

NEURAL NETWORKS RECOMMENDATION SYSTEM

on Amazon Reviews Dataset



TensorFlow

OBJECTIVE: Explore Neural Networks by using TensorFlow Recommenders to address Cold Start problem.

PROJECTED OUTCOME: Test Retrieval, Ranking, Sequential models.



Outline



BUSINESS
PROBLEM



DATA AND
METHODS



RESULTS



CONCLUSIONS

Business Problem

Stakeholder: Marketing team

Low user
penetration in US
(20% at 2022)

Cold Start
Problem



Deliver to Elena
Newcastle 98059

Sports & Outdoors ▾



EN ▾

All Groceries ▾ Pharmacy Buy Again Prime Video Health & Household Beauty & Personal Care

Sports & Outdoors

Exercise & Fitness

Outdoor Recreation

Sports Fan Shop

Team Sports

Hunting

Fishing



Hiland 27.5 inch Mountain Bike 27 Speeds, Lock-Out Suspension Fork, Aluminum 18/19.5 inch Frame
Hydraulic Disc-Brake for Men Women Mens MTB Bicycle Adult Bike

◀ Back to results



Share

Hiland Aluminum Mountain Bike 27 Speeds, Hydraulic Disc-Brakes, Lock-Out Suspension Fork, 27.5 inch Wheel, 3 Sizes for Men Mens Mountain Bike Adult Womens Bicycle

[Visit the HH HILAND Store](#)

★★★★★ 555 ratings
| 80 answered questions

-8% \$369⁹⁹

List Price: \$399.99 ⓘ

prime

FREE Returns ▾

Get 40% off eligible products when using American Express Membership Rewards points.
Max discount \$40. Activation required. Prime exclusive offer. Limited-time offer, see terms.

Color: Grey&Orange



DATA & METHODS

DATA:

2.3M Outdoor product reviews (2000 – 2015)

FEATURES:

Product title, review title, review, review date, votes

DATA SOURCE:

[Amazon Reviews dataset](#)

RECOMMENDATION SYSTEMS:

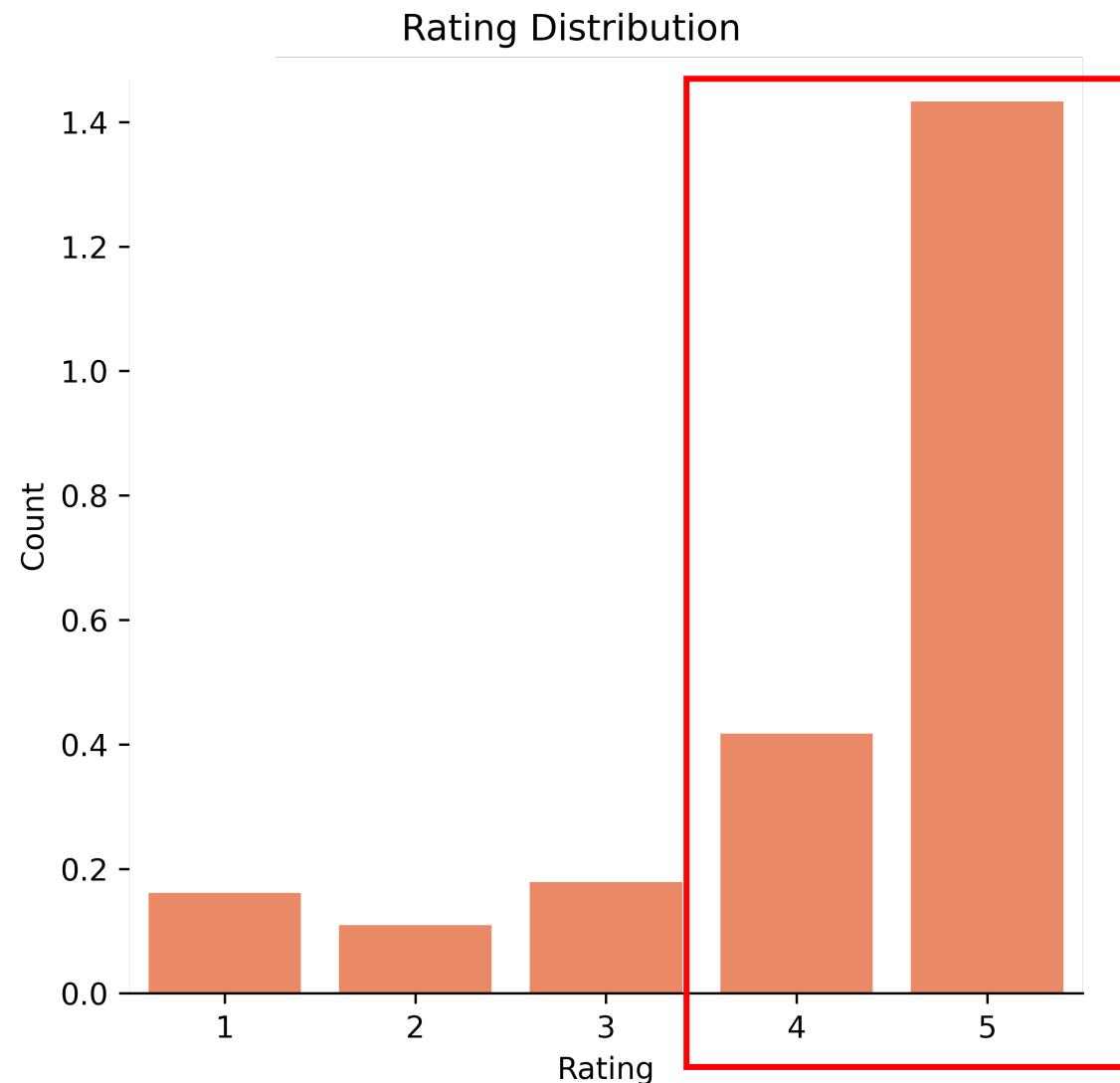
Retrieval

Ranking

Sequential

Combined Features





Star Rating Distribution:

62.4% - 5 star

18.1% - 4 star

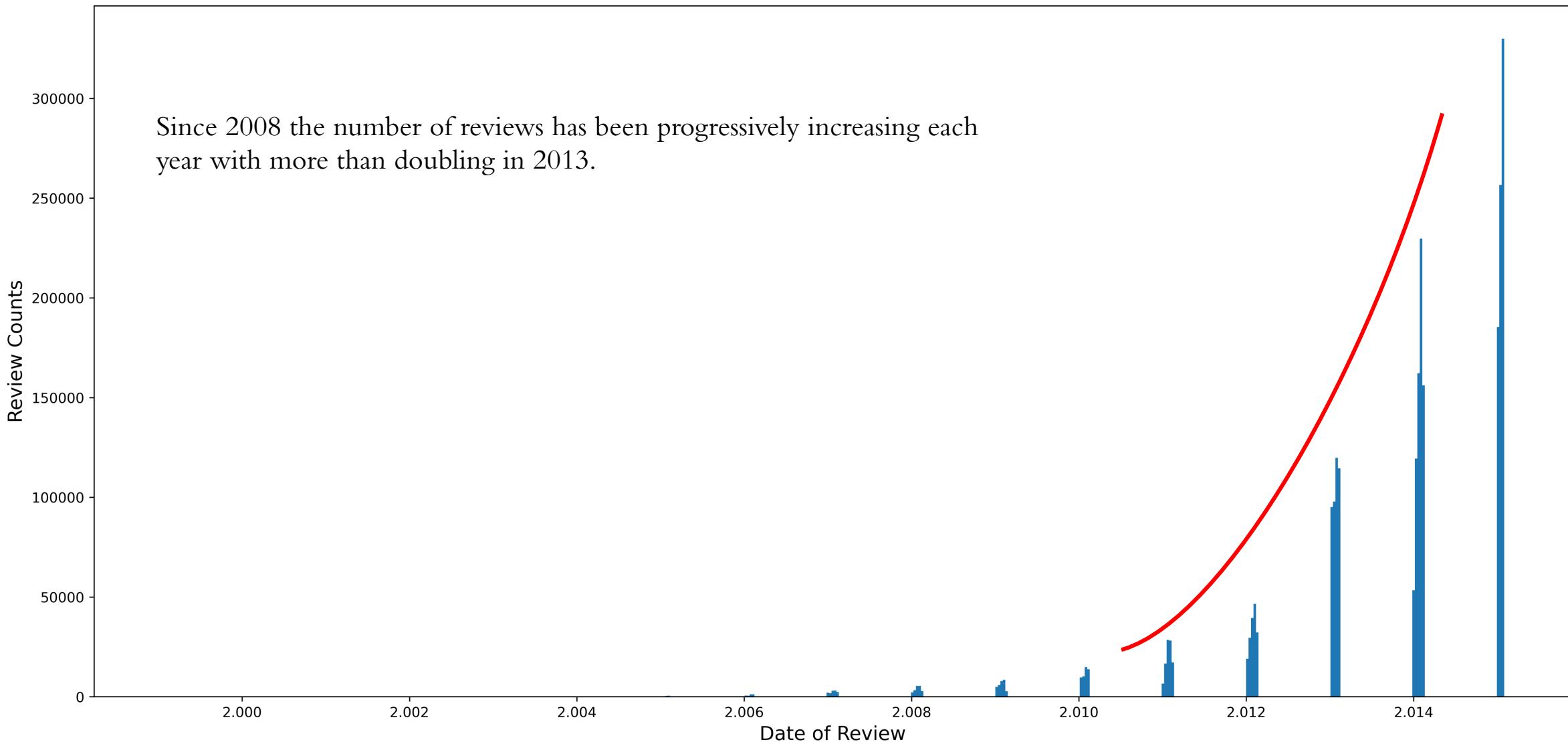
7.6% - 3 star

4.7% - 2 star

7.1% - 1 star

Rating distribution is skewed left indicating that customers tend to leave positive ratings.

Review Distribution



Top 5 Rated Products between 2000 - 2015

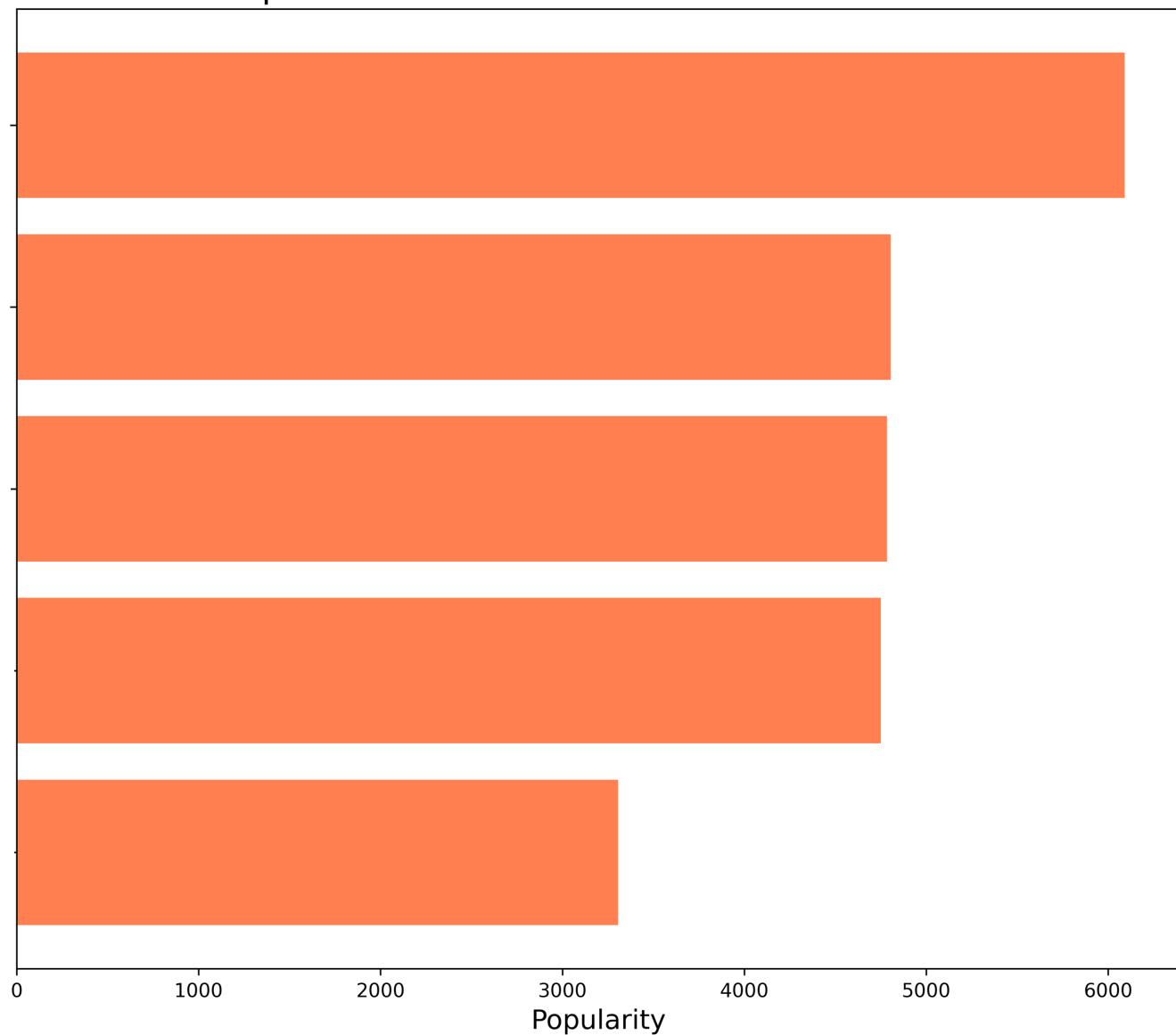
SoundAsleep Dream Series Air Mattress

Intex Pillow Rest Raised Airbed

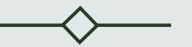
Hydro Flask Insulated Water Bottle

Intex Raised Downy Airbed

LifeStraw Personal Water Filter for Camping



Test User



Mountain biking

Camping

Does have a kid



ITEM-TO-ITEM Retrieval Model (tuned)

Top-K Categorical Accuracy Rate on Test Data

115K subset dataset

Top-1 36%

Top-5 49%

Top-10 58%

Top-50 68%

Top-100 70%

2.3M full dataset

95.9%

96.12%

96.12%

96.13%

96.18%

Top-10 Recommendations on Subset Data



Top-10 Recommendations on Full Data



BruteForce vs ScaNN

Serving Performance

BruteForce and ScaNN
retrieved the same Top-10
recommendations

BruteForce 5.29 ms

ScaNN 4.55 ms

ScaNN is 15% faster than
BruteForce at the same
accuracy rate of 96%.

BUSINESS RECOMMENDATIONS

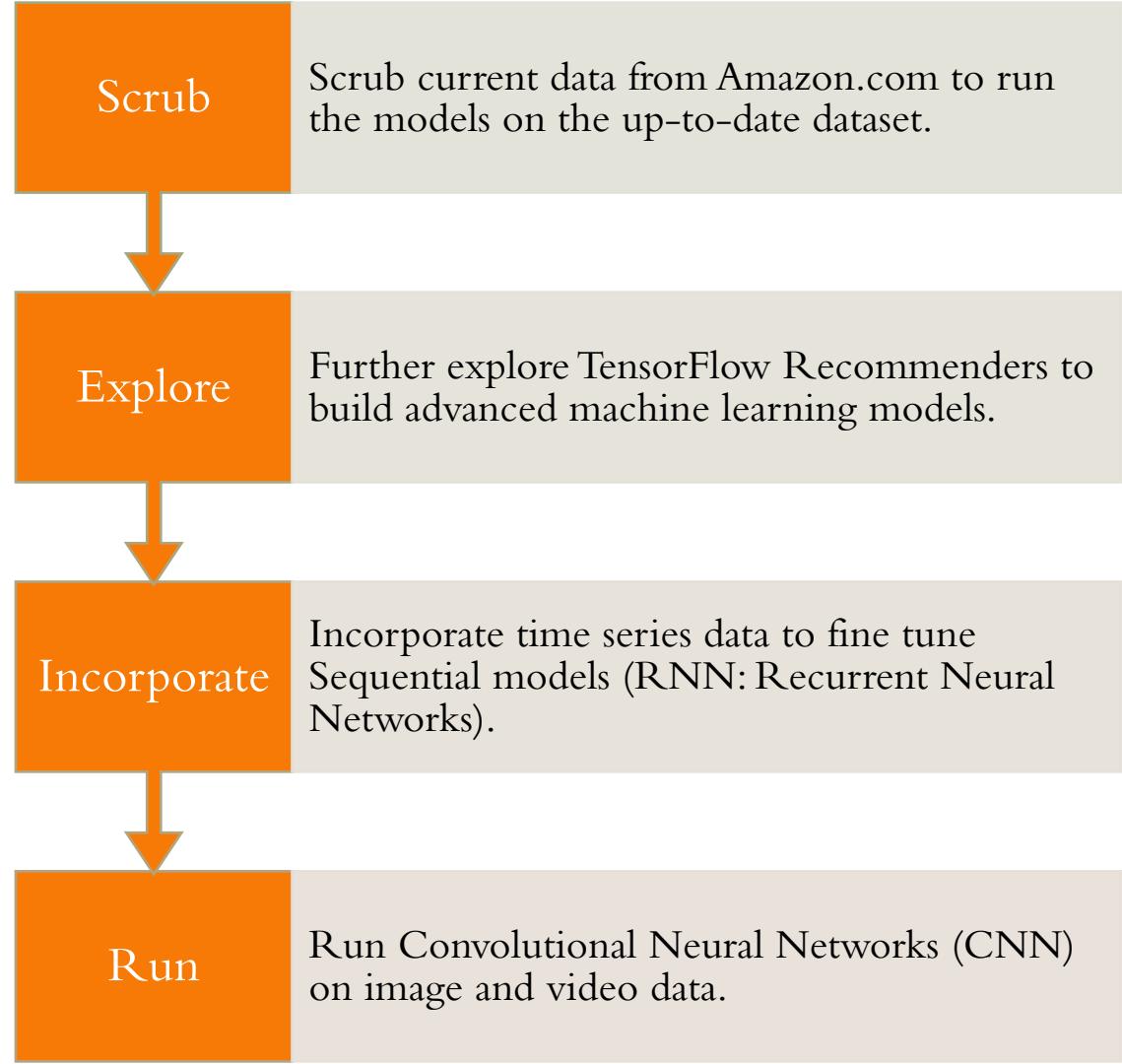


A/B test item-to-item Retrieval
TensorFlow model on the website.



Implement ScaNN for efficient
and fast serving.

NEXT STEPS



The background of the entire image is a high-angle aerial photograph of a long bridge spanning a body of water with a vibrant turquoise hue. The bridge has two distinct levels: a lower level with four lanes of traffic and an upper level with two lanes. Several vehicles, including cars and trucks, are visible on both levels. The water below shows subtle ripples.

THANK YOU

[Link to Notebook](#)

