DS L&L Series Lesson 2
Feb 1, 2019

Data Science: Case Studies and Code

3 Questions about Products

1. What to recommend to customers?

2. What do customers think of the products?

3. What if we let customers try them first?

1. What to recommend to customers?

Recommending products to shoppers: Why?

Upsell

Cross sell

Delight them

Make them spend more money!

So how do we recommend products?

Most basic is a *popularity* model

Most common is a *collaborative filtering* model

Popularity model: AI or marketing hype?

Amazon.com: Kodak Cameras Newsletters | X

Amazon.com to me show details Jun 2 (6 days ago) Reply

amazon.com

More to Explore

Customers who have shown an interest in point-and-shoot cameras might like to take a look at this week's bestselling products from Kodak.

Kodak EasyShare C143 Digital Camera (Blue)

Kodak EasyShare C143 12 MP Digital Camera with 3X Optical Zoom and 2.7-Inch LCD (Silver)

Kodak EasyShare C195 Digital Camera (Purple)

Kodak EasyShare Sport C123 12 MP Waterproof Digital Camera with 2.4-Inch LCD - Blue (New Model)

Collaborative Filtering

Item based:
X is like Y, based on some measurement and representation of the products

User-item based:
I like this, you like that, we're alike, so I must like that

Let's dive into the algorithms!

Amazon's (Patented) Item-Item CF: Patented, but not machine learning

Recommended for You Based on Kindle Paperwhite, 6" High Resolution Display w...

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MoKo Case for Kindle Paperwhite, Premium Thinnest and Lightest Leather Cover with…

898

$9.99 Prime

Swees Ultra Slim Leather Case Cover for Amazon All-New Kindle Paperwhite (Both 2012…

273

$3.99 Prime

Fintie SmartShell Case for Kindle Paperwhite - The Thinnest and Lightest Leather Cover for…

7,015

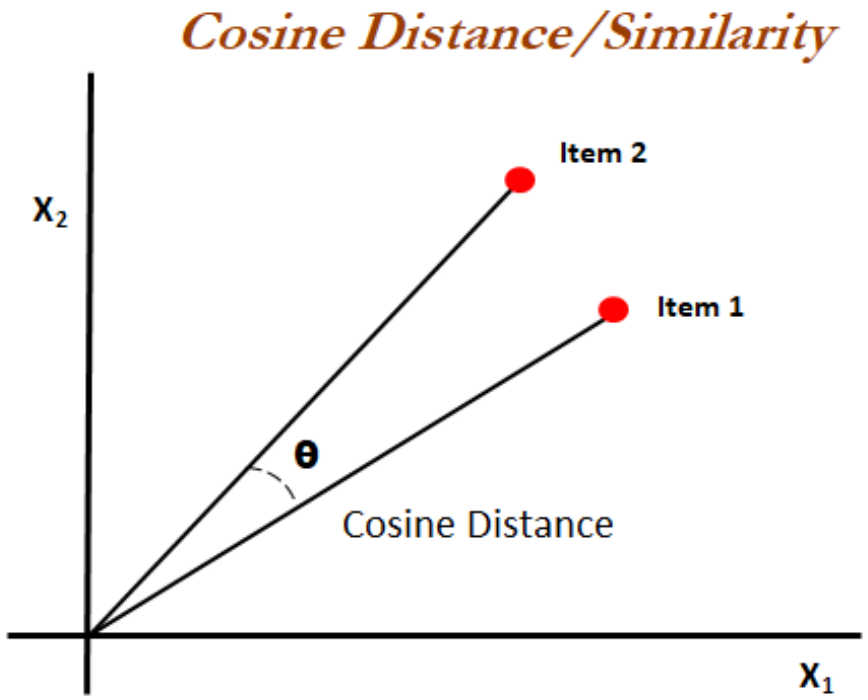
$14.99 Prime

Kindle Paperwhite, 6" High Resolution Display (212 ppi) with Built-in Light, Free 3G…

45,265

$159.99 Prime

Item-based collaborative filtering

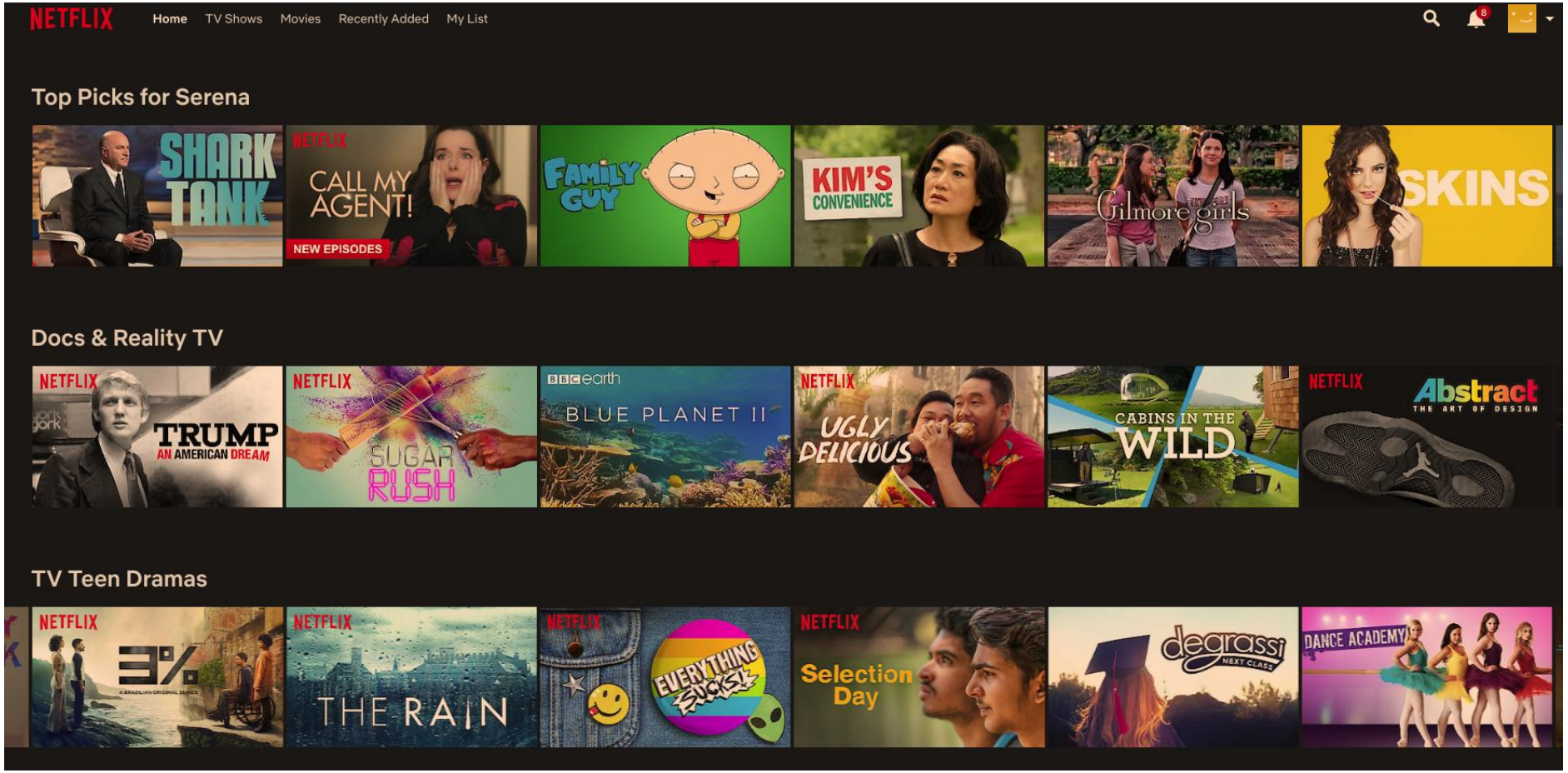


- Steps in the algorithm:
  - 1. Define vector representation of the product
  - 2. For all product pairs, compute cosine similarity between the two
- The higher the score, the more similar the product

But how do we implement this?

Item-item similarity Python code

Netflix's Model: User-item CF. ML!



User-item collaborative filtering

- Represent user and movie ratings in a user-item matrix
- Fill in unknown ratings then give recommendations
- Need to decompose the matrix
- Simple method is singular value decomposition




John	5	1	3	5
Tom	?	?	?	2
Alice	4	?	3	?

And how do we implement *this*?

User-item collaborative filtering

2. What do customers think of the products? How do they *feel?*

How do customers like our products? What do our employees think of us? Why do we care?

Directly get feedback on our company/products

Could help for marketing purposes

Too much content to look at ourselves, so automate it with machine learning

Sentiment analysis

How do we implement sentiment analysis?

Sentiment Analysis

3. What if we let customers try our products first, before recommending, before seeking out their feedback?

What if we let shoppers try our products first?

Delightful customer experience

If they try it, maybe they'll buy it

Can collect more data

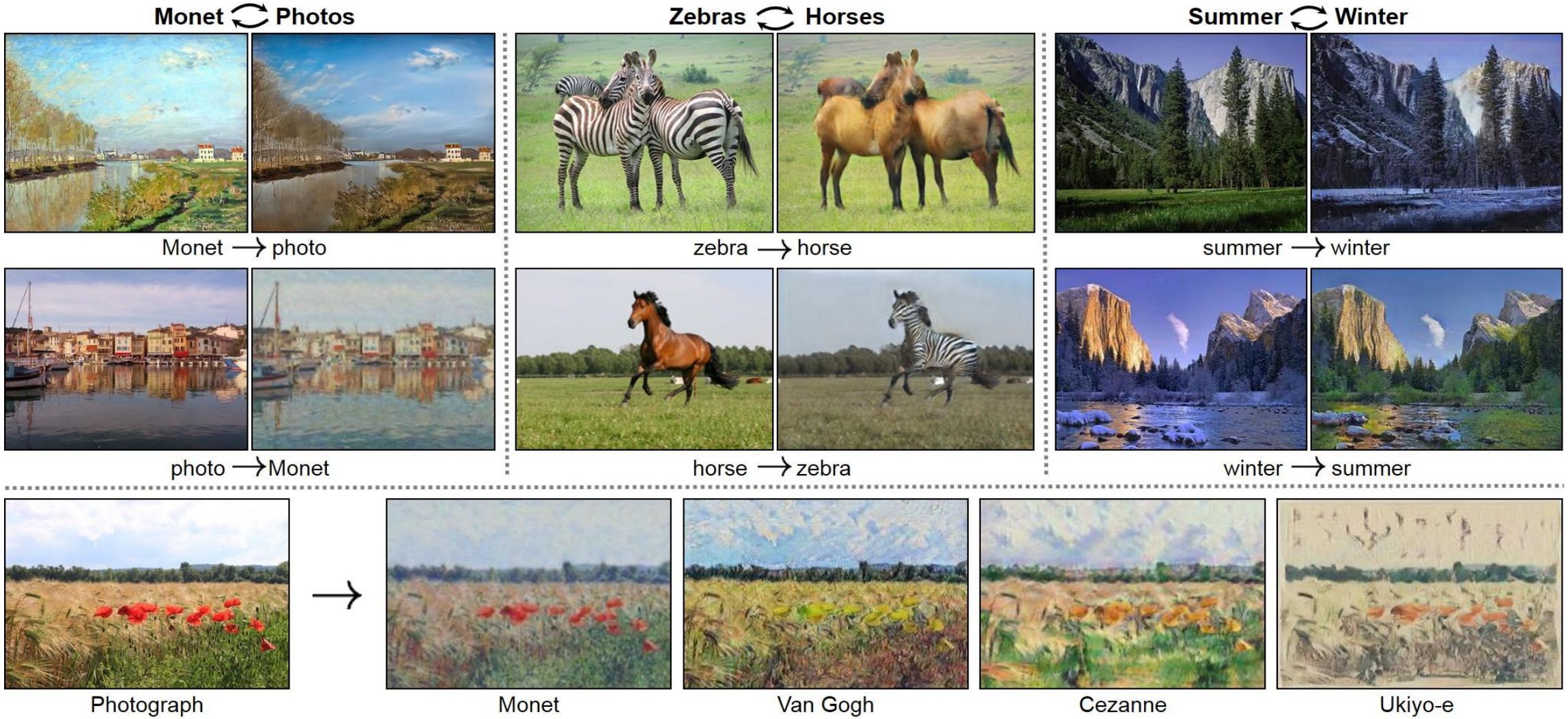
try on
FULL FACE
looks!

Generative Adversarial Networks

GAN model is made up of a generator and discriminator

Generator tries to create "fake" images

Discriminator tries to determine if the images are "fake" or not


Monet ⇄ Photos
Zebras ⇄ Horses
Summer ⇄ Winter
Monet → photo
zebra → horse
summer → winter
photo → Monet
horse → zebra
winter → summer
Photograph
Monet
Van Gogh
Cezanne
Ukiyo-e

HOW DO WE IMPLEMENT THIS!?

Neural Style Transfer

The knife cuts both ways

Amazing results

But implementation is difficult

Maybe someday!

Recap

1. What to recommend to customers?

Popularity model.

Item-based collaborative filtering.

User-item collaborative filtering.

2. What do customers think of the products? Or what do your employees think of your company?

NLP.

-Sentiment analysis.

3. What if we let customers try our products before buying?

Generate Adversarial Networks.

-StarGAN.

-CycleGAN.