

# Developing a hybrid recommender system for Amazon products: Sports & Outdoors

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# Many web services suggest relevant products to their users



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

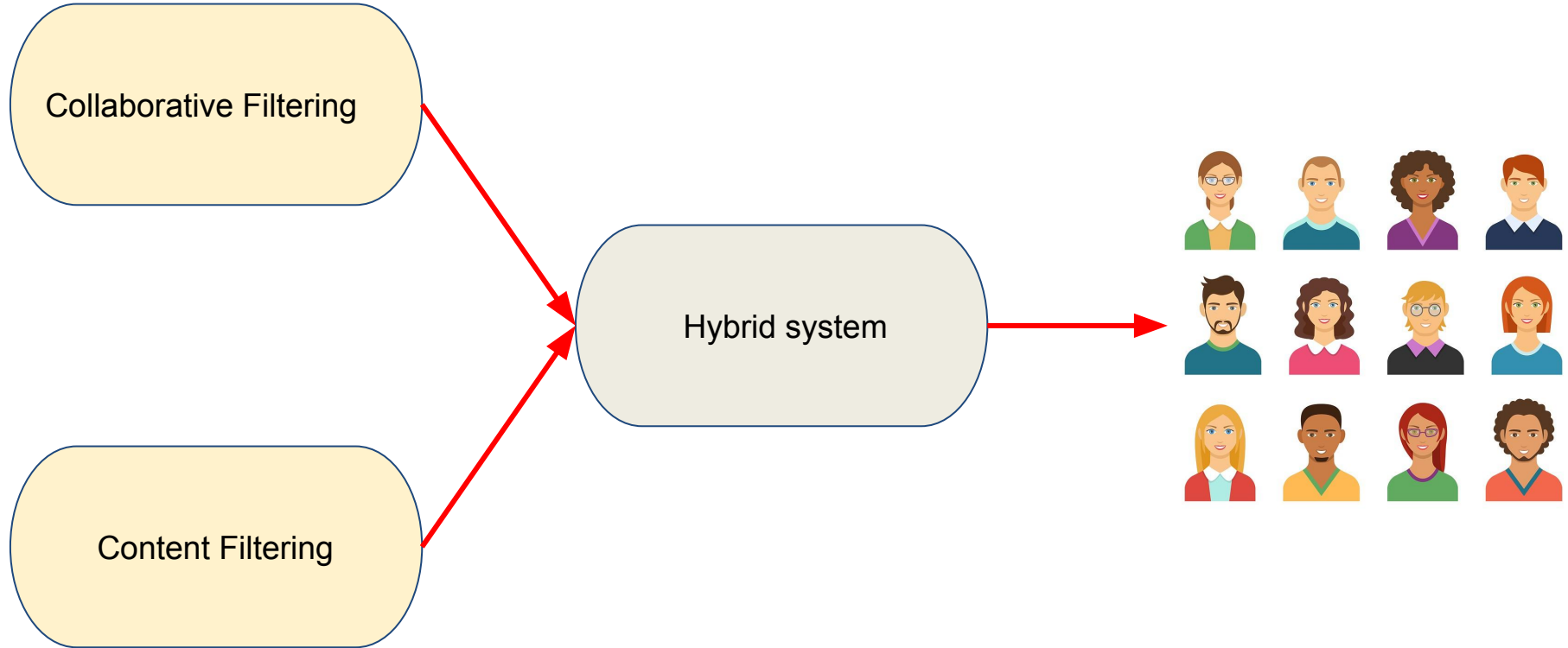


American Challenge  
DL2000 Soccer Ball (Bone,  
4)  
★★★★★ 65  
\$19.75 ✓prime

HOW?

# Recommender systems

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# Objects

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

# Data

- Amazon review data
  - 12 million reviews
  - Reviews and rating
  - Product information
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- Category
  - Sports and outdoors
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- 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...	...	\$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 (		...	\$11.97	0000032069		

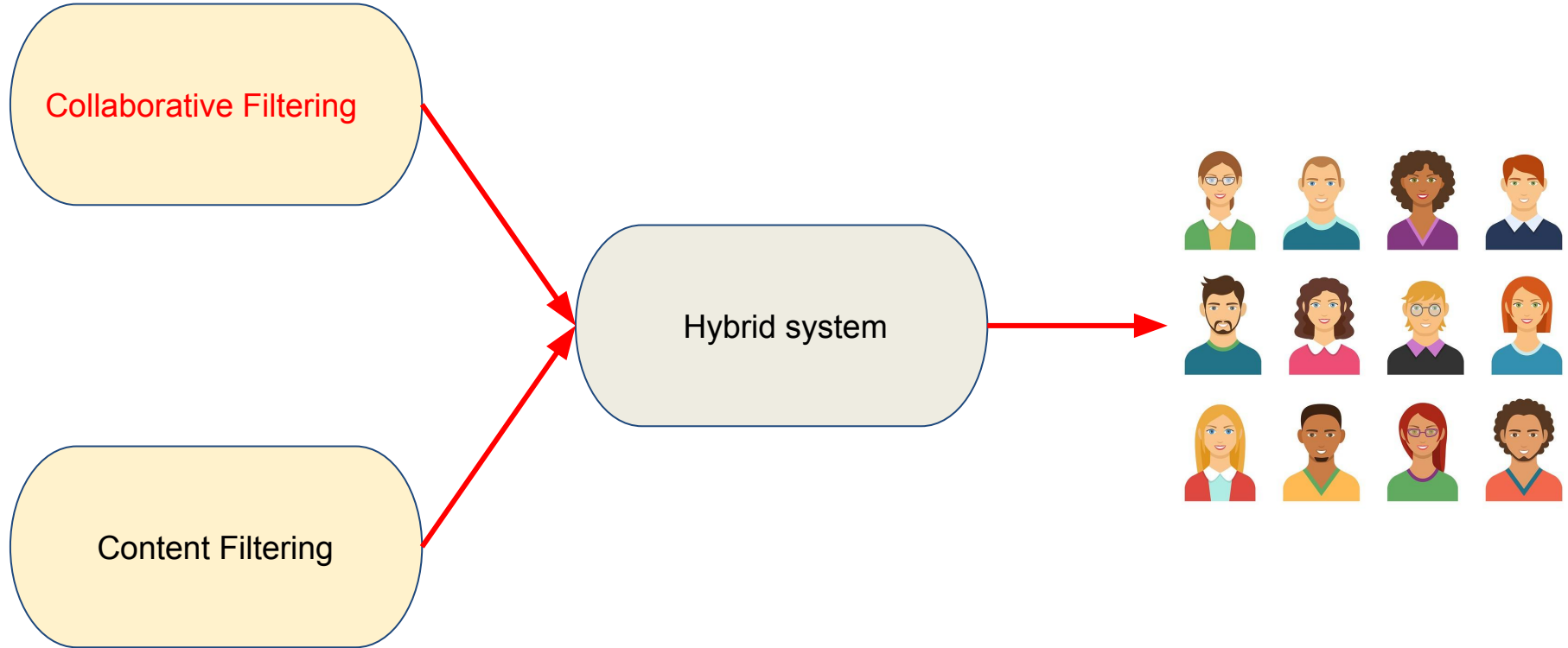
## Reviews

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

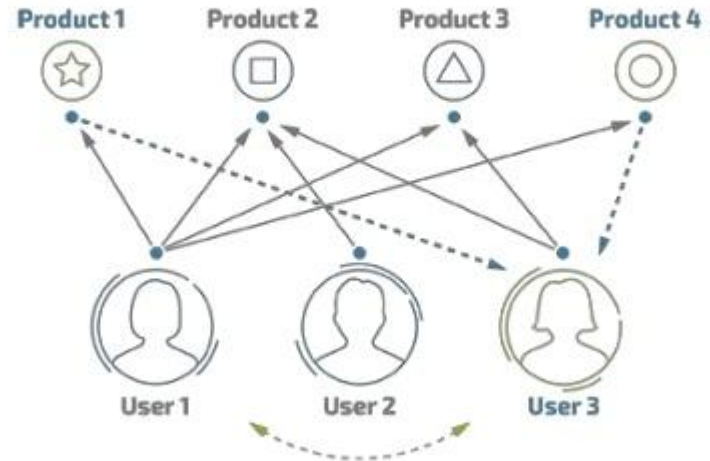
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# Collaborative recommender

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- Using Surprise module
- Algorithm: Non-negative matrix factorization
- Hyperparameter tuning



[Source](#)

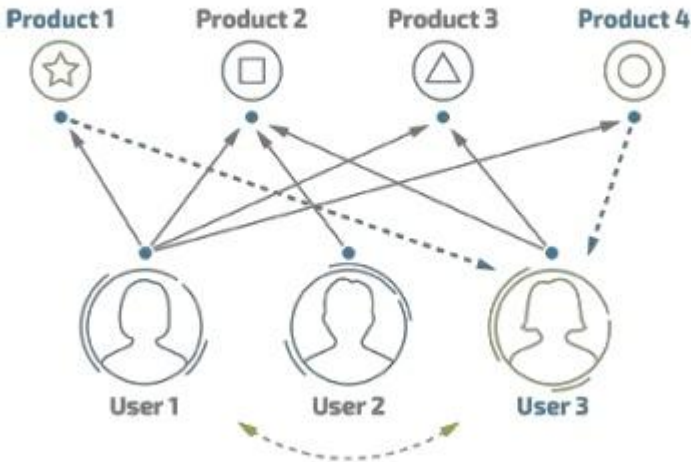


# Collaborative recommender (Cont'd)

Top 10 recommendations for a given user

[Source](#)

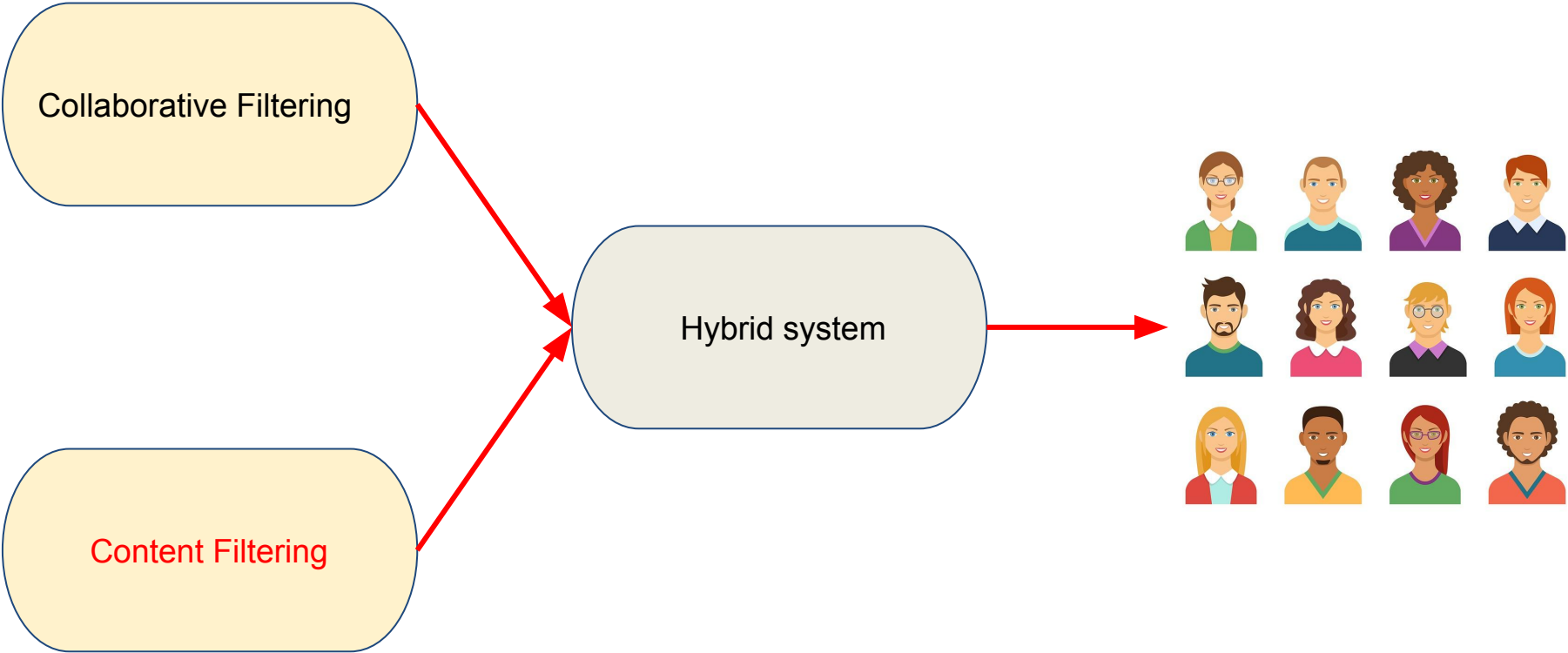
iid	predicted_rating
B000P3WQ86	5.000000
B001ASUH4A	5.000000
B004TBMUMM	5.000000
B00AT6HZGM	5.000000
B00GU3K5AQ	5.000000
B00I77PNUA	5.000000
B00QBLAQCE	5.000000
B01D8WEH14	2.435884
7245456275	NaN
7245456313	NaN



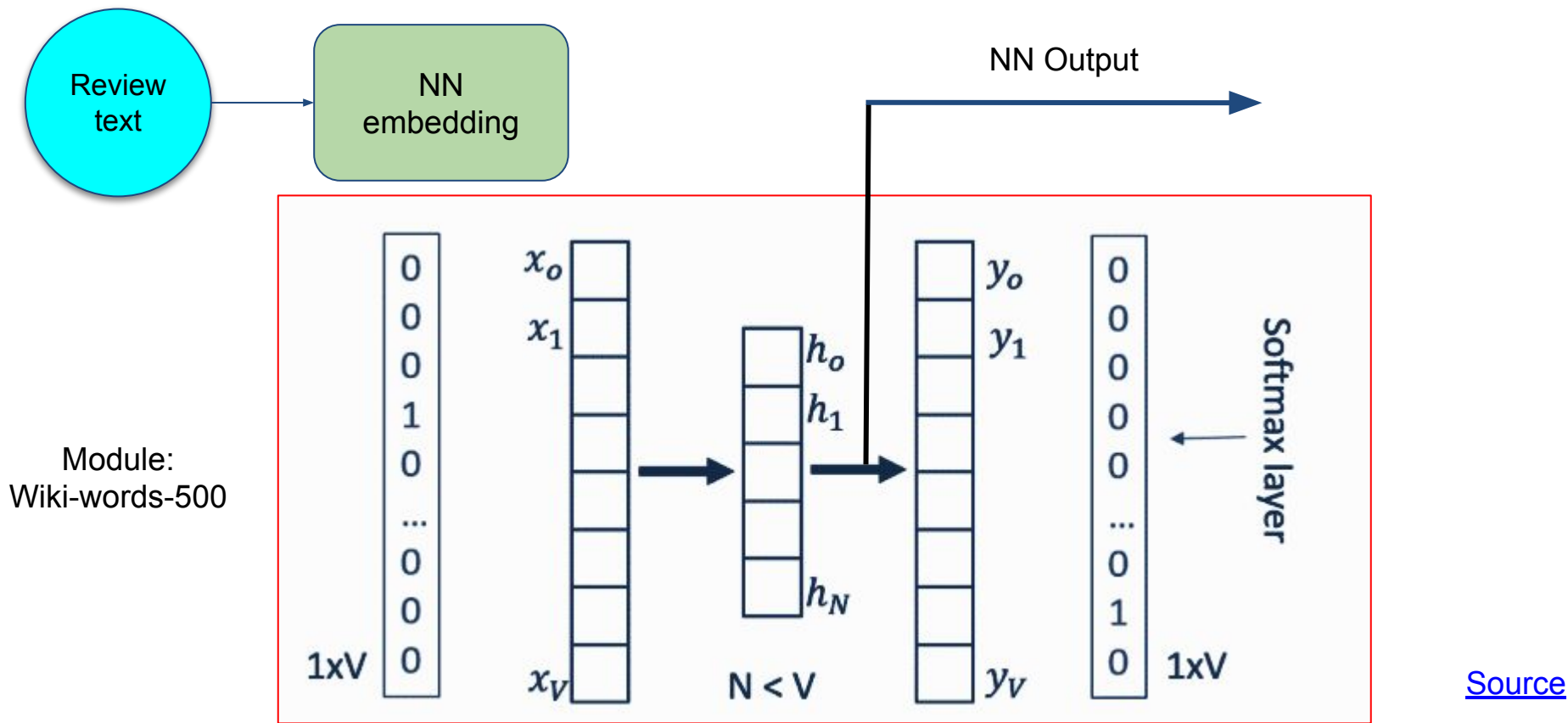
Any problem?

# Alternative solution

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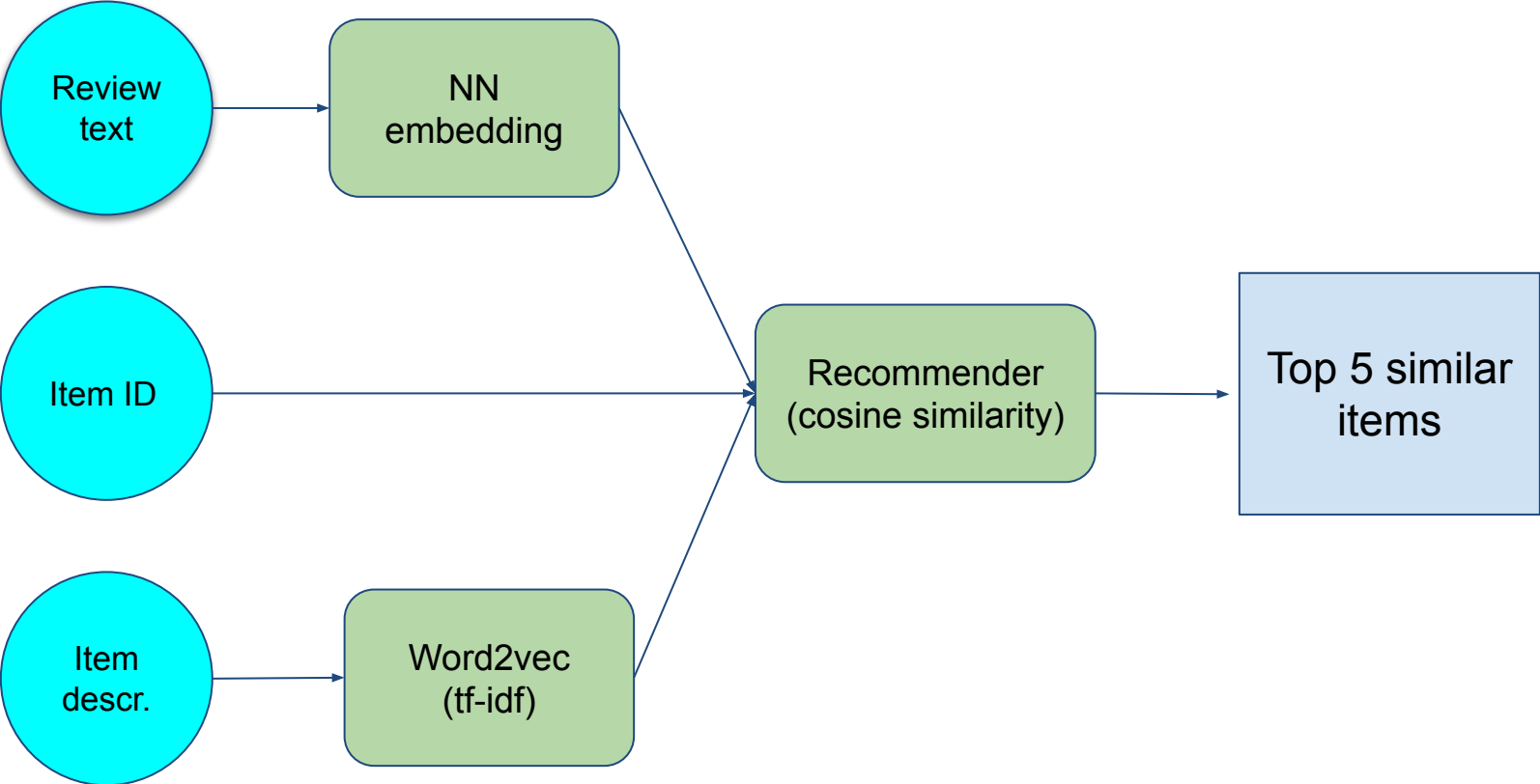


# Content Filtering



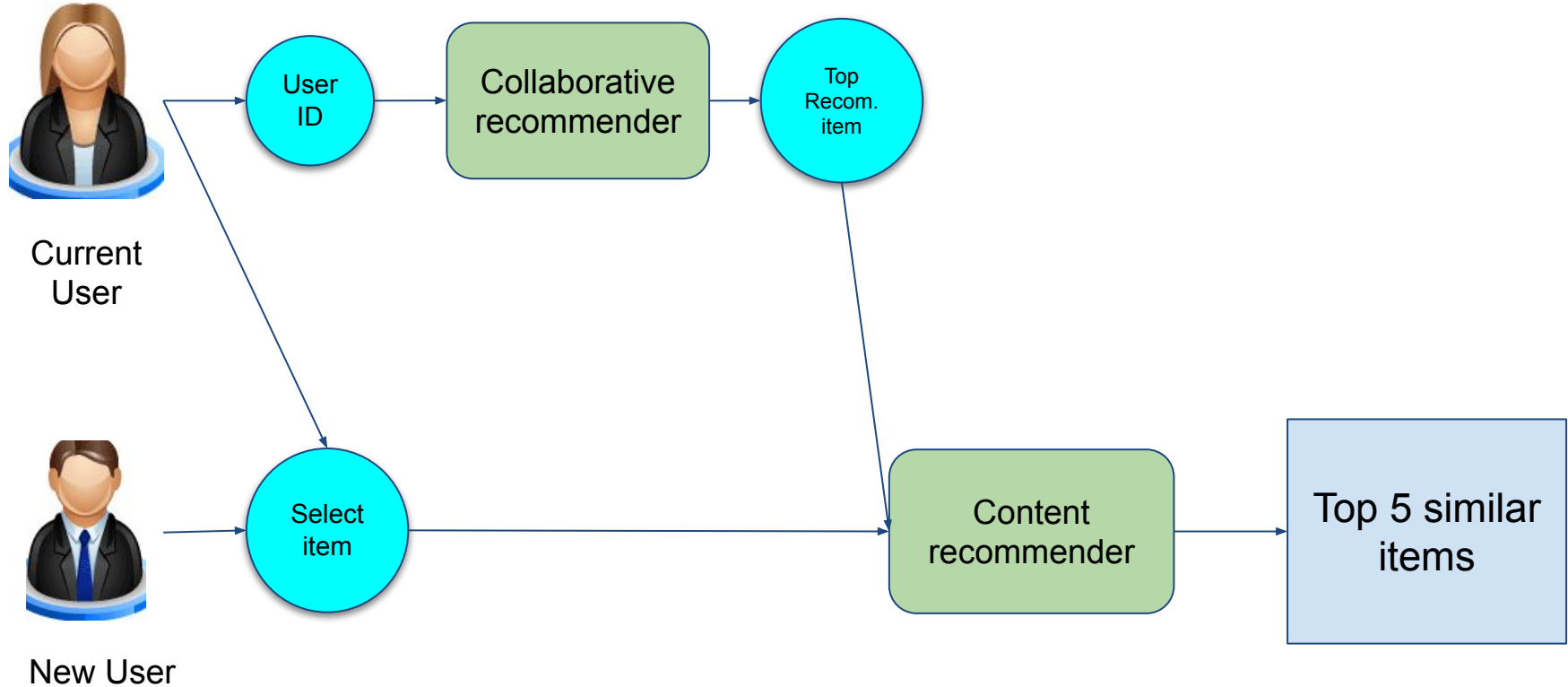
# Content Filtering

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# Hybrid Filtering

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# Amazon Products Recommender

## Sports & Outdoors

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

Product Name:

User ID:

Flask app