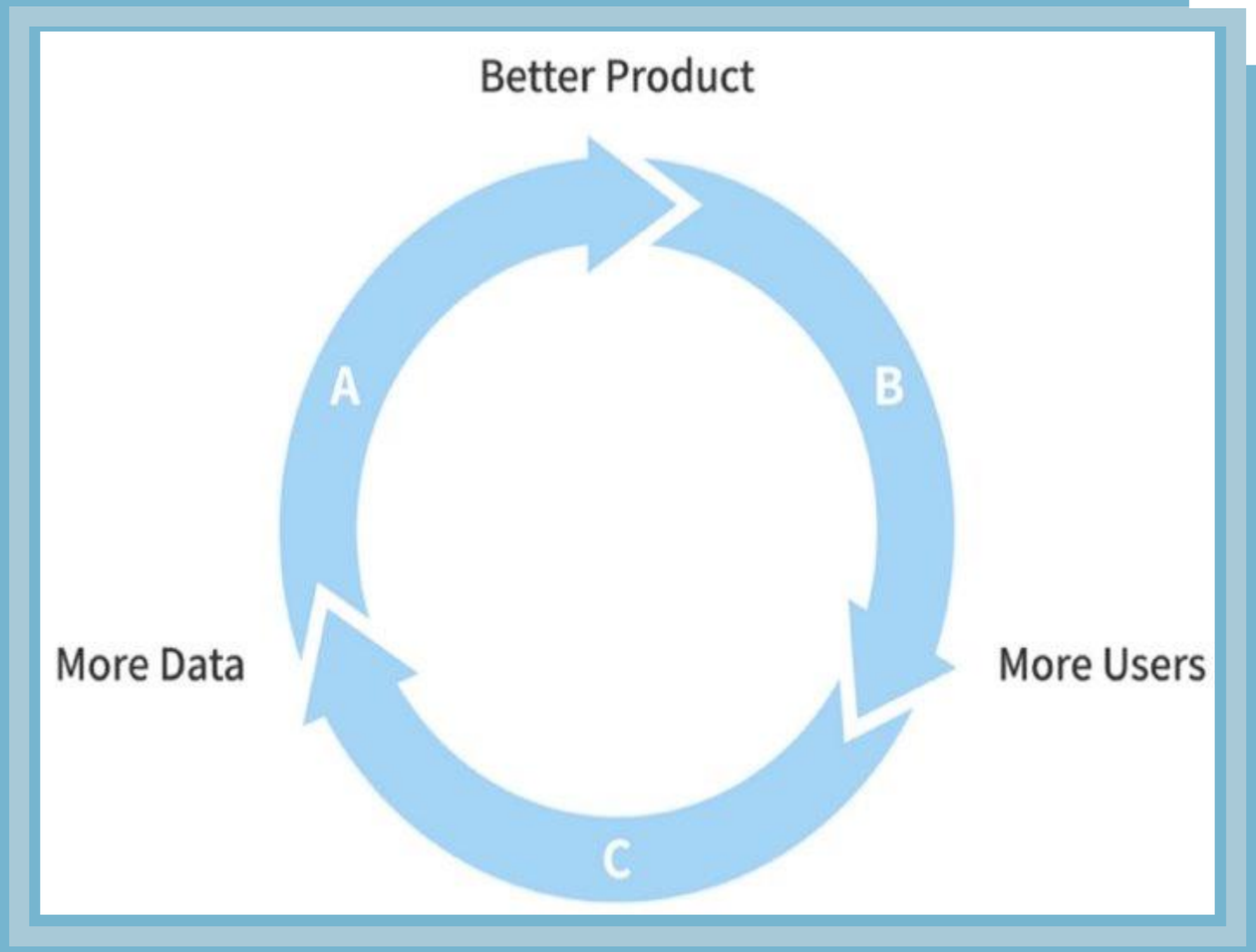
Why Am I Seeing This Ad?

Exploring the Secrets
Behind AI & Algorithms
A Python Data Science / Data Analytics Use Case

GUEST PRESENTER: ERNESTO LEE, PhD

The Business Value



BUSINESS VALUE

RECOMMENDERS ARE THE SINGLE MOST IMPORTANT ALGORITHM.

THE MORE THEY ARE USED, THE MORE VALUE THEY GENERATE.

RECOMMENDERS ARE A RENEWABLE DATA RESOURCE THAT PROVIDES DEEP CUSTOMER INSIGHTS.

WHAT PROBLEMS DOES THIS SOLVE?

SONGS ON SPOTIFY

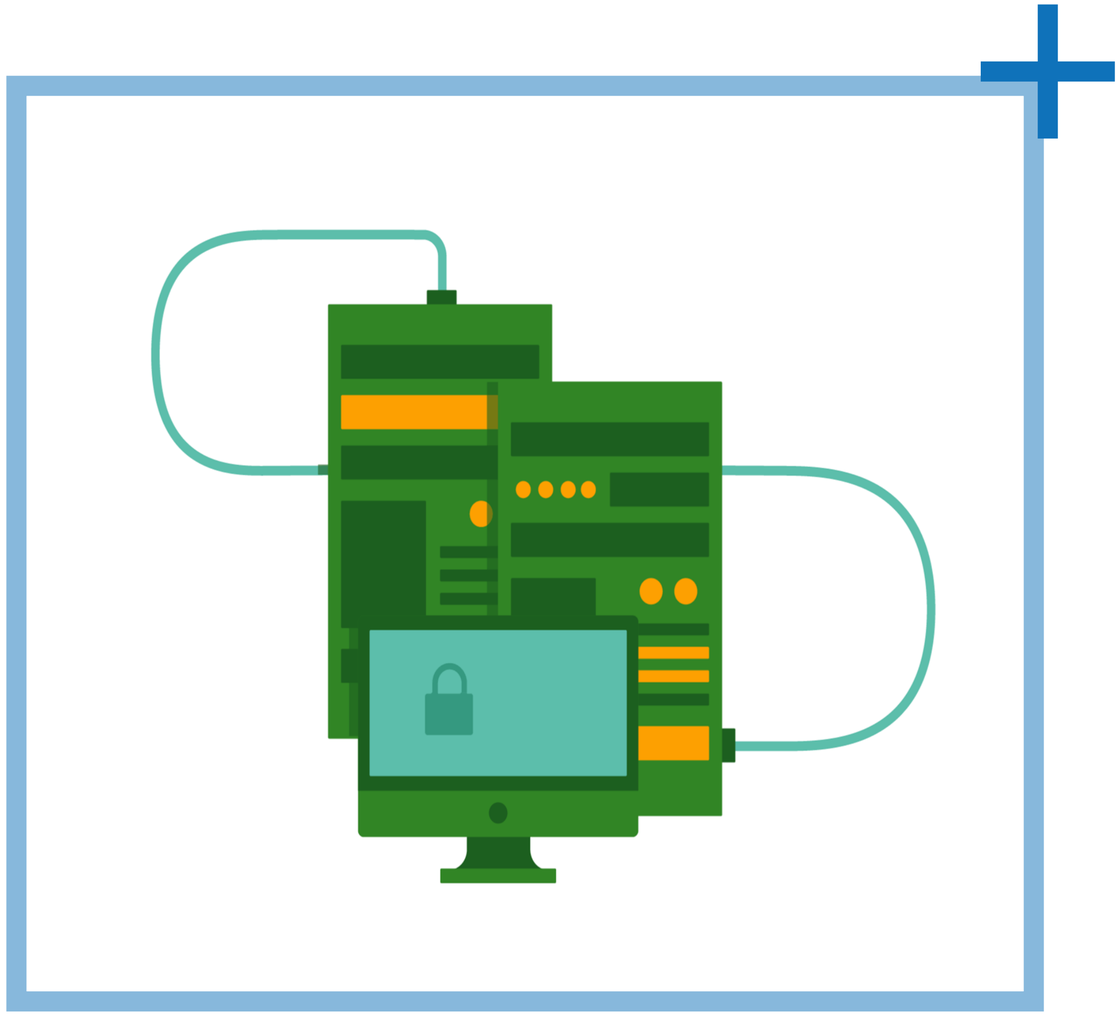
MOVIES ON NETFLIX

VIDEOS ON YOUTUBE

RELATED POSTS ON TWITTER/INSTAGRAM/LI

SIMILAR DISHES ON UBER EATS

AND YES, ADS ON FACEBOOK...



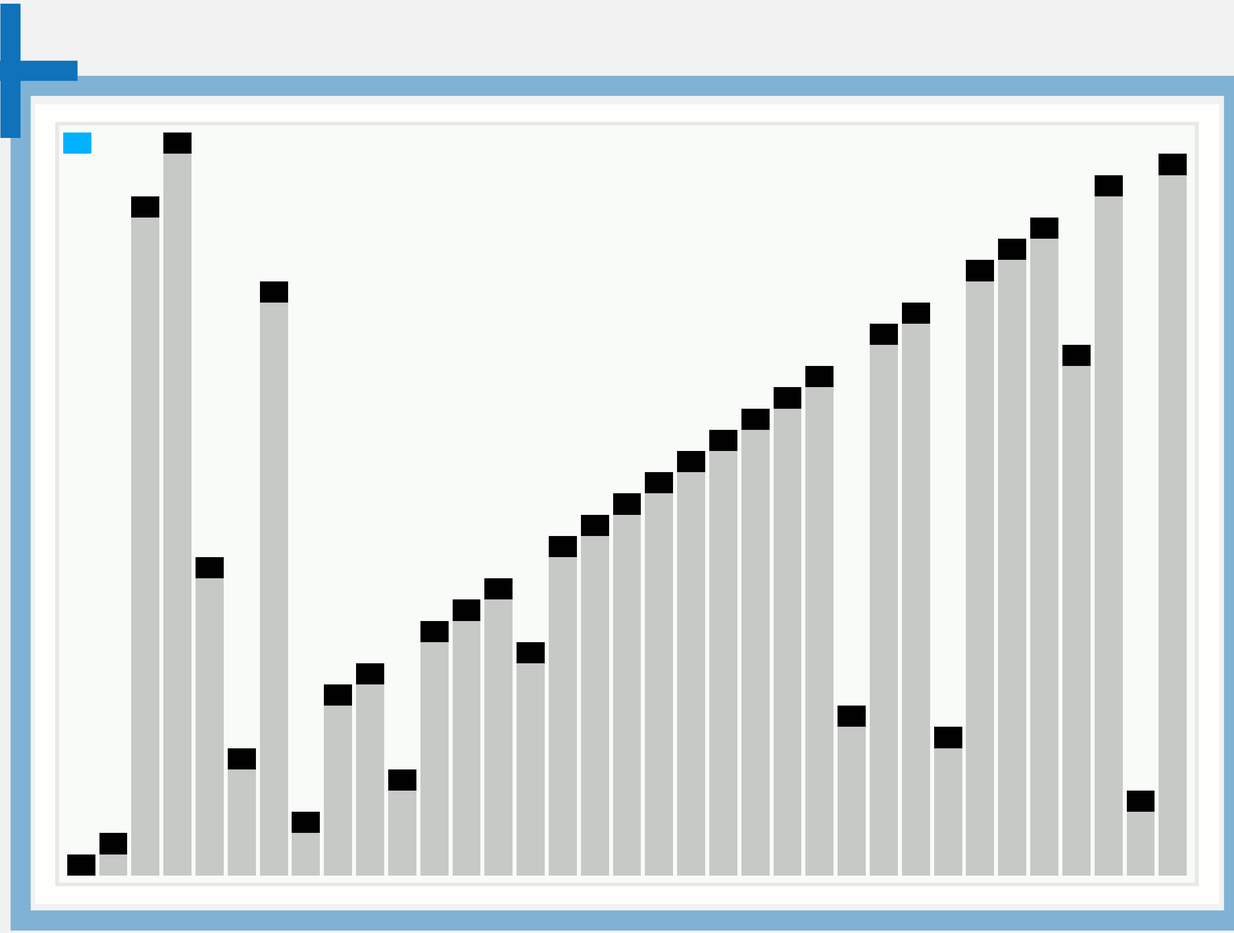
HOW DO YOU GET THE DATA?

EXPLICIT DATA: HOW YOU INTENTIONALLY INTERACTED WITH THE SITE. (WHAT YOU LIKED, PURCHASED, ETC.)

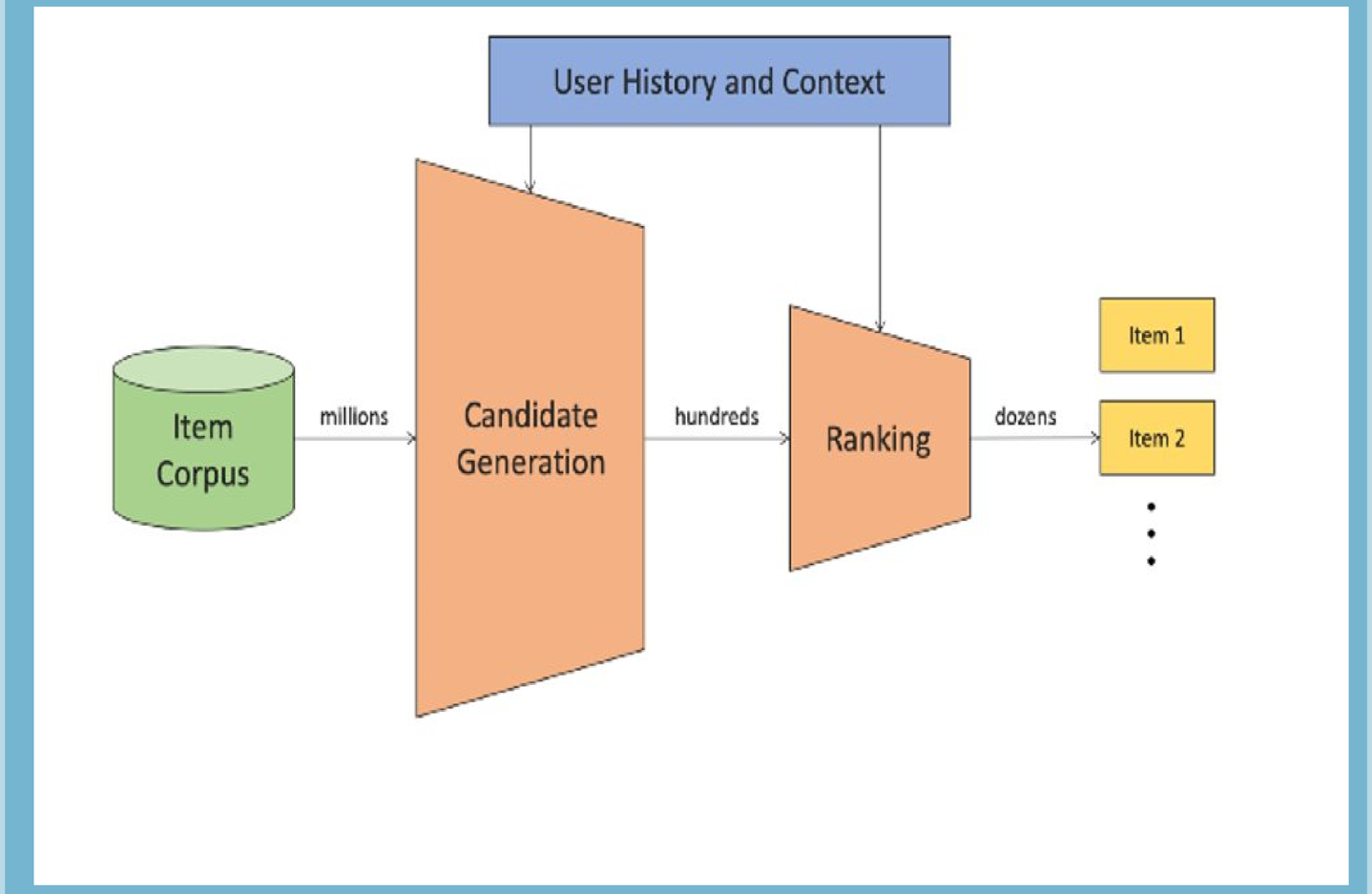
IMPLICIT DATA: DATA FROM THE ITEMS AND HOW YOU IMPLICITLY INTERACTED WITH THE STIE (WHAT YOU CLICKED ON, SEARCH LOGS, ETC.)

ALGORITHMS

1. Collaborative Filtering
2. Content-based Filtering
3. Social and Demographic recommenders
4. Contextual recommendation



https://www.cs.umd.edu/~samir/498/Amazon-Recommendations.pdf



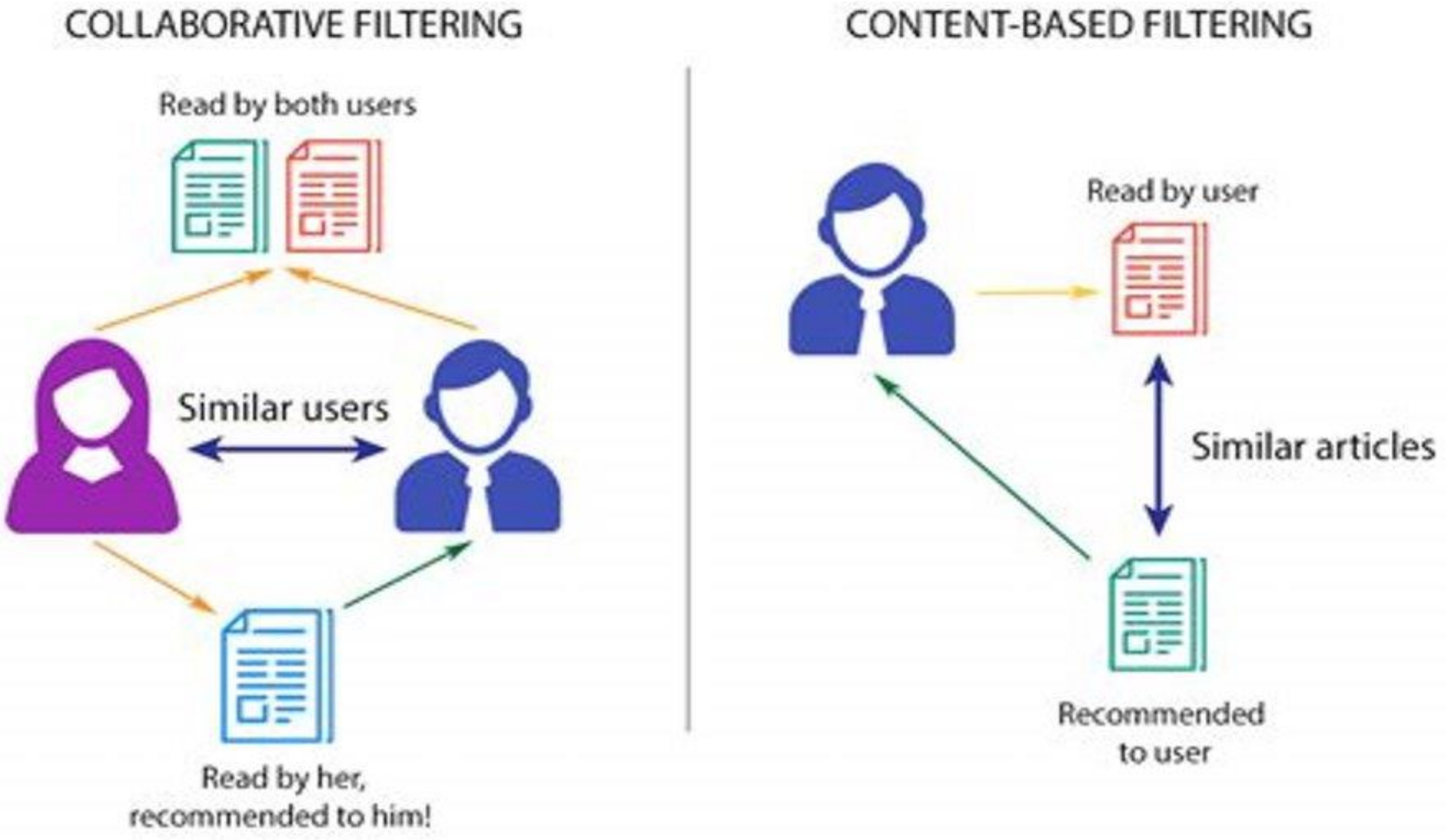
THE ESSENCE OF RECOMMENDERS

ALL RECOMMENDERS HAVE TWO THINGS IN COMMON:

- THEY GENERATE CANDIDATES
- THEY RANK THE CANDIDATES

DEMO | Content Based Recommender

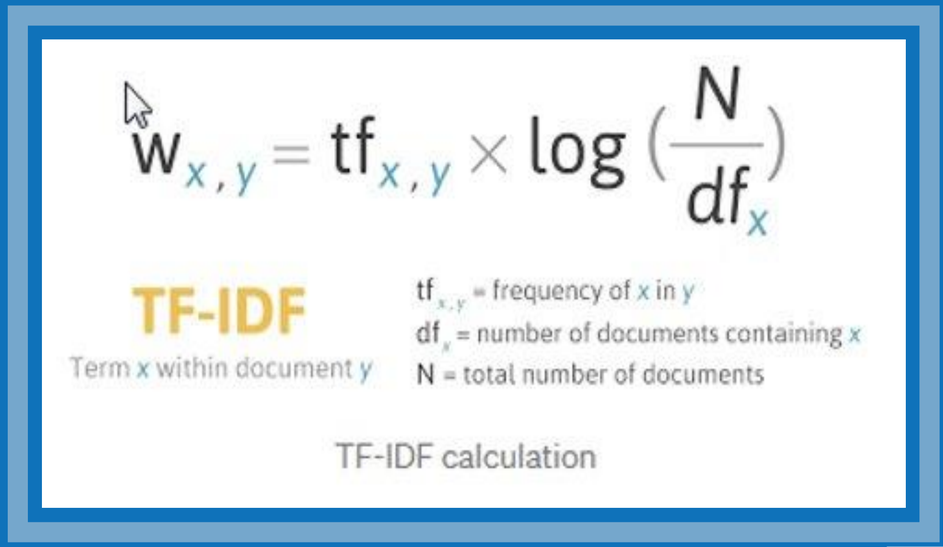
HTTPS://REPL.IT/@IMMANUELKANT/CONTENTRECOMMENDEREXAMPLE


COLLABORATIVE FILTERING
Read by both users
Similar users
Read by her,
recommended to him!
CONTENT-BASED FILTERING
Read by user
Similar articles
Recommended
to user

TF-IDF VECTORIZER

TF (TERM FREQUENCY) OF A WORD IS THE NUMBER OF TIMES IT APPEARS IN A DOCUMENT. WHEN YOU KNOW IT, YOU'RE ABLE TO SEE IF YOU'RE USING A TERM TOO OFTEN OR TOO INFREQUENTLY.

IDF (INVERSE DOCUMENT FREQUENCY) OF A WORD IS THE MEASURE OF HOW SIGNIFICANT THAT TERM IS IN THE WHOLE CORPUS.



TF-IDF calculation

Julie loves John more than Linda loves John

Jane loves John more than Julie likes John

John	2	2
Jane	0	1
Julie	1	1
Linda	1	0
likes	0	1
loves	2	1
more	1	1
than	1	1

The two vectors are:

Item 1: [2, 0, 1, 1, 0, 2, 1, 1]

Item 2: [2, 1, 1, 0, 1, 1, 1, 1]

The cosine angle (the smaller the angle) between the two vectors' value is 0.822 which is nearest to 1.

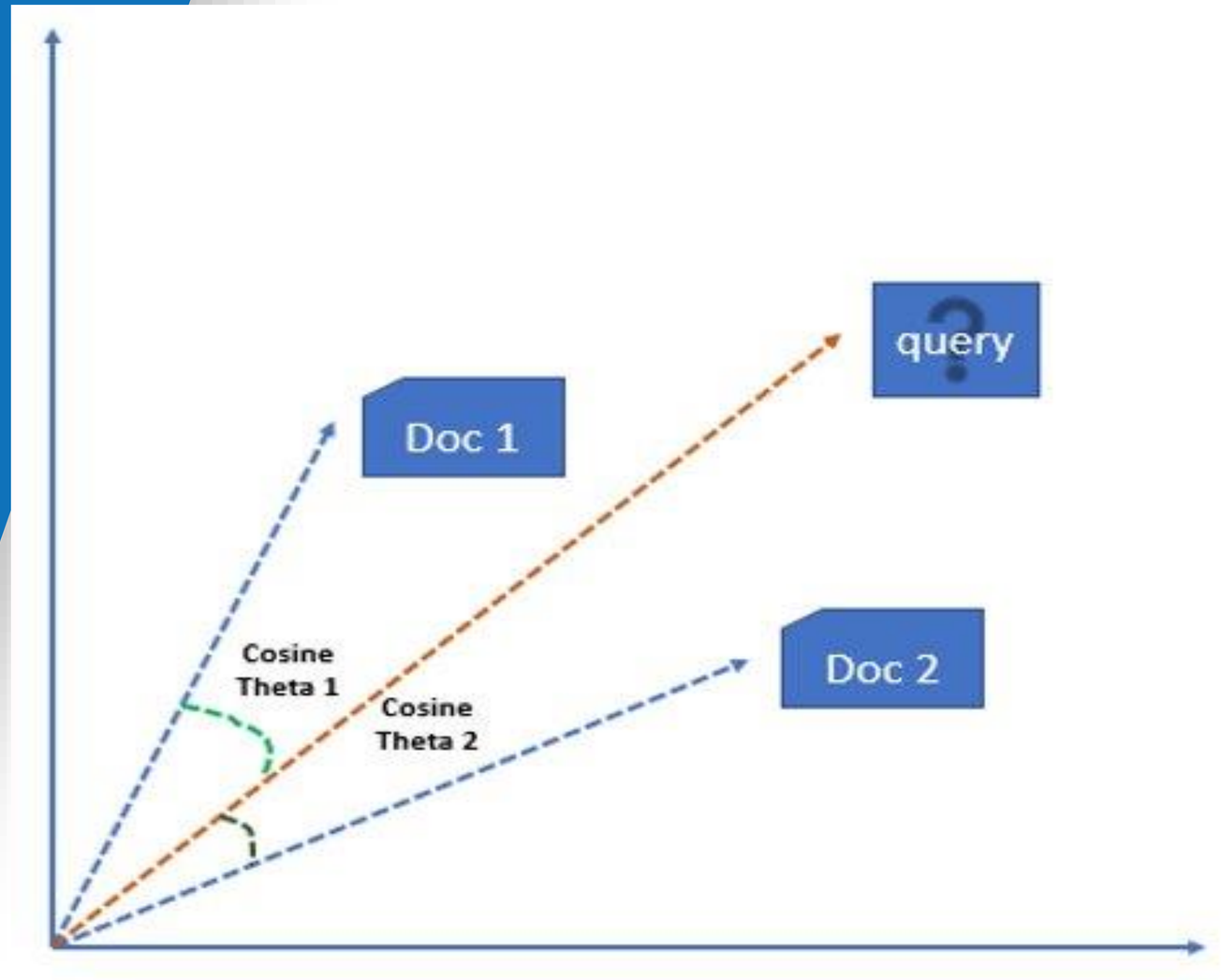
(i.e.: the sentences are similar)

HOW TO MAKE A VECTOR FROM SENTENCES

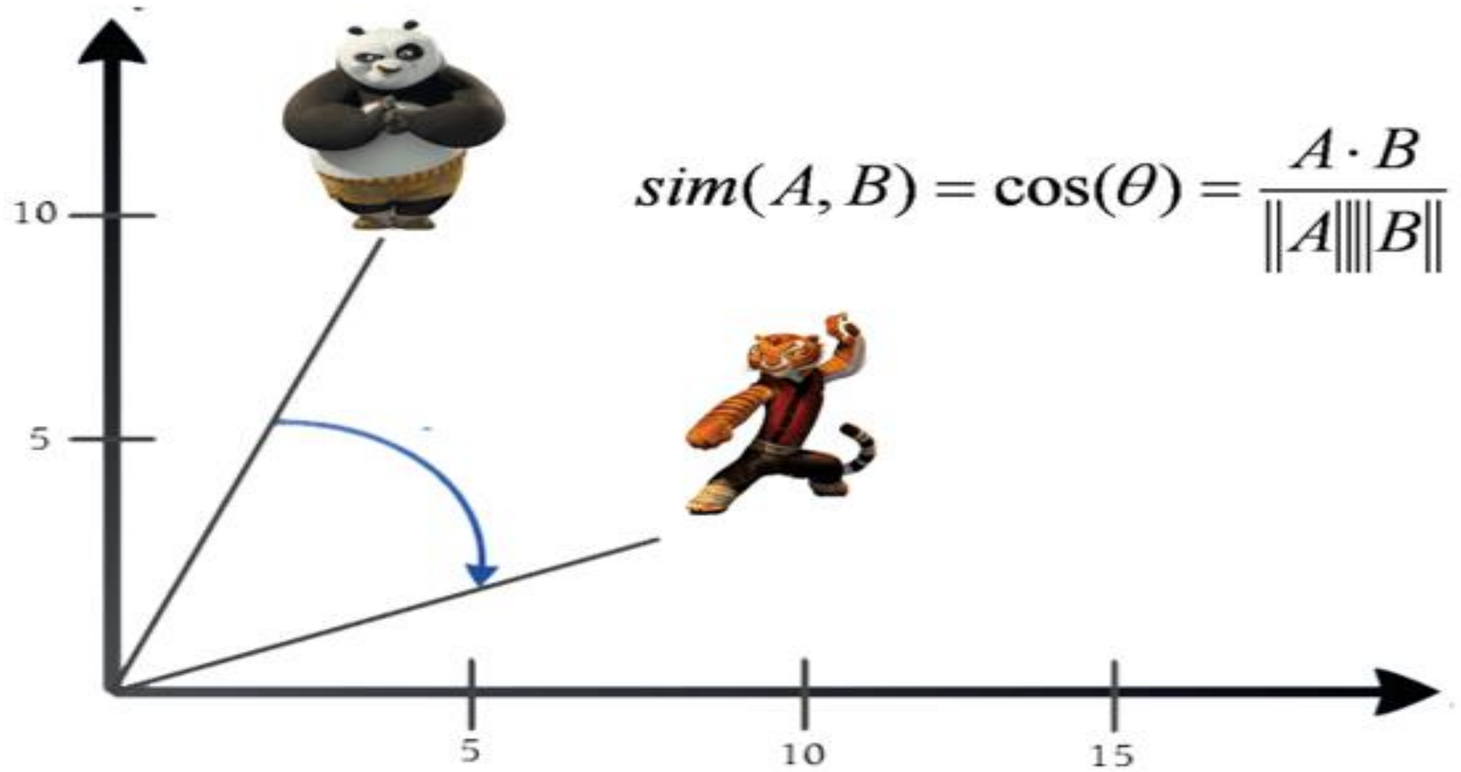
THE BIG IDEA

Every item in your set is a unique vector.

By calculating the cosine between the vectors, you can create a score that determines how “similar” the items are.



Cosine Similarity



$$sim(A, B) = \cos(\theta) = \frac{A \cdot B}{\|A\| \|B\|}$$

COSINE SIMILARITY

RECOMMENDATION

THANK YOU