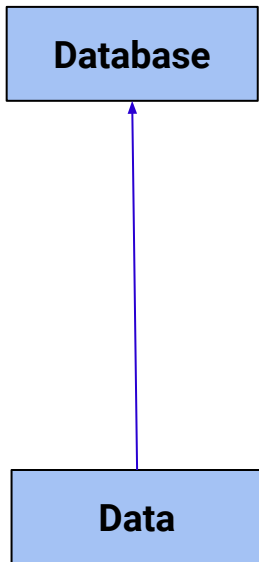


Weekly project

Data

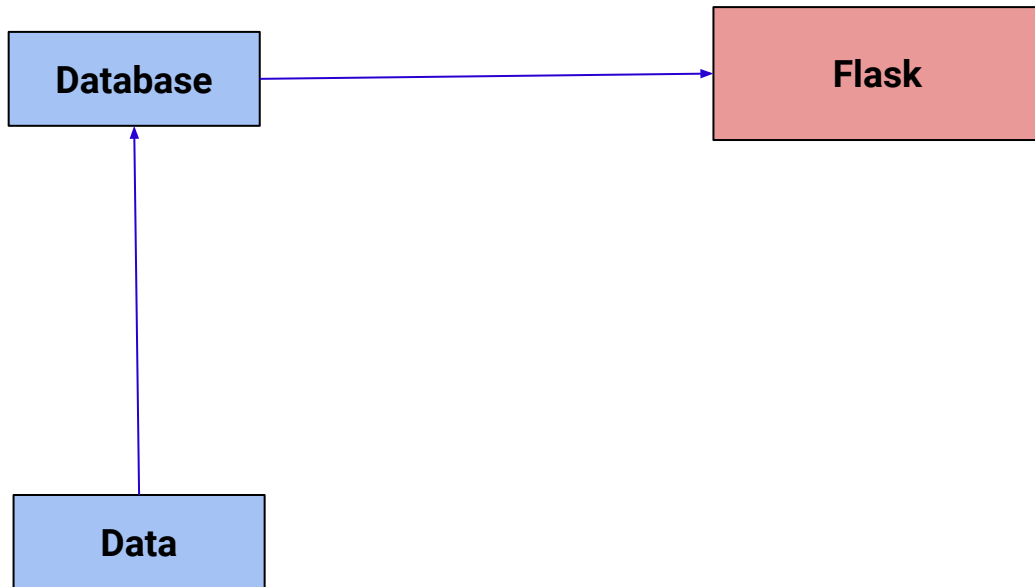
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- Store movie recommendation data in a db
- Perform unsupervised learning on the data
- Pick from memory-based or neighborhood-based UL
- Recommend films to your users!
- Wrap the application in a web-framework
- Engineer the product using DevOps techniques

Weekly project



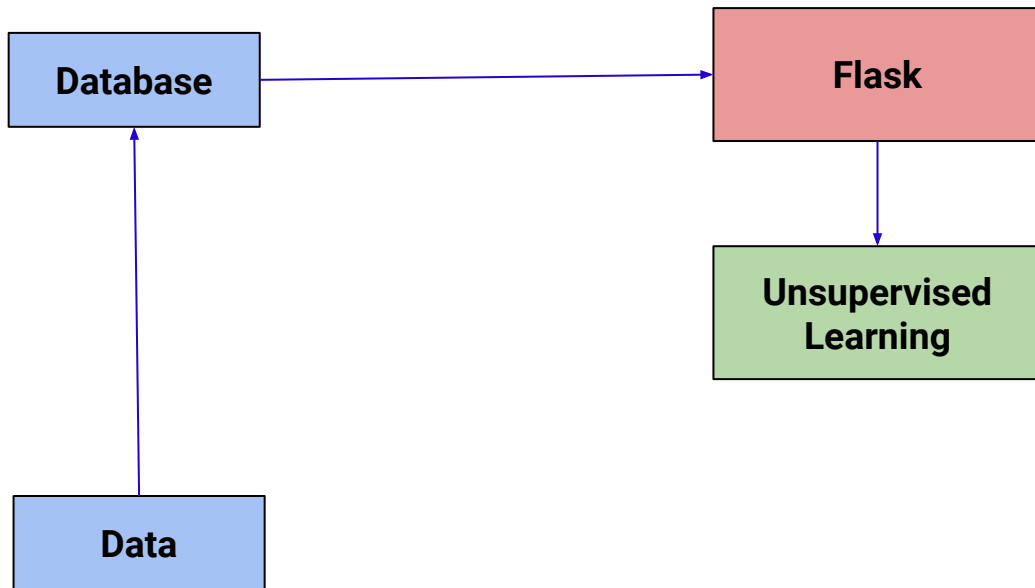
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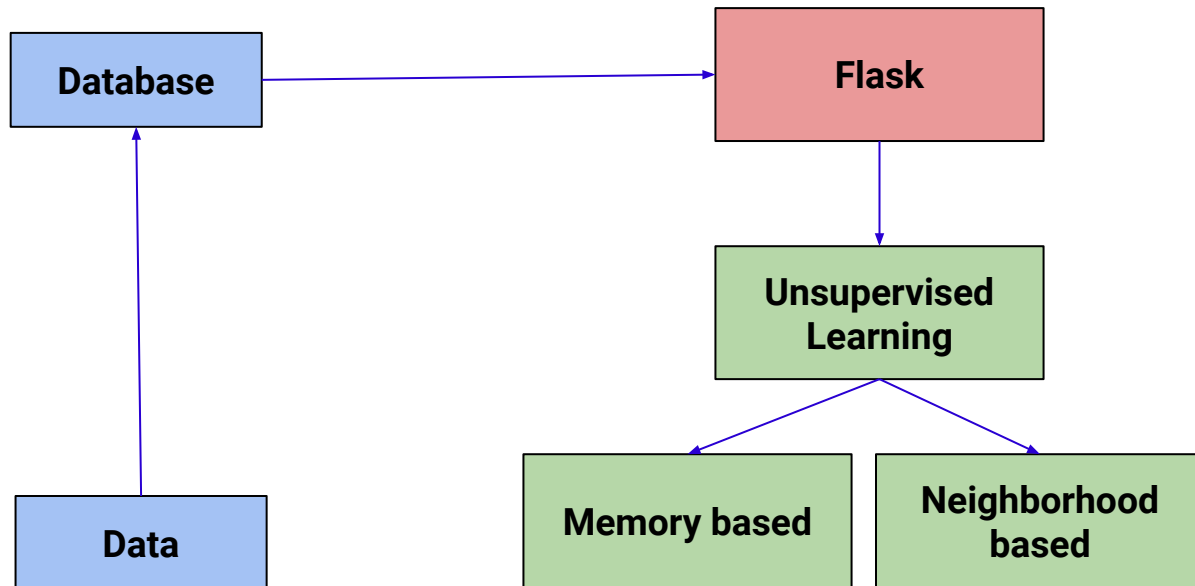
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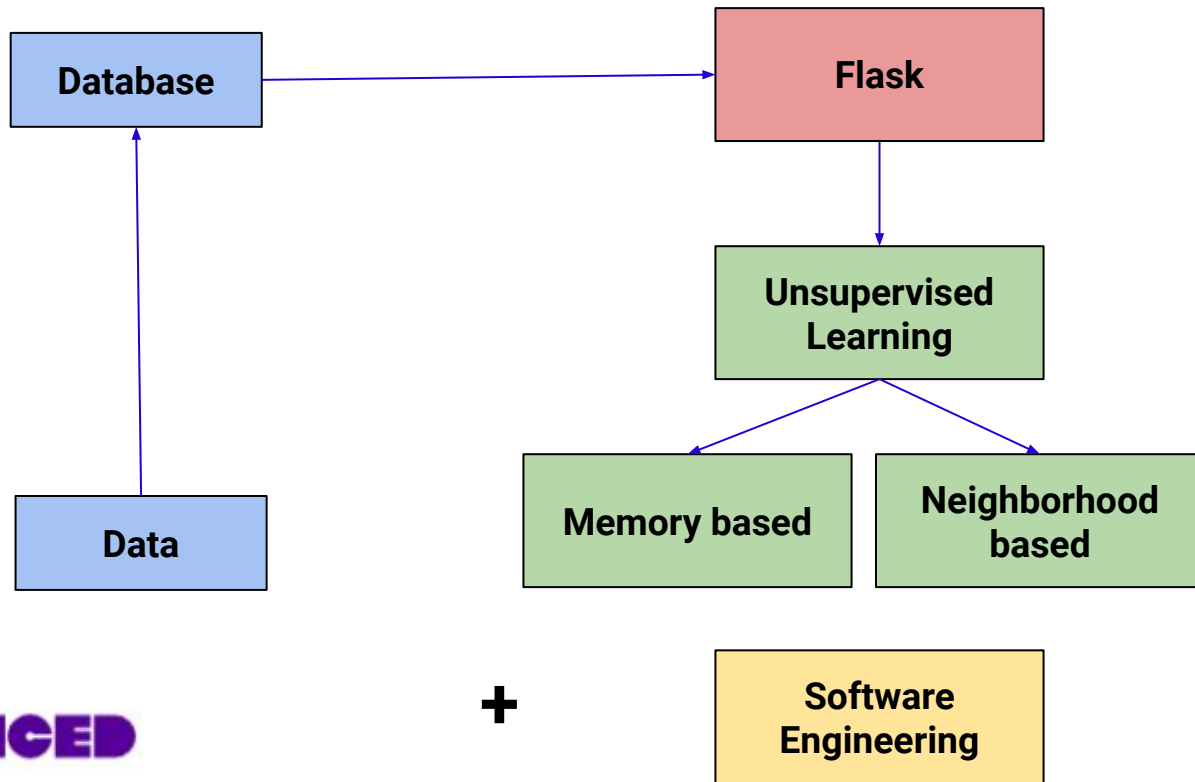
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Unsupervised Learning

*“If intelligence is a cake, **the bulk of the cake is unsupervised learning**, the icing on the cake is supervised learning, and the cherry on the cake is reinforcement learning (RL)” - Yann LeCun, Facebook AI Chief*

Unsupervised Learning

- **USE CASES**

Recommendation engines - there's no category but that which we invent!

Customer segmentation - cohort analysis, but not about the Spearmints!

Anomaly detection - is it fraud? Not when its my bank card!

.....

Why Unsupervised Learning?

- **WHY?**

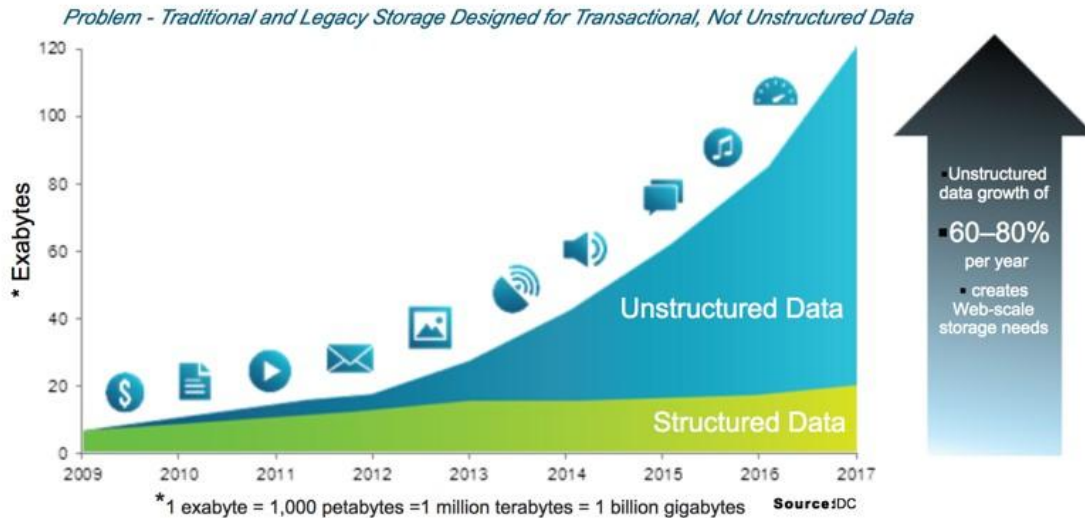
Human labelling is expensive, the majority of data is unlabelled

Labelling injects human knowledge and biases

Unsupervised generates new features for ML models to optimise on

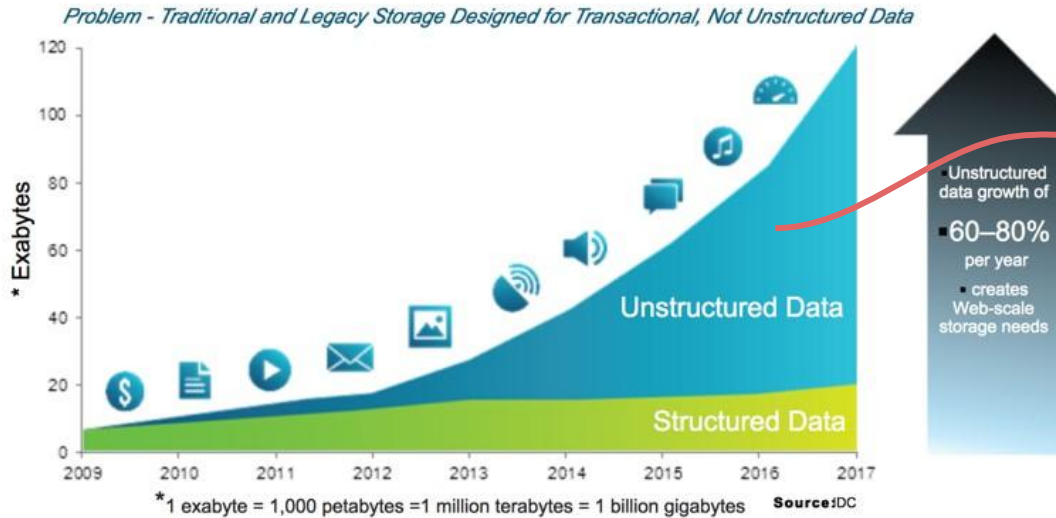
Why Unsupervised Learning?

Data Growth



Why Unsupervised Learning?

Data Growth



Unstructured data is everywhere, and its unlabelled, and we need to make sense of it!

What is Unsupervised Learning?

- 3 types

Find patterns in data without labels - **CLUSTERING**

Find essential characteristics about data without labels - **DIMENSIONALITY REDUCTION**

Predict missing data using only other data - **SELF-SUPERVISED** (*out of scope*)

What is Unsupervised Learning?

SUPERVISED VS UNSUPERVISED

In supervised learning, for every observation we have some feature values and some target vector or tensor. We use both to train a model that takes in some x values and outputs a predicted value.

In unsupervised learning, we only have features and do not have a target. This makes the estimation problem more difficult. When possible, use supervised learning.

Chris Albon

How do we do Unsupervised Learning?

- **HOW?**

Distance - Euclidean / Manhattan

Angle - Dot Product / Cosine

Variance conservation - Reconstruct data using smaller datasets / Calculate Eigenpairs

Most likely outcome - Expectation maximisation

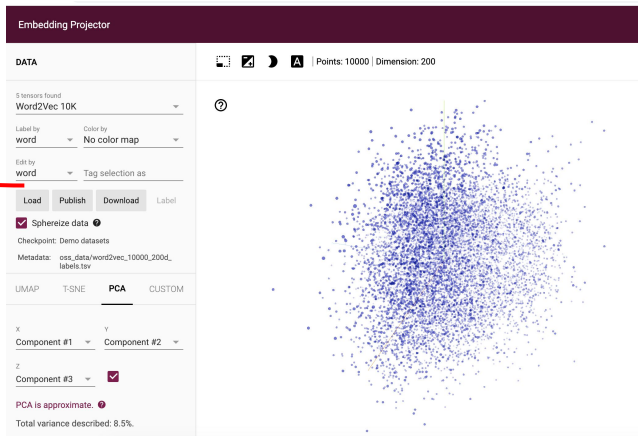
When to do Unsupervised Learning?

- **WHEN?**

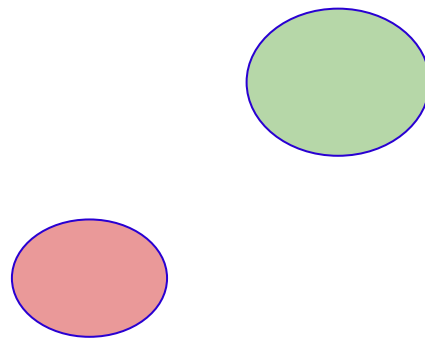
Creating new data

Too many dimensions, look to reduce complexity

Predicting a category without labelled data

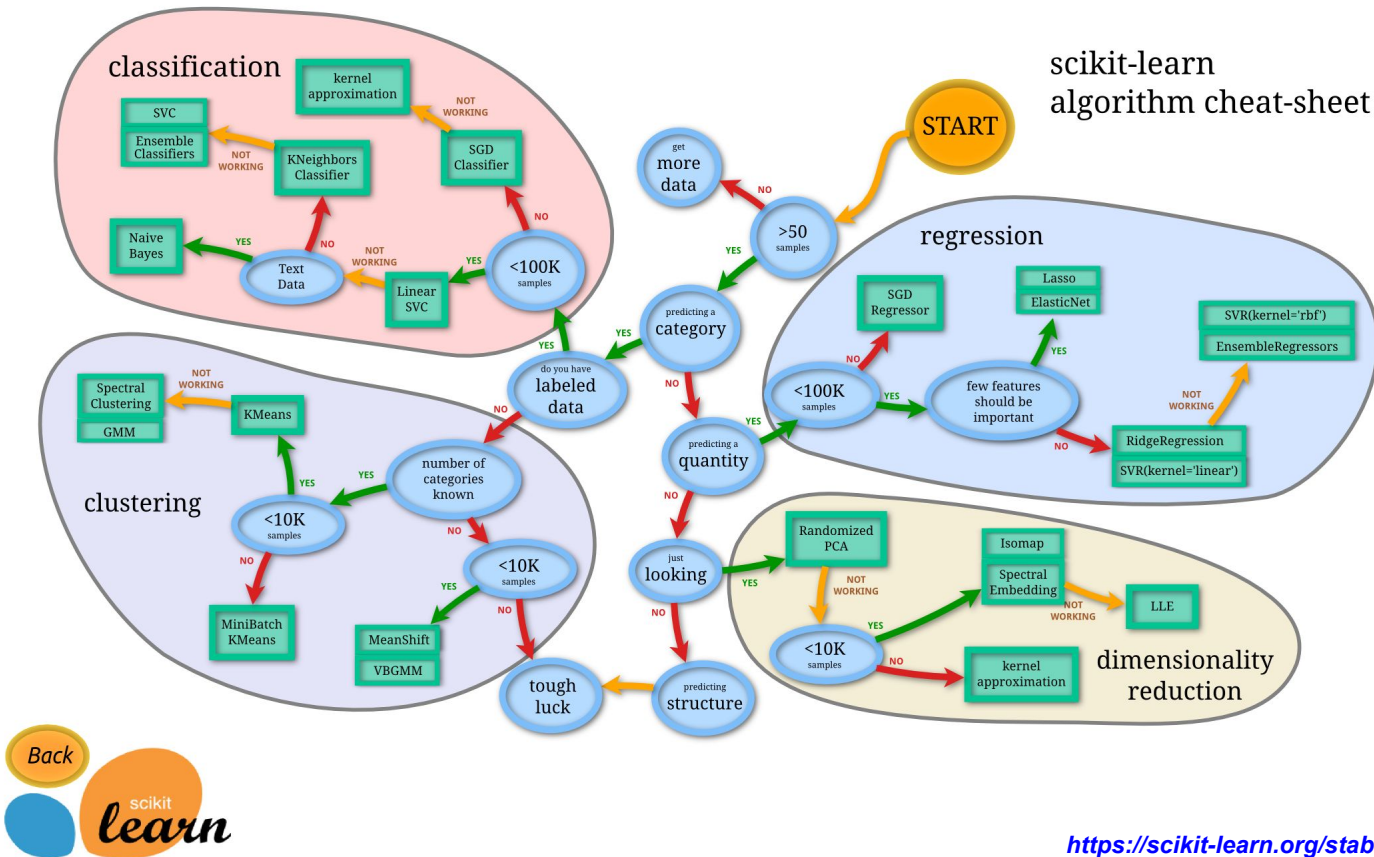


Time spent on the app



movies watched

Unsupervised Learning Map



Unsupervised Learning Map

We are here!

