Google Cloud

Introduction

Recommendation Systems with TensorFlow on Google Cloud Platform

Advanced ML with TensorFlow on GCP

End-to-End Lab on Structured Data ML

Production ML Systems

Image Classification Models

Sequence Models

Recommendation Systems

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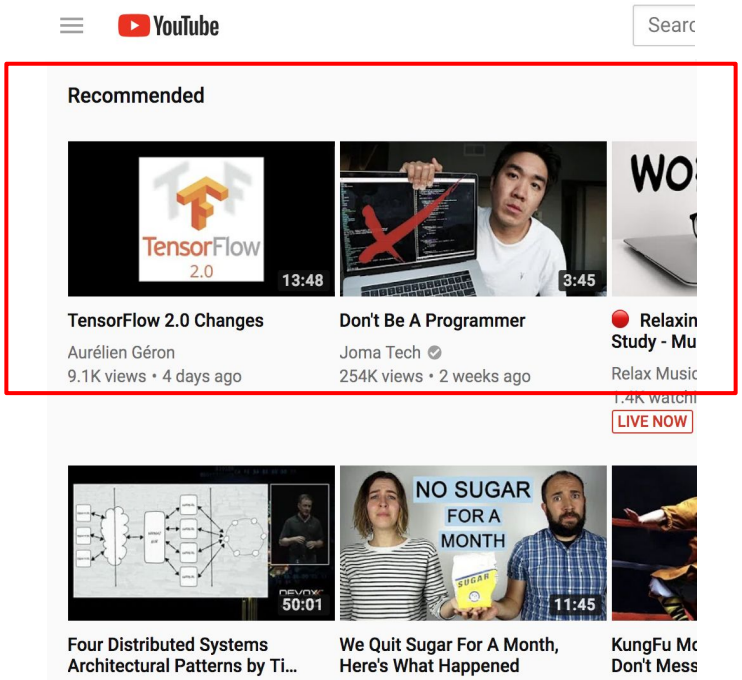
Content-Based Recommendation Systems

Collaborative Filtering

Neural Networks for Recommendation Systems

Building an End-to-End Recommendation System

Recommendation engines identify things that a user may like based on what they've watched in the past



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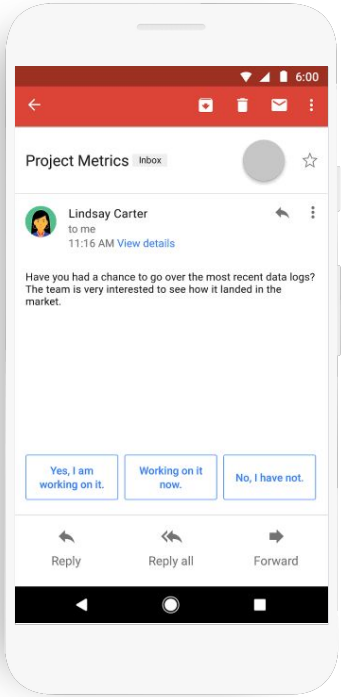
Recommendation systems are not always about what you would think of as “products”



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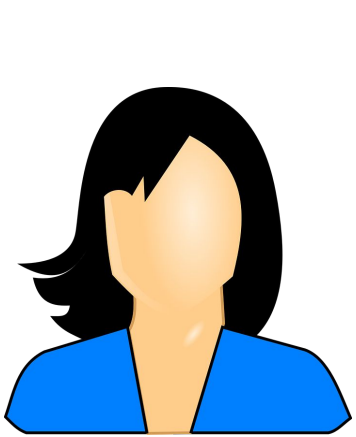
Content-based filtering uses item features to recommend new items that are similar to what the user has liked in the past



Recommendations

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This matrix ties an interaction between a user and a video



	Harry Potter	The Triplets of Belleville	Shrek	The Dark Knight Rises	Memento
	✓		✓	✓	
		✓			✓
	✓	✓	✓		
			?	✓	✓

0

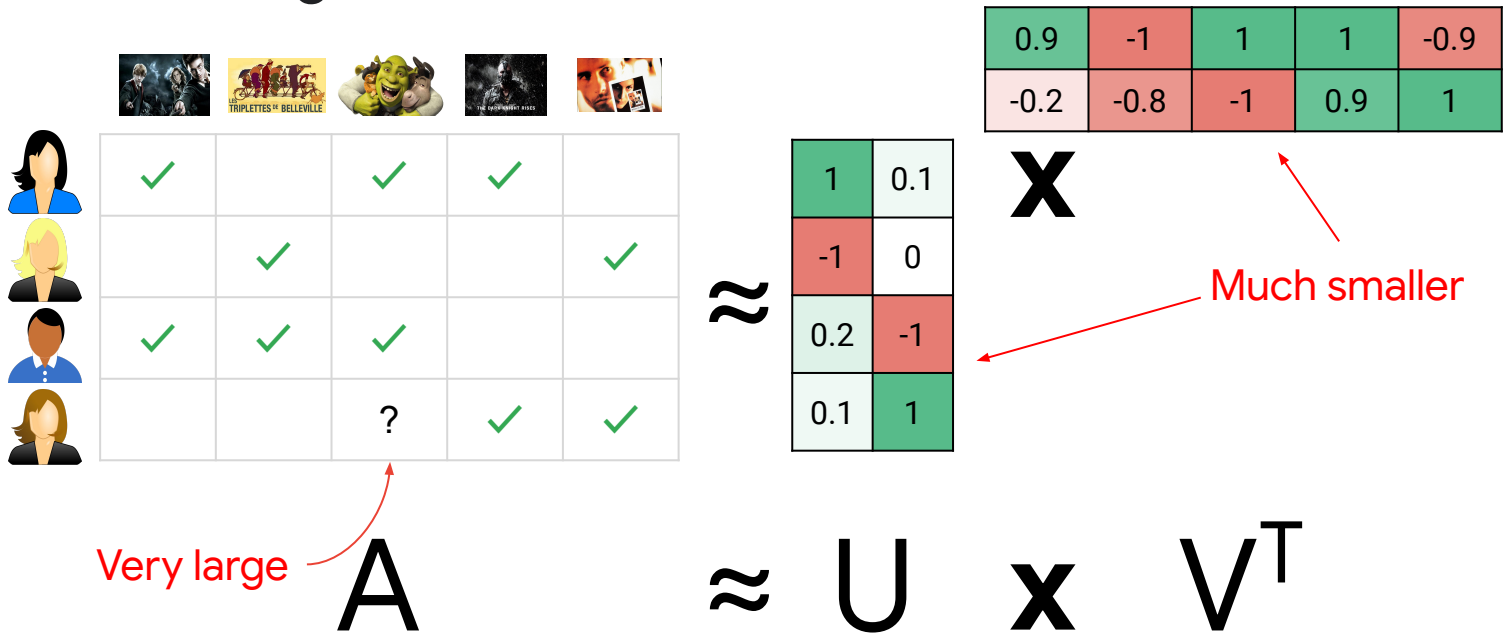
Time

User #

Video #

1

The factorization splits this matrix into row factors and column factors that are essentially user and item embeddings



To recommend movies to users, we recommend the movies that we predict they will rate the highest

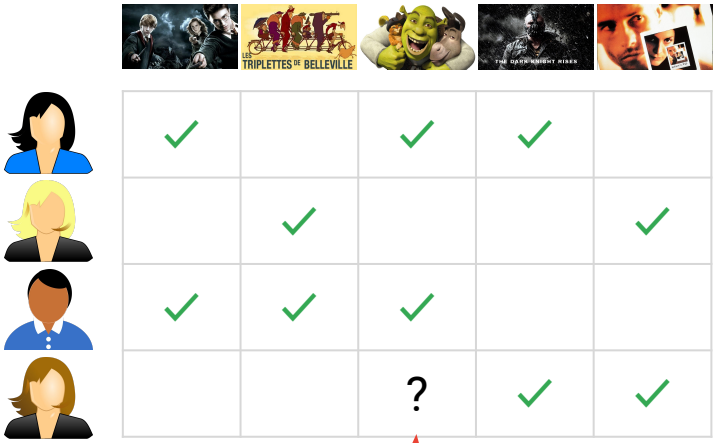
0.9	-1	1	1	-0.9
-0.2	-0.8	-1	0.9	1

1	0.1
-1	0
0.2	-1
0.1	1

X

$$0.2*1 + (-1)*0.9 = -0.7$$

The WALS Estimator in TensorFlow does not need any labels; it just needs the ratings matrix organized into rows and columns



Sparse and large

```
def training_input_fn():
  features = {
    INPUT_ROWS: tf.SparseTensor(...)
    INPUT_COLS: tf.SparseTensor(...)
  }

  return features, None
```

Shouldn't feeding the rows be enough? Why also columns?

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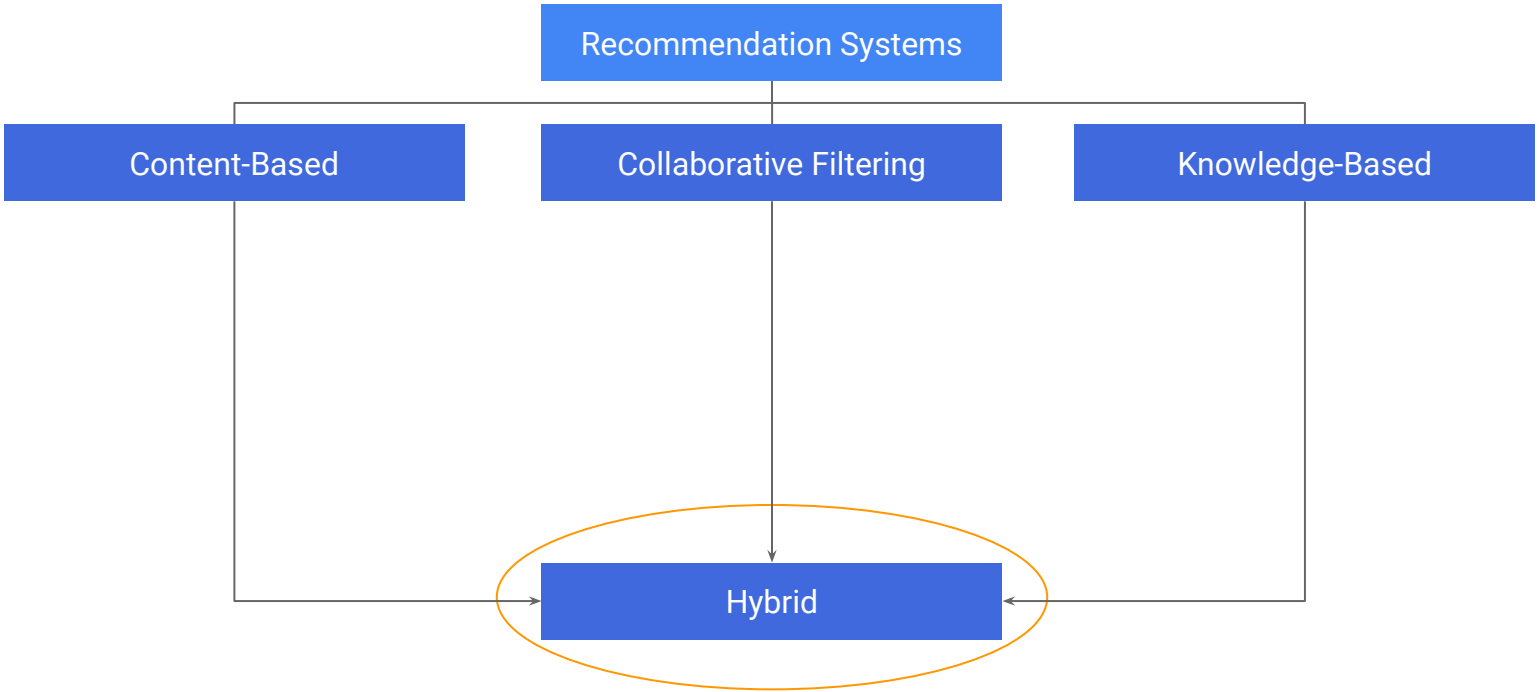
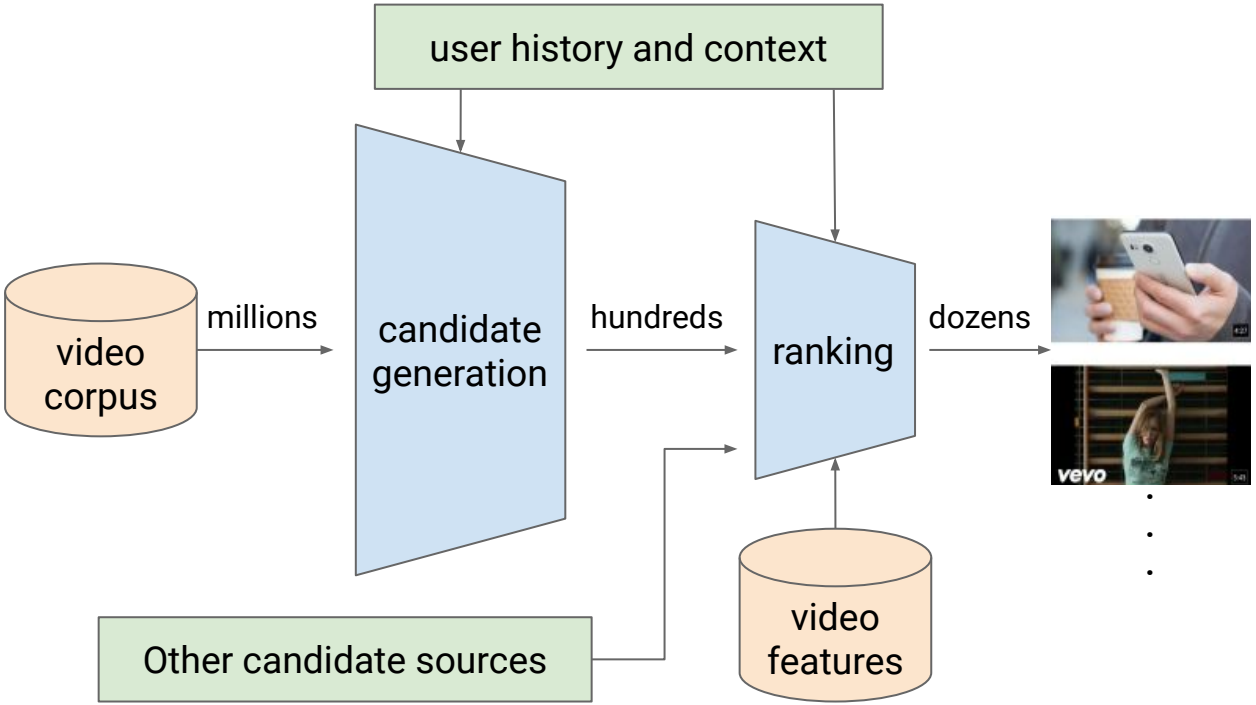
Real-world recommendation systems are a hybrid of three broad theoretical approaches



YouTube video recommendations



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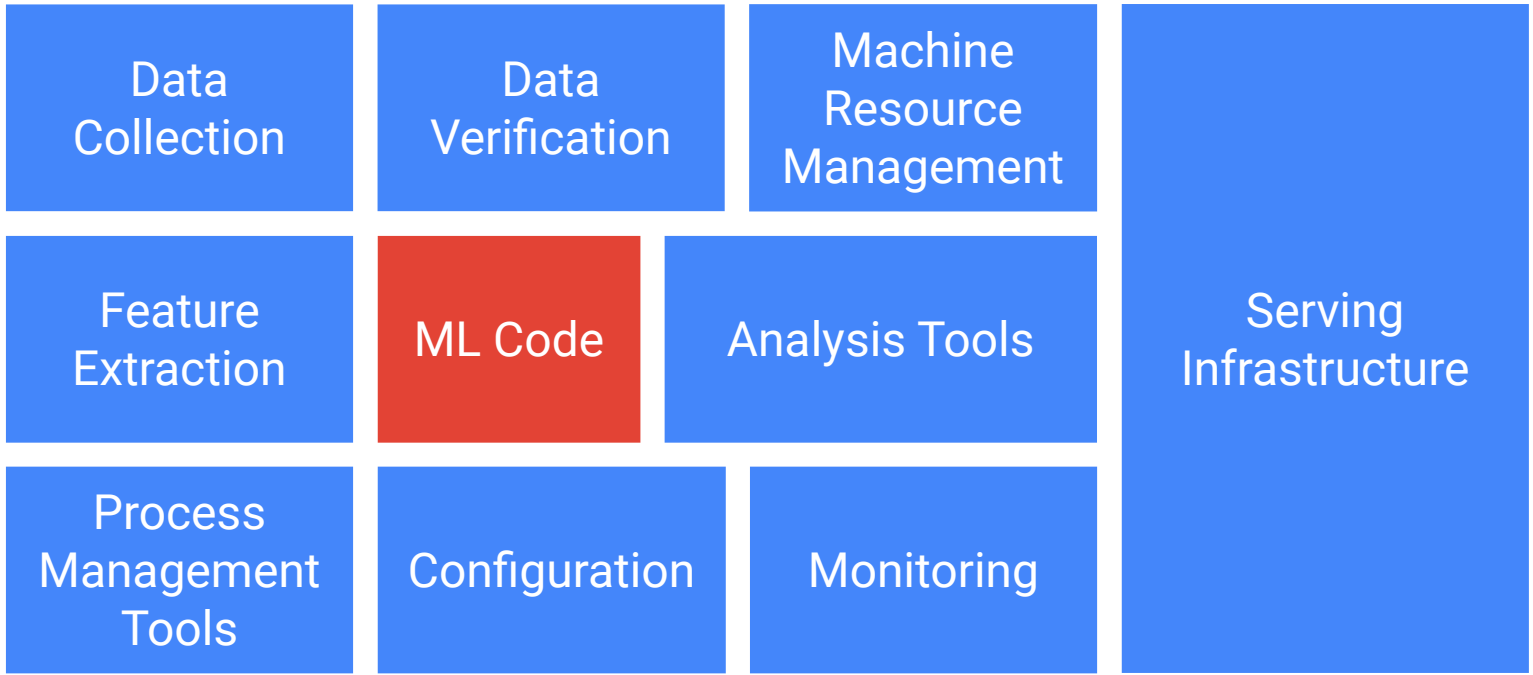
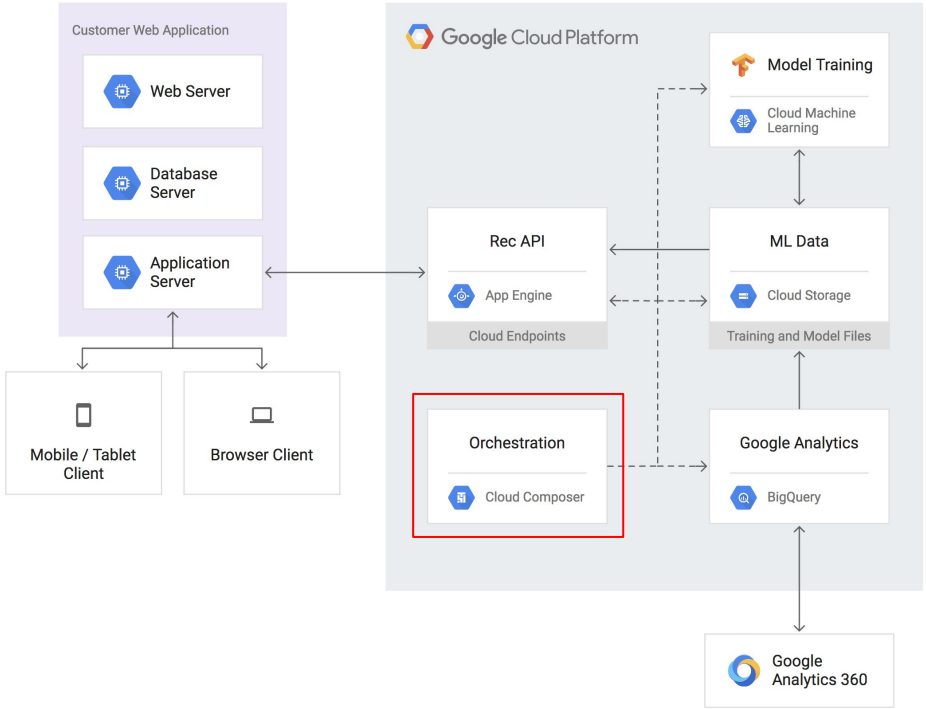
ML models account for a small percentage



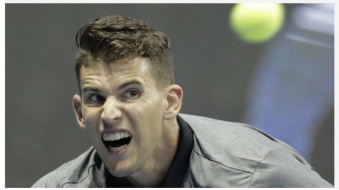
Architecture of an end-to-end system for recommendations



Completed recommendation model

kurier.at

Politik Regional Wirtschaft Sport Stars Kultur Lifestyle Video MEHR



Die Kanzlerin und ihre verunsicherte Partei

Polnische Regierung ruft Auslandspolen zum Denunzieren auf

Bis zu 10.000 Geschädigte durch Bitcoin-Firma

Am 24. Mai enden 24 Jahre Häupl

Olympia-Telegramm: Tag 6 im Rückblick

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