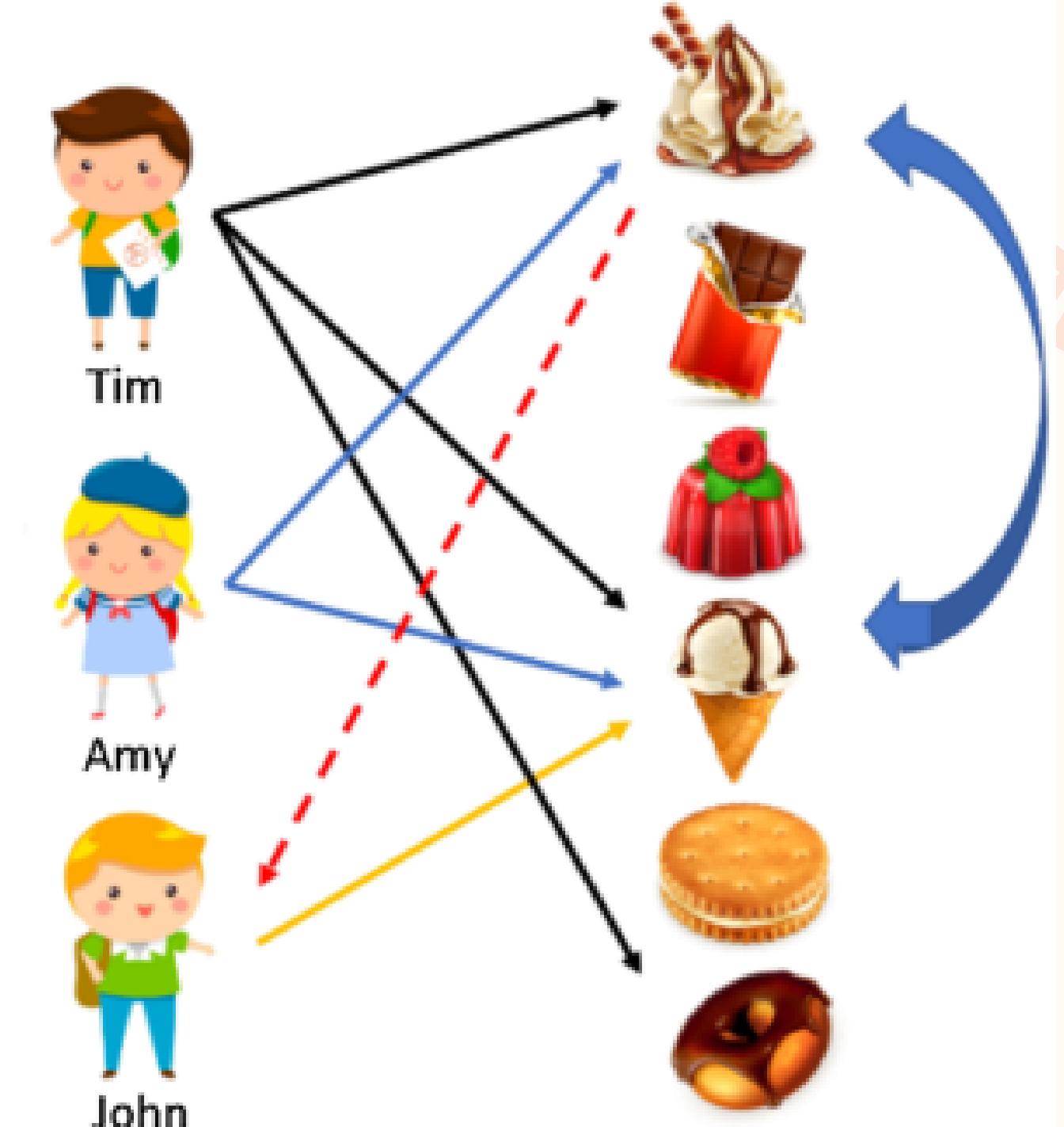
### Model

- new representations of users and items are build based on a model (small dense vectors)
- recommendations are done following the model information

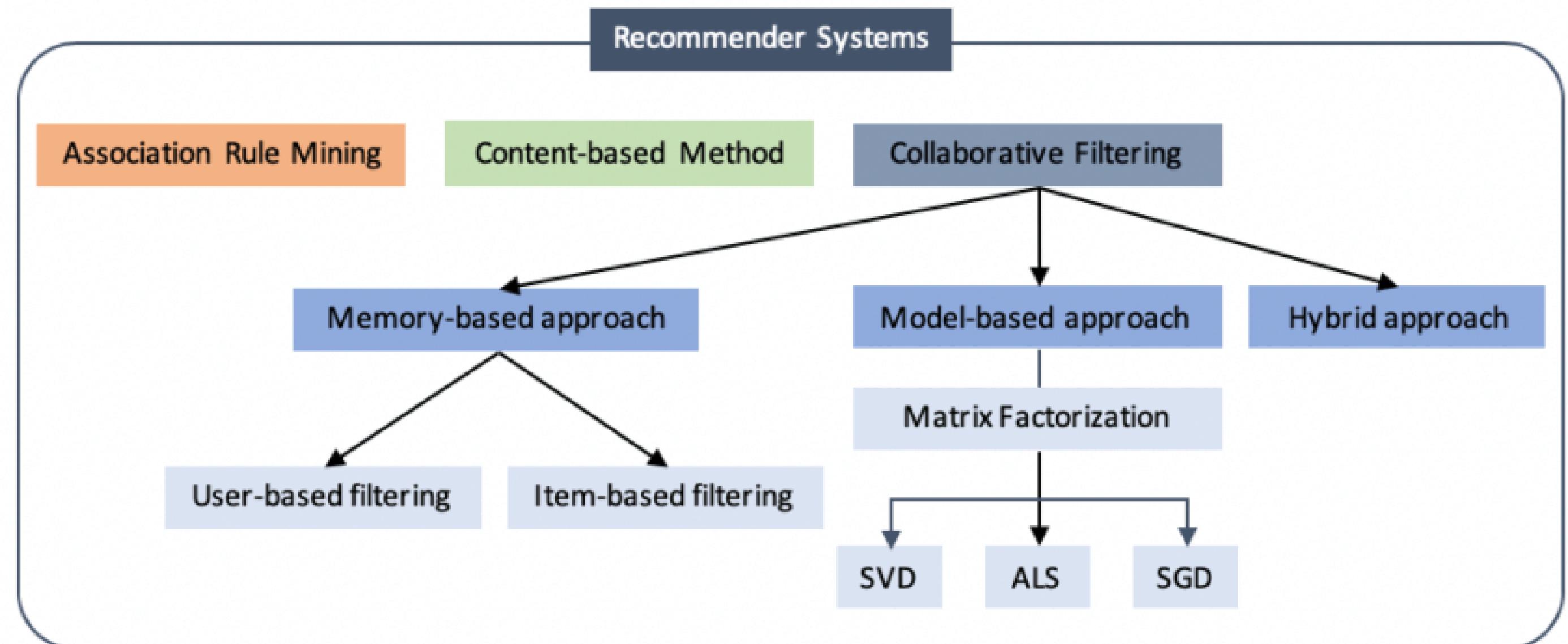




**(a) User-based filtering**

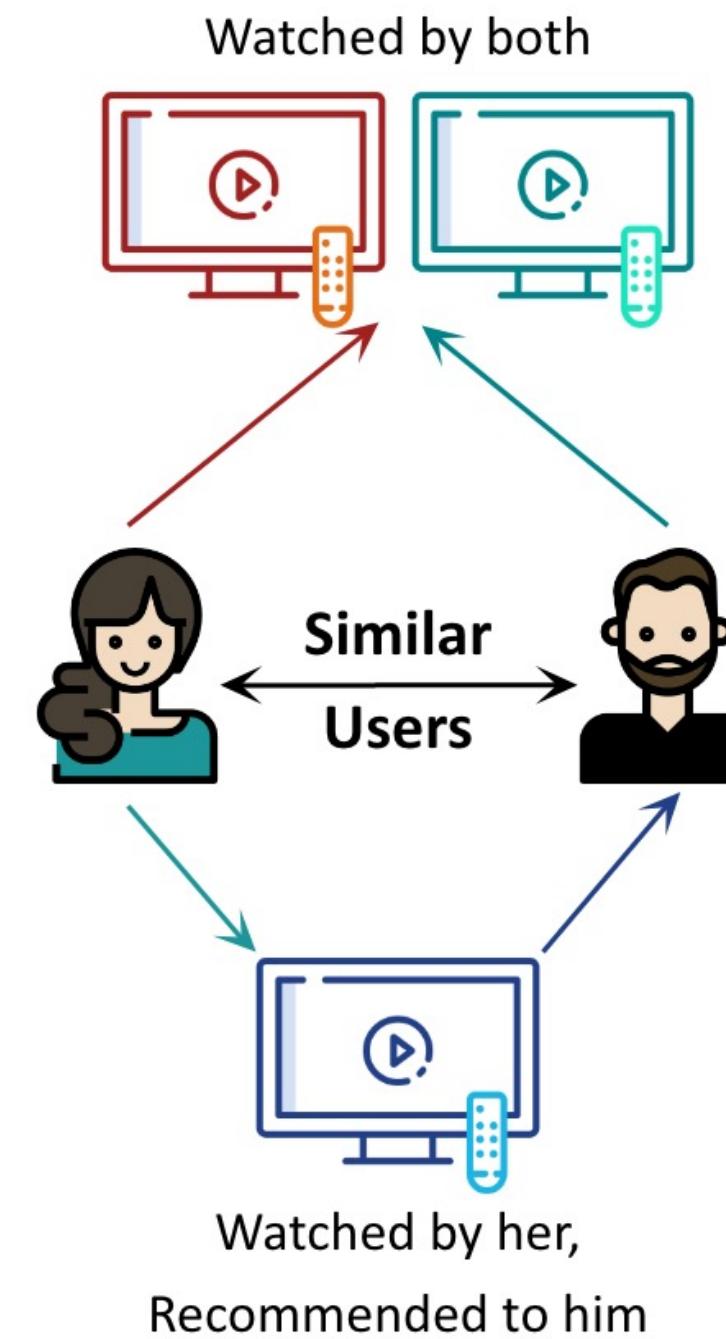


**(b) Item-based filtering**

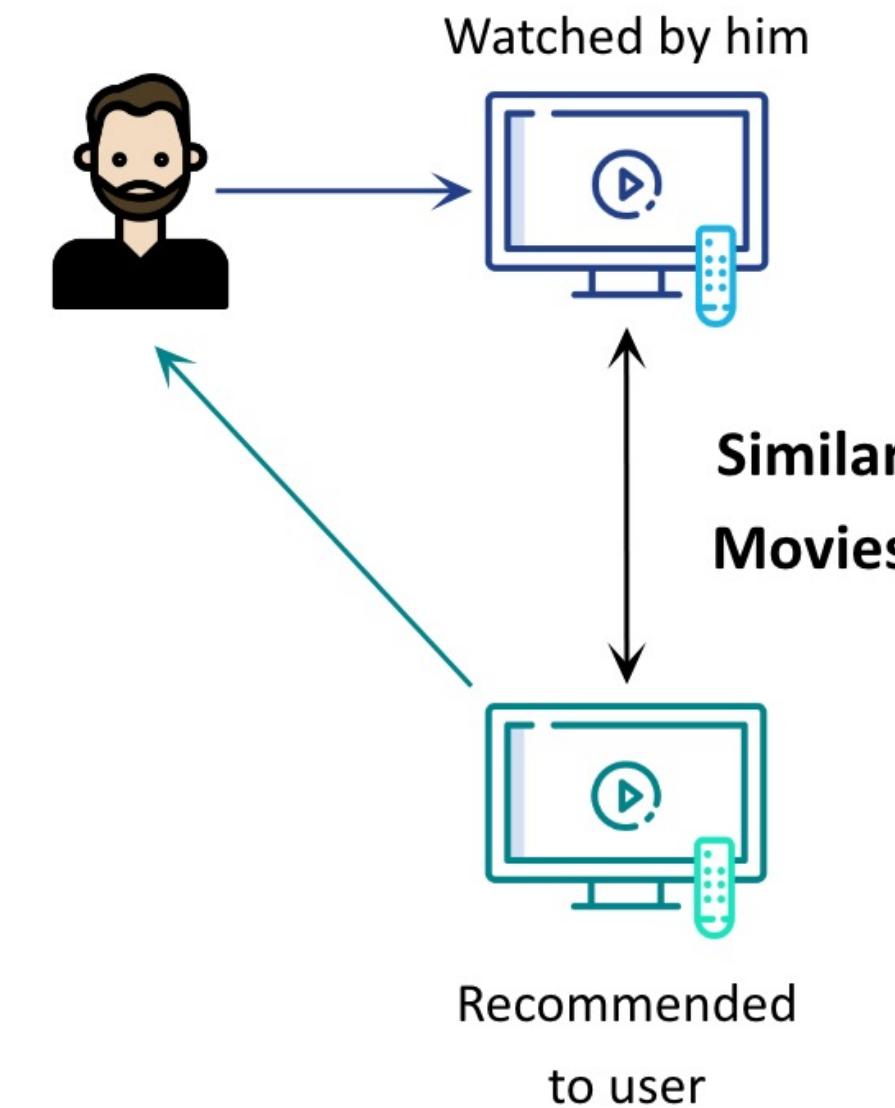


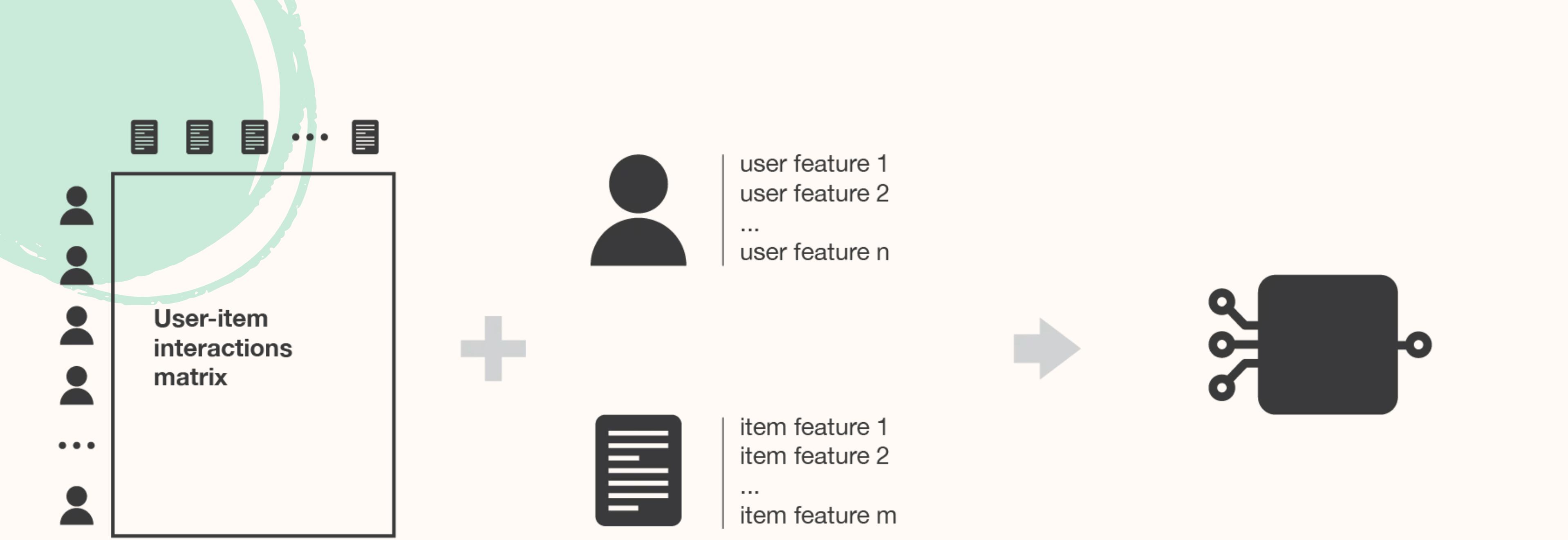
# Content based methods

## Collaborative Filtering



## Content-Based Filtering





## Collaborative information

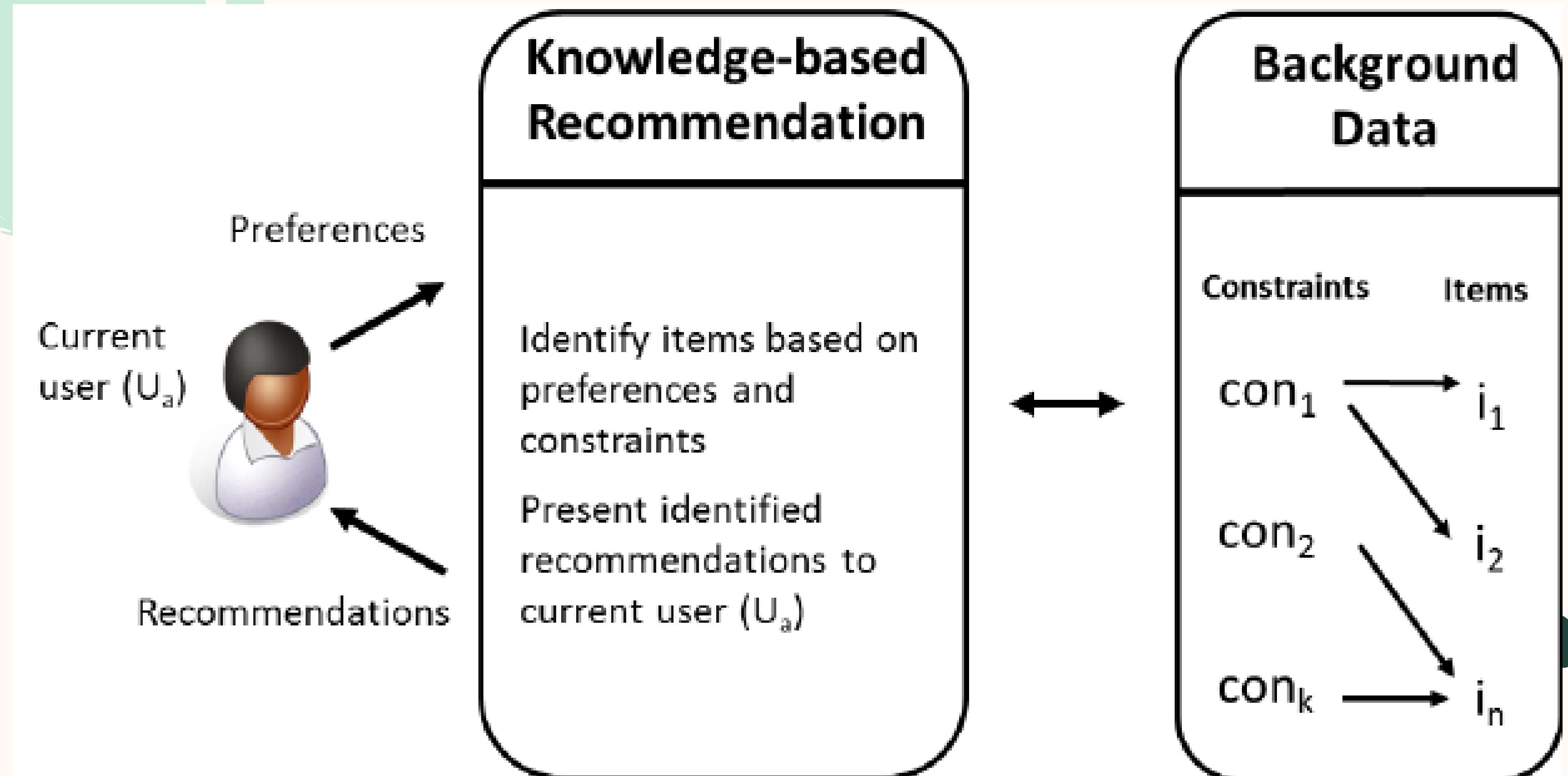
(The user-item interactions matrix)

## Content information

Can be users or/and items features

## Model

Takes user or/and items features and returns predicted interactions





## Regression

What is the temperature going to be tomorrow?

PREDICTION

84°



## Classification

Will it be Cold or Hot tomorrow?

PREDICTION

HOT



# Recommender systems

## Content based methods

Define a model for user-item interactions where users and/or items representations are given (explicit features).

## Collaborative filtering methods

### Model based

Define a model for user-item interactions where users and items representations have to be learned from interactions matrix.

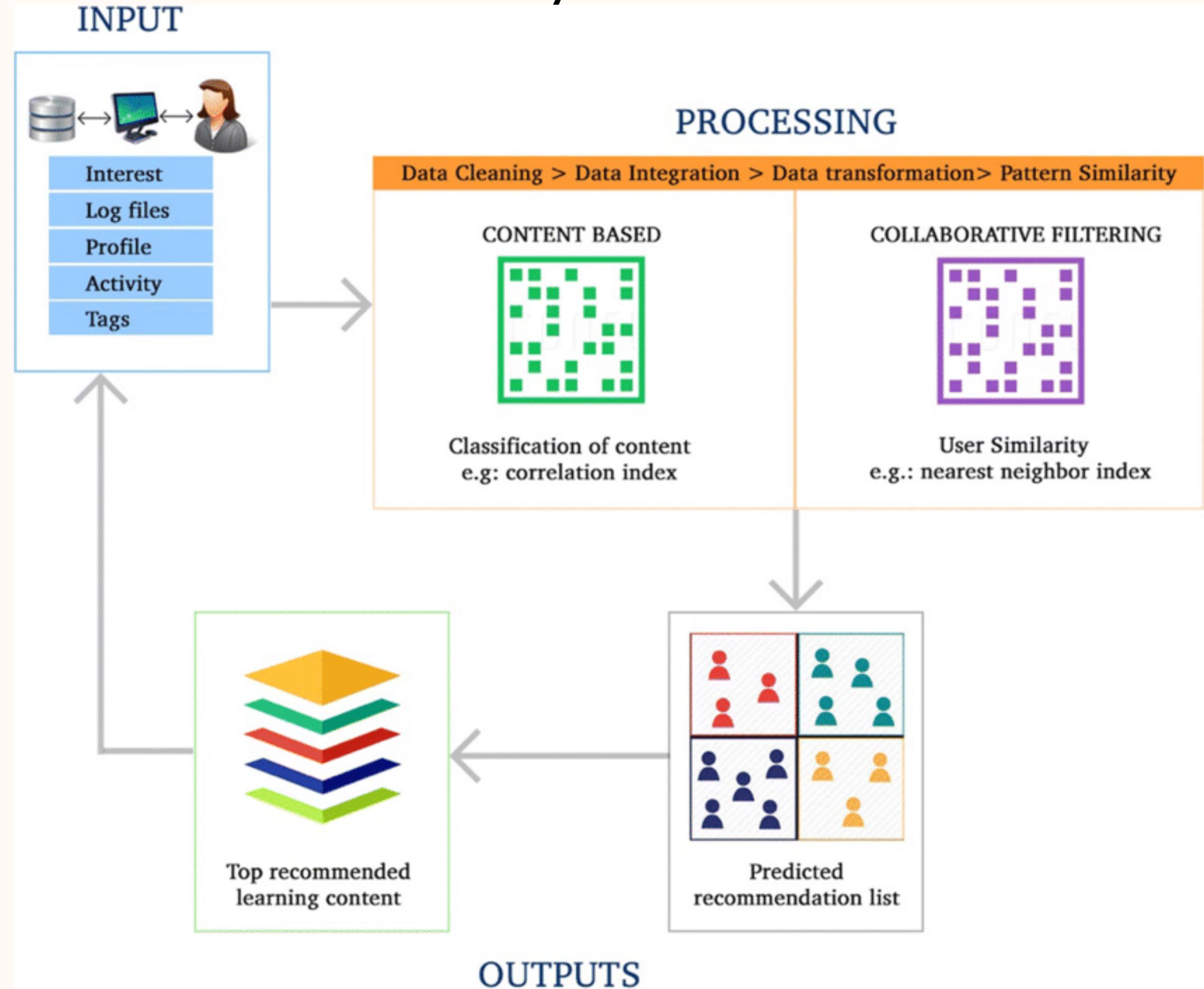
### Memory based

Define no model for user-item interactions and rely on similarities between users or items in terms of observed interactions.

## Hybrid methods

Mix content based and collaborative filtering approaches.

# hybrid recommender systems





Thank  
you