Developing a hybrid recommender system for Amazon products (Sports & Outdoors)

Alireza Sedighi

Many web services suggest relevant products to their users

amazon

| GoSports Size Soccer Ball 6 Pack Classic Soccerball 6 Pack - Size - with Premium Pu... ★★★★☆ 746 $39.99 ✓prime | American Challenge Brasilia Soccer Ball (Orange, 4) ★★★★☆ 1,608 $19.99 ✓prime | Senston Performance Soccer Ball Training Size 5 Soccer Balls with Pump 501 ★★★★☆ 55 $19.99 ✓prime | CubicFun Kids Soccer Ball Size 3 with Hand Pump Mesh Bag, Dinosaur Soccer Ball Outd... ★★★★☆ 141 $14.99 ✓prime | GoSports Fusion Soccer Ball with Premium Pump & Mesh Carrying Bag (6 Pack), Size 5,... ★★★★☆ 73 $81.70 ✓prime | SHOKE Soccer Ball Size 5 Thermal-Bonding Hold Air, Water-Resistant Match Training S... ★★★★☆ 50 $45.99 ✓prime | American Challenge DL2000 Soccer Ball (Bone, 4) ★★★★☆ 65 $19.75 ✓prime |

HOW?

2

Recommender systems
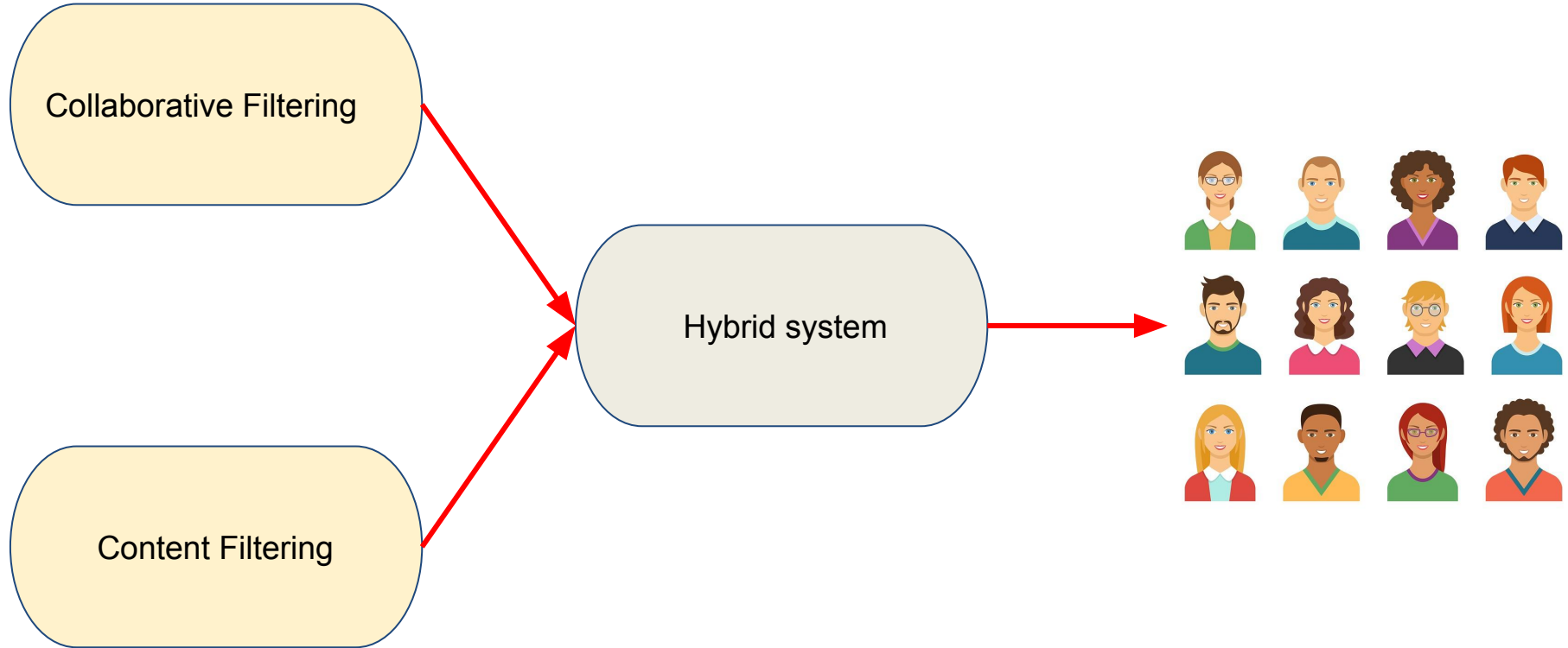
Objects

Main object of this project is to develop a hybrid recommender system for Amazon products

Data

- Amazon review data

  - 233.1 million reviews
  - Reviews and rating
  - Product information

- Category

 - Sports and outdoors

- Data Structure

Data Structure

Products

category	tech1	description	fit	title	also_buy	image	tech2	brand	feature	rank	also_view	main_cat	similar_item	date	price	asin
['Sports & Outdoors', 'Sports & Fitness', 'Oth...	NaN	['3 layers of super-soft polyester tulle can b...	NaN	Adult Tutu Assorted Colors (Turquoise)	[]	[]	NaN	BubuBibi	['3 Layers - 100% Polyester Tulle, Hand Wash L...	712,899 in Clothing, Shoes & Jewelry (	['B071LQWQBQ', 'B00M14DG0O', 'B076GTTY9W', 'B0...	<img src="https://images-na.ssl-images-amazon....	NaN	<div class="a-fixed-left-grid a-spacing-none">...	$11.80	0000032042
['Sports & Outdoors', 'Sports & Fitness', 'Oth...	NaN	['3 layers of super-soft polyester tulle can b...	NaN	Bububibi Adult Ballet Tutu Cheetah Pink	[]	[]	NaN	BubuBibi	['3 Layers - 100% Polyester Tulle, Hand Wash L...	712,899 in Clothing, Shoes & Jewelry (	[]	<img src="https://images-na.ssl-images-amazon....	NaN	<div class="a-fixed-left-grid a-spacing-none">...	$11.97	0000032069

Reviews

overall	verified	reviewTime	reviewerID	asin	reviewerName	reviewText	summary
5.0	False	02 1, 2014	A23K73OVXJ04EG	0000031895	Lamb612000	It was as described and fit my 6 year old gran...	Neon Blue Tutu
4.0	True	11 20, 2013	A2681T699HV6H1	0000031895	Courtney R	very cute and went great with my Halloween cos...	loved it!

Recommender systems
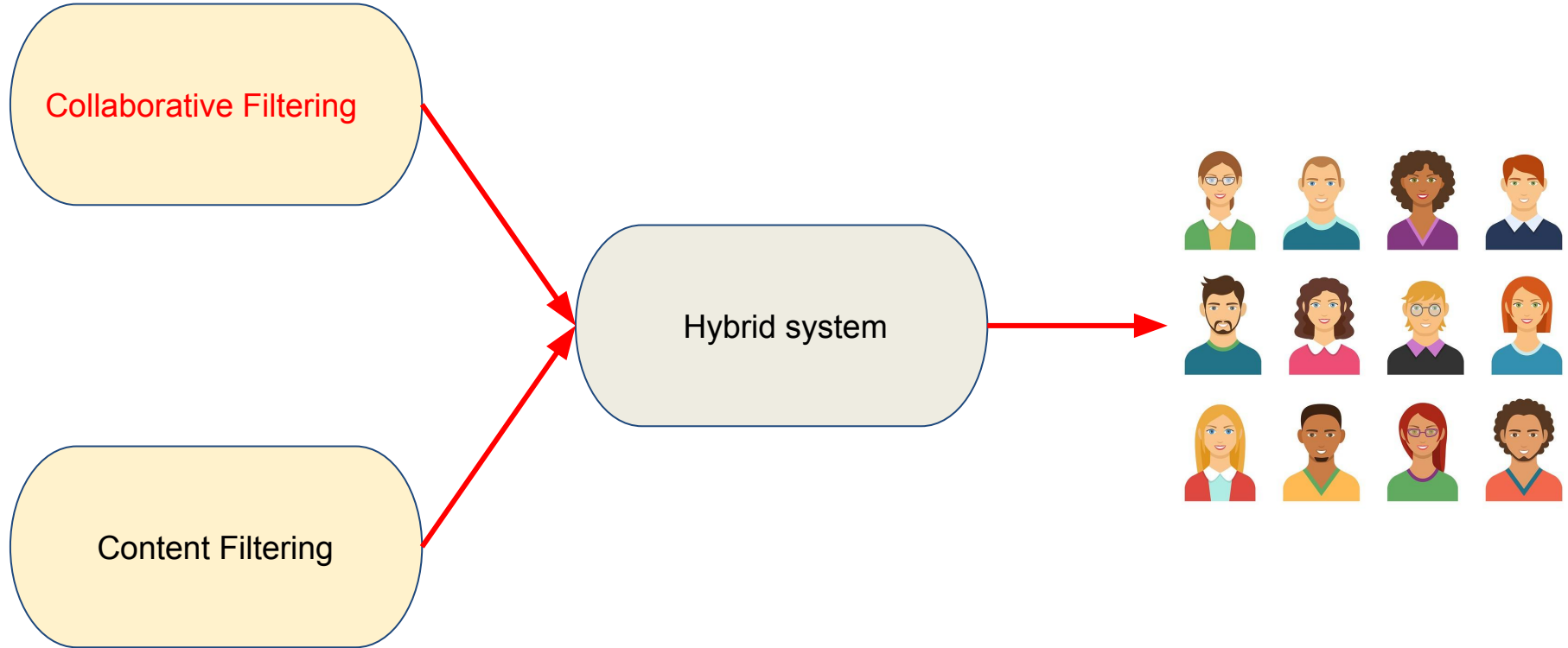
Collaborative recommender

- Using Surprise module

- Algorithm: Non-negative matrix factorization

- Hyperparameter tuning

Product 1   Product 2   Product 3   Product 4

User 1   User 2   User 3
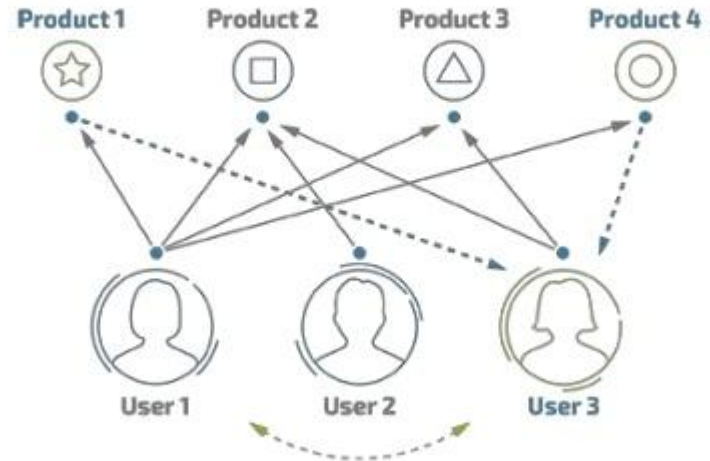
[Source](#)

Collaborative recommender (Cont'd)

Top 10 recommendations for a given user

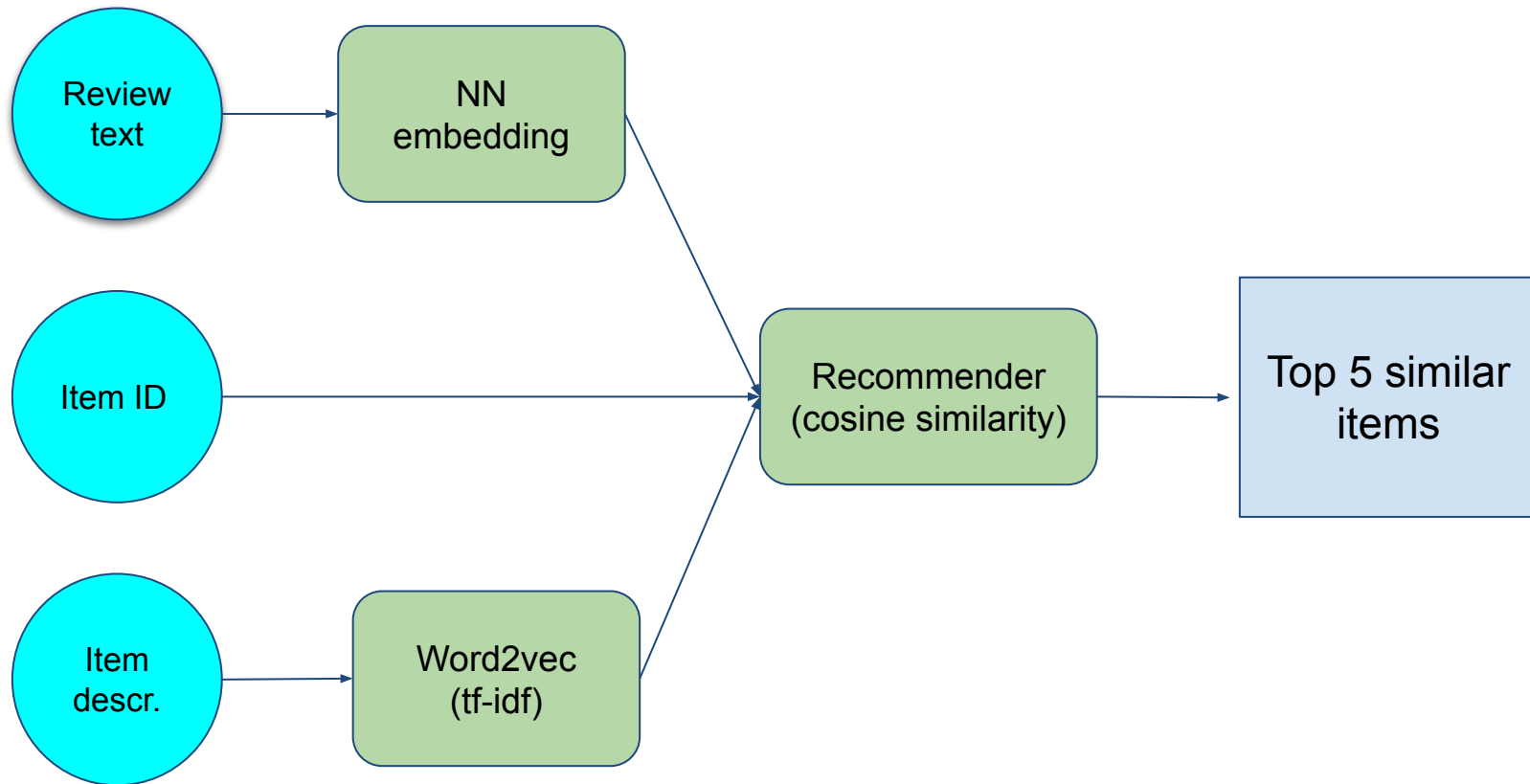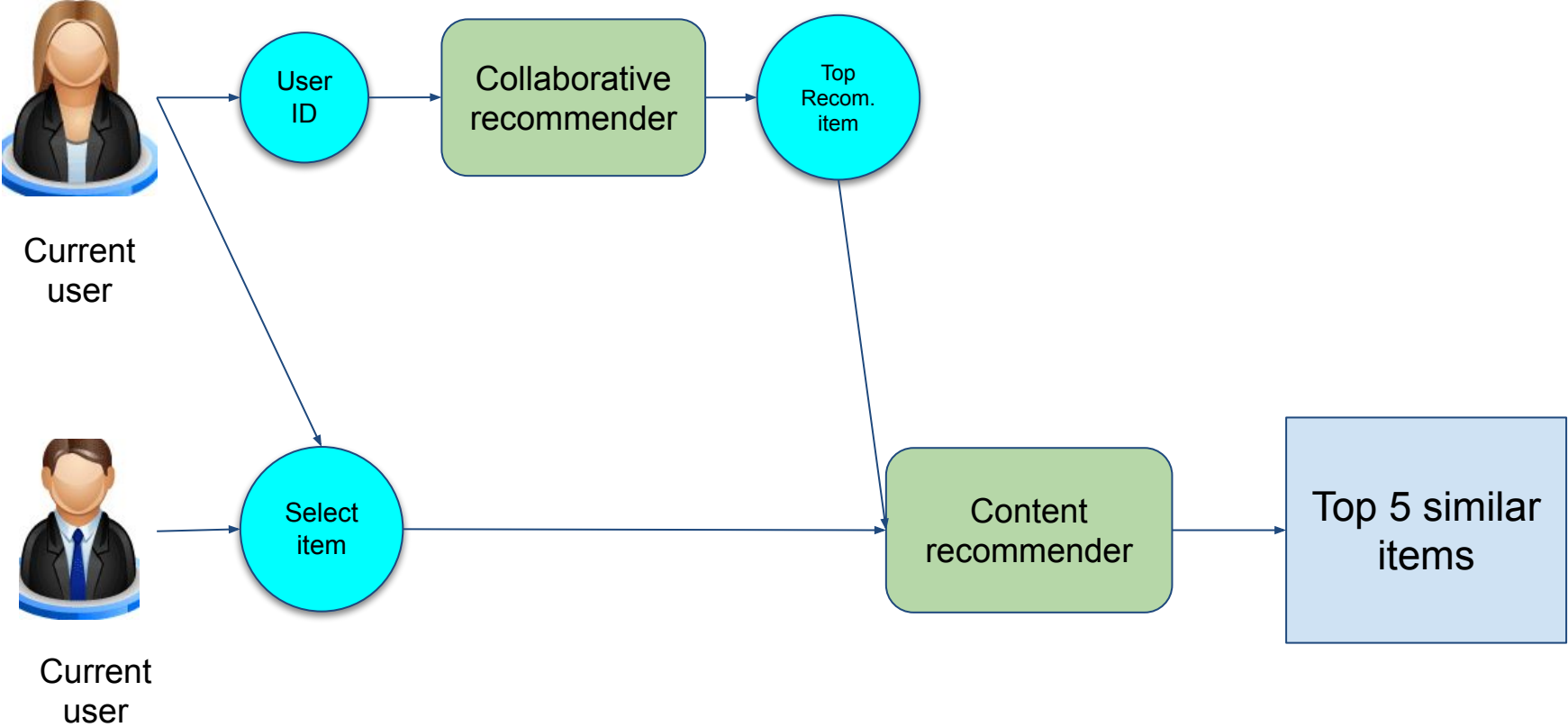| iid	predicted_rating
B000P3WQ86	5.000000
B001ASUH4A	5.000000
B004TBMUMM	5.000000
B00AT6HZGM	5.000000
B00GU3K5AQ	5.000000
B00I77PNUA	5.000000
B00QBLAQCE	5.000000
B01D8WEH14	2.435884
7245456275	NaN
7245456313	NaN
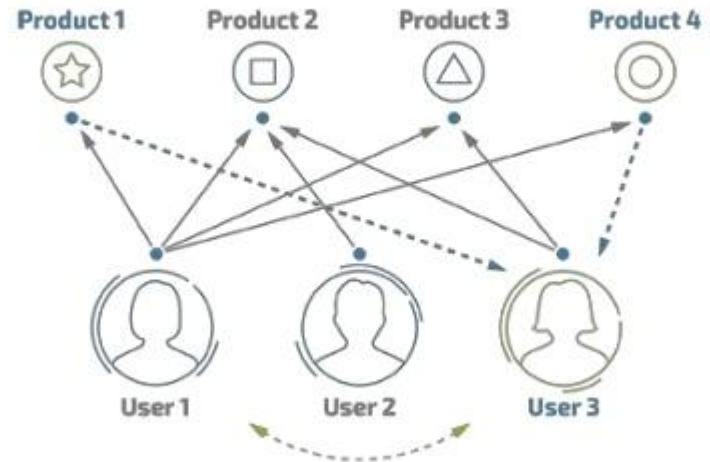
Any problem?

Alternative solution
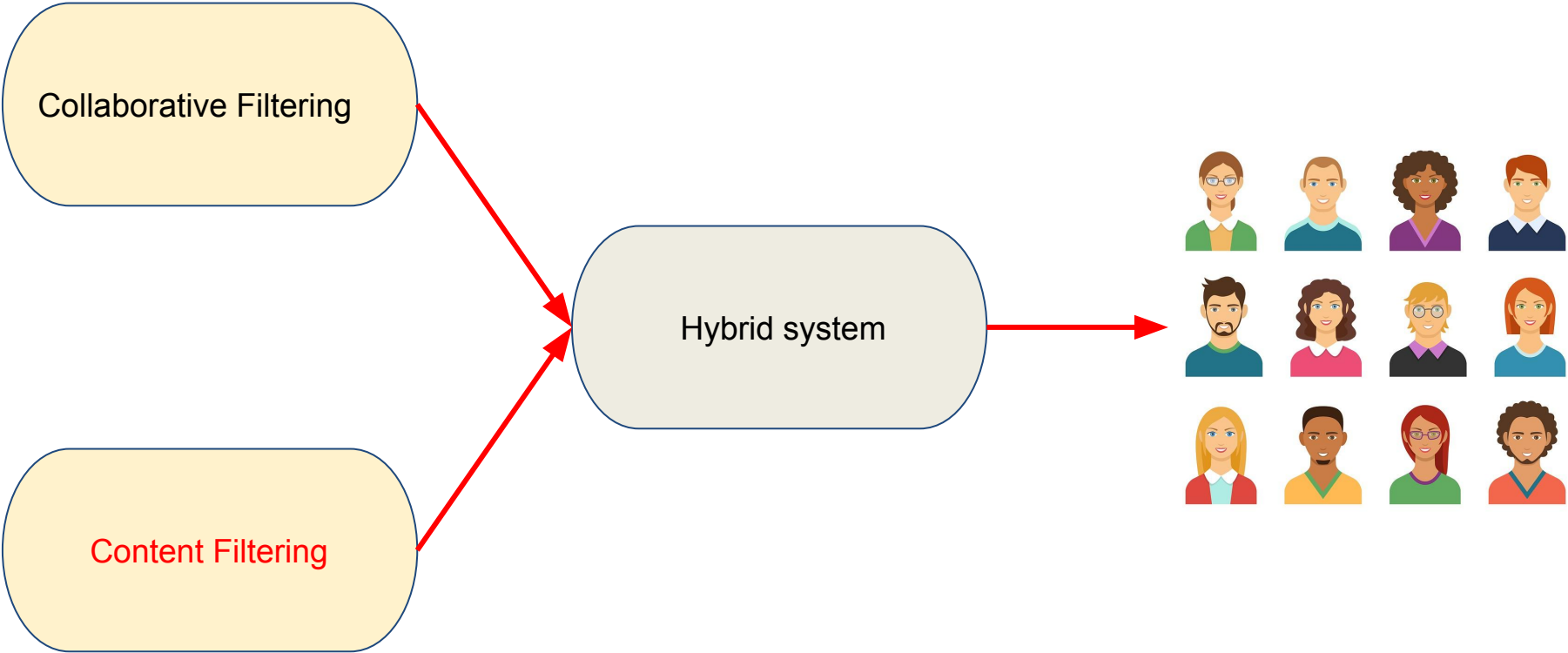
Content Filtering

Hybrid Filtering

Amazon Products Recommender

Sports & Outdoors

For new users, enter the search term and for current users enter User ID

Product Name:

Search..

New User

User ID:

User ID..

Current User

[Flask app](#)