University of Manchester AI ML Society - Introduction to ML

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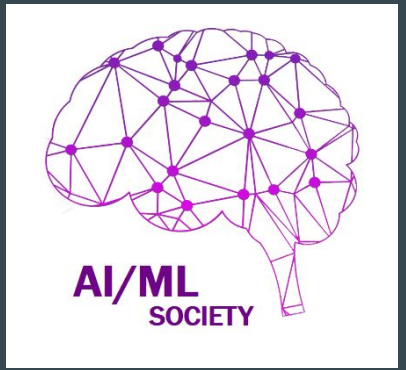
Workshop 1



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4th year MMath student

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Dissertation: Reinforcement Learning

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Tech Project Manager

3rd year EEE student

Dissertation: Image processing with special chip set

Intro to ML timetable

Workshop 1 - Introduction to Machine Learning

Workshop 2 - Data preprocessing

Workshop 3 - Fundamental Algorithms I

Workshop 4 - Fundamental Algorithms II

Workshop 5 - Neural Networks Part I

Workshop 6 - Neural Networks Part II

Today's session

What is Machine learning?

Some terminology

Overview of machine learning workflow

Coding exercise

What is Artificial Intelligence?
What is Machine Learning?
What is Deep Learning?

ARTIFICIAL INTELLIGENCE

IS NOT NEW

ARTIFICIAL INTELLIGENCE

Any technique which enables computers to mimic human behavior

MACHINE LEARNING

AI techniques that give computers the ability to learn without being explicitly programmed to do so

DEEP LEARNING

A subset of ML which make the computation of multi-layer neural networks feasible

1950's 1960's 1970's 1980's 1990's 2000's 2010s

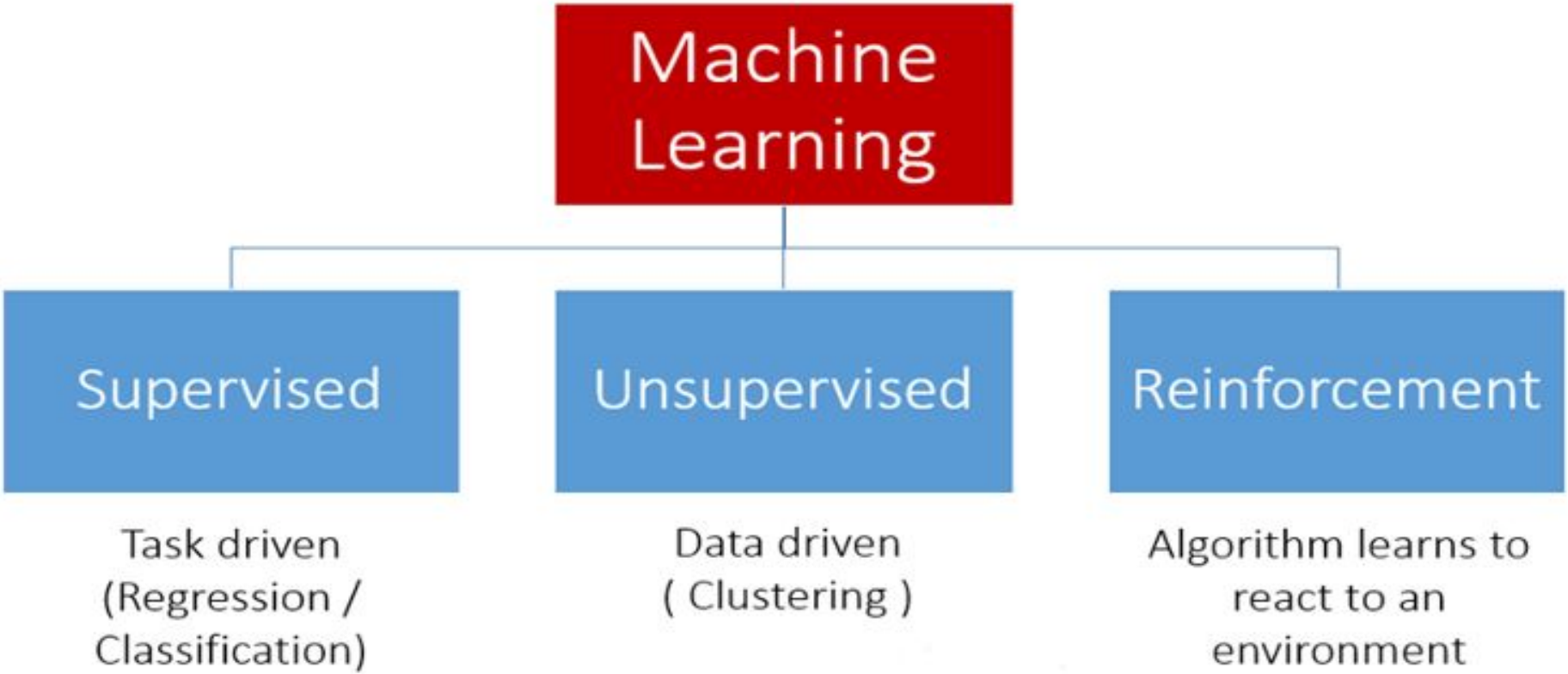
ORACLE

Terminology

tumor size	texture	perimeter	shade	outcome	size change
18.02	rough	117.5	0 (very light)	Y	- 0.1
16.05	smooth	112.2	4 (dark)	Y	+ 0.2
18.9	smooth	102.3	1 (light)	N	- 0.2

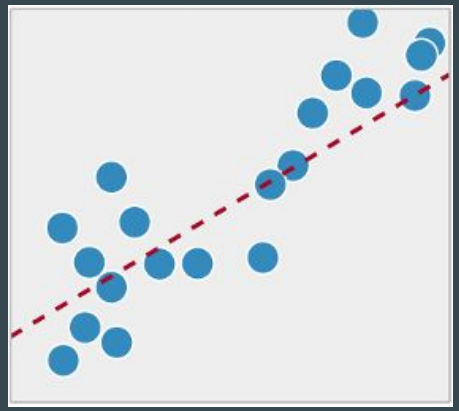
- Columns are called input variables / features / attributes
- Columns we are trying to predict are called output variables or targets
- A row is called training example
- The whole table is called the data set

Types of Machine Learning



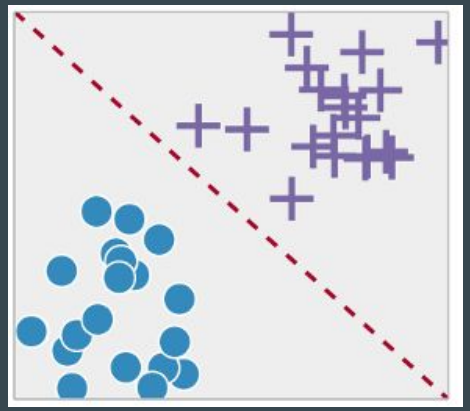
Types of Supervised Learning

Regression



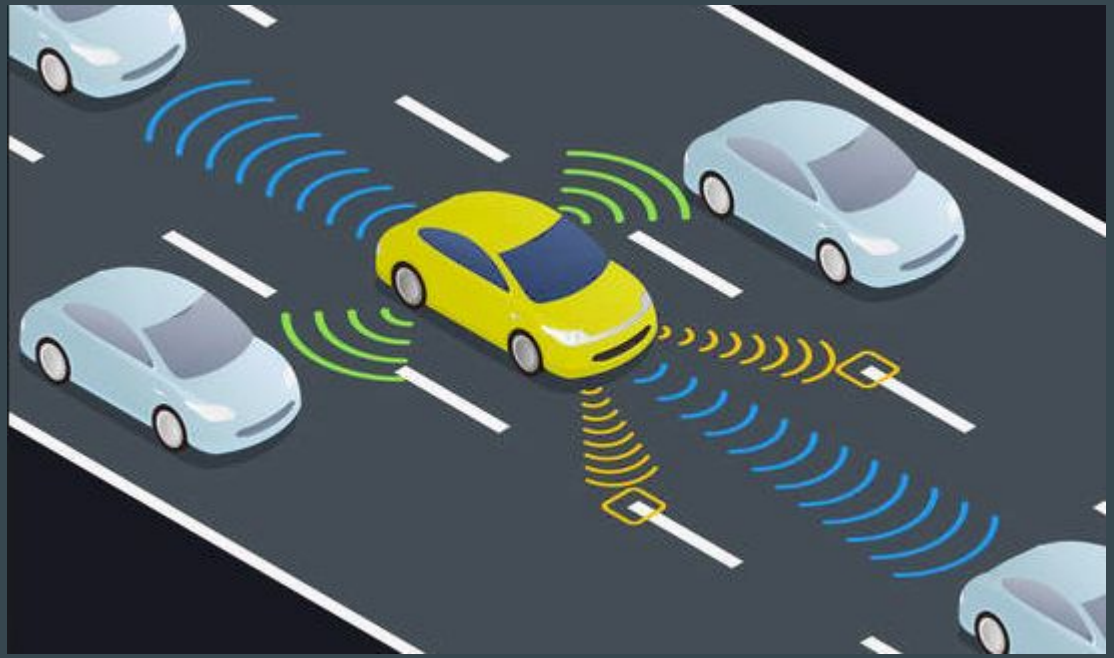
Learning a function for a **continuous** output

Classification

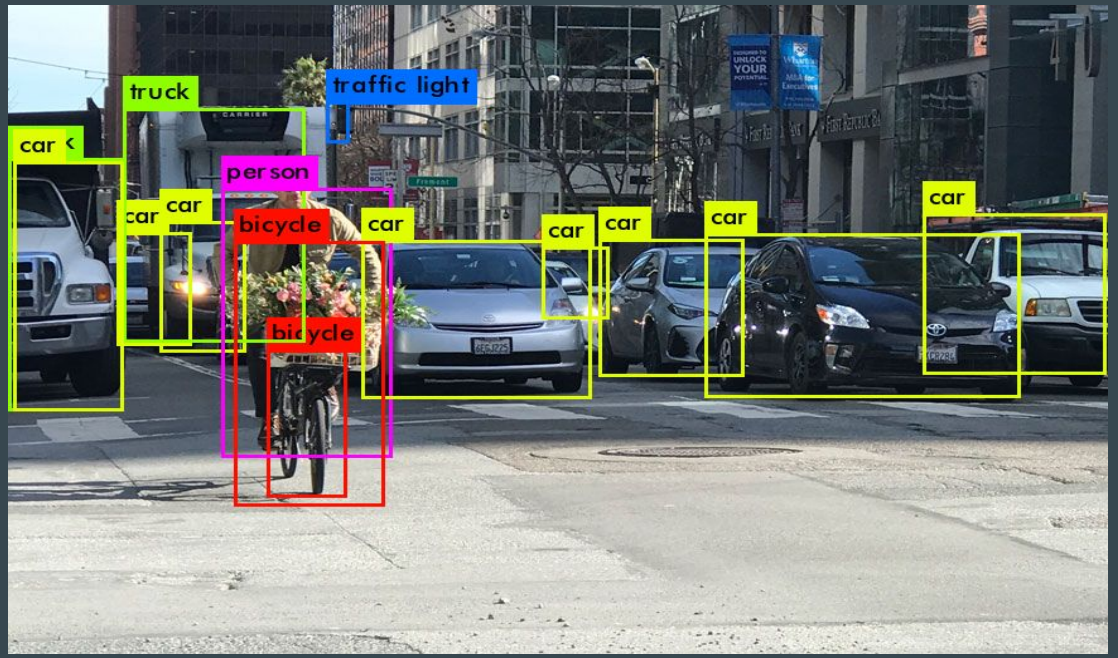


Learning a function for a **categorical** output

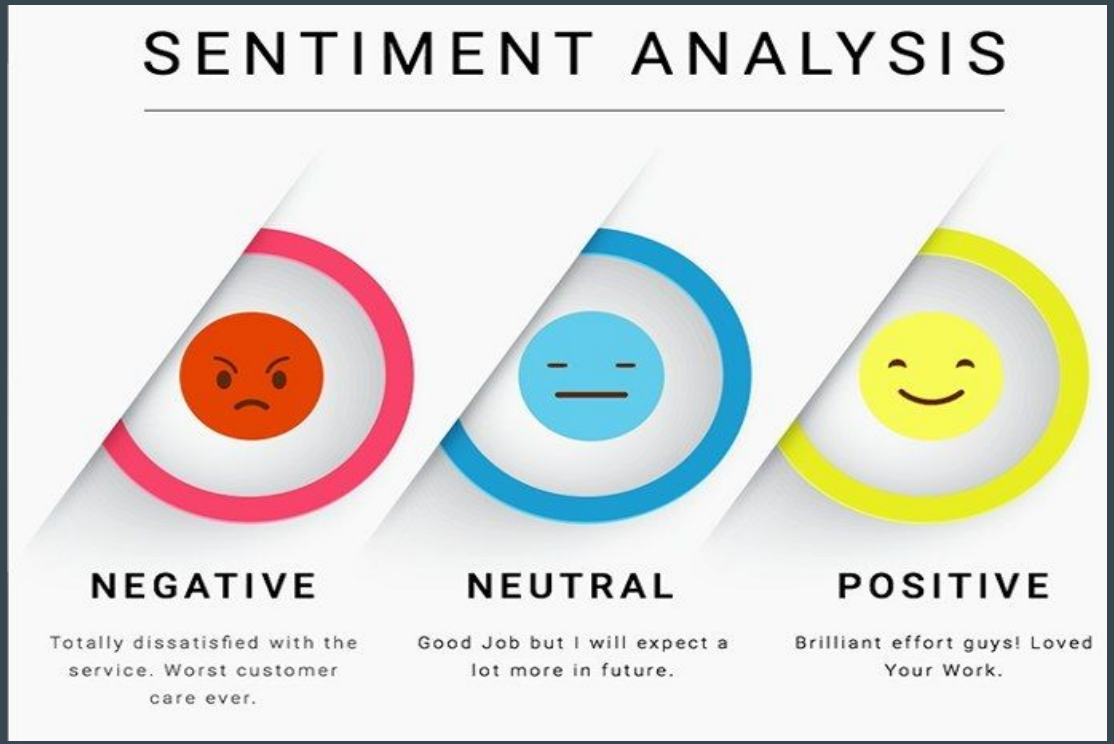
Example - Object Localization



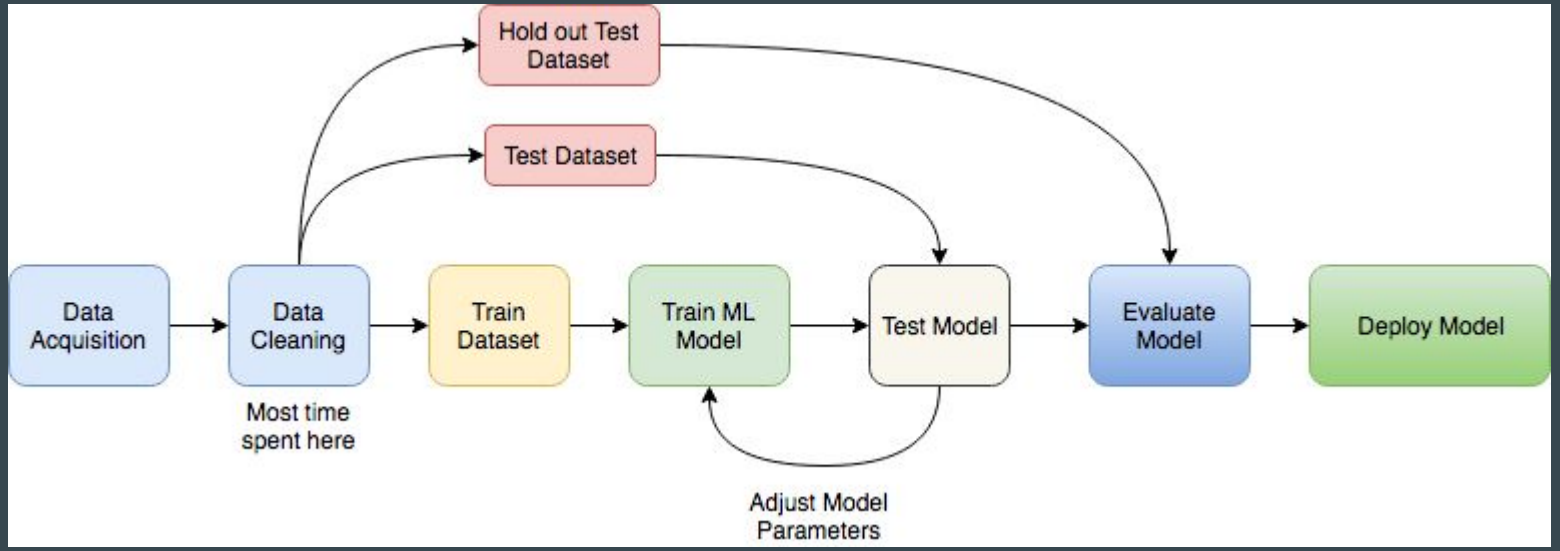
Example - Object Recognition



Example - Sentiment Analysis

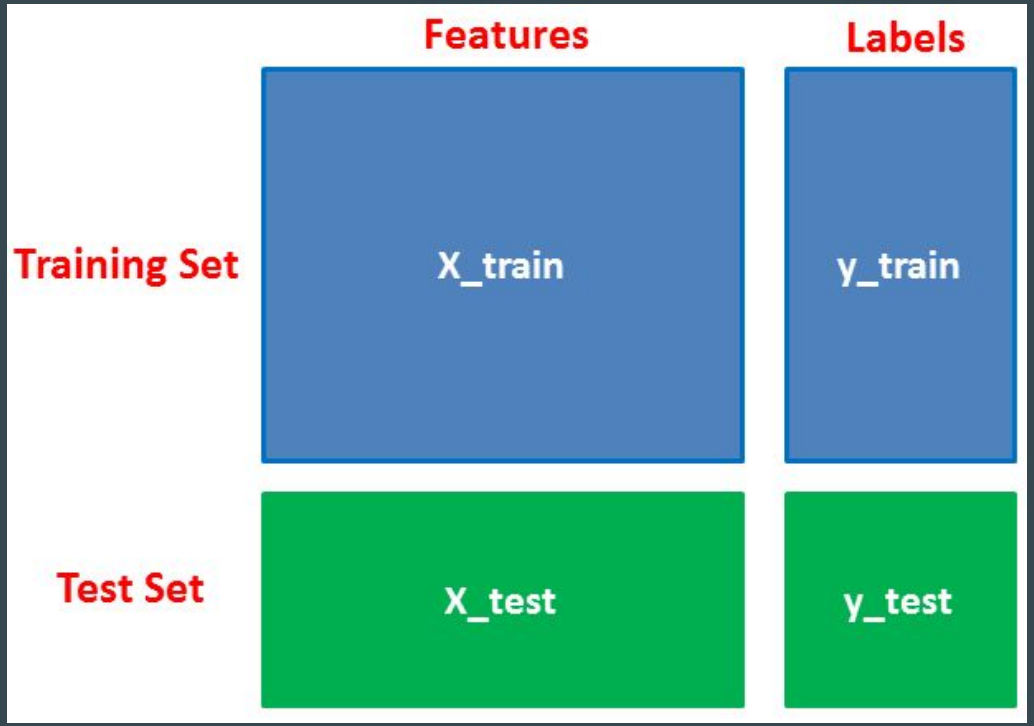


The ML Workflow



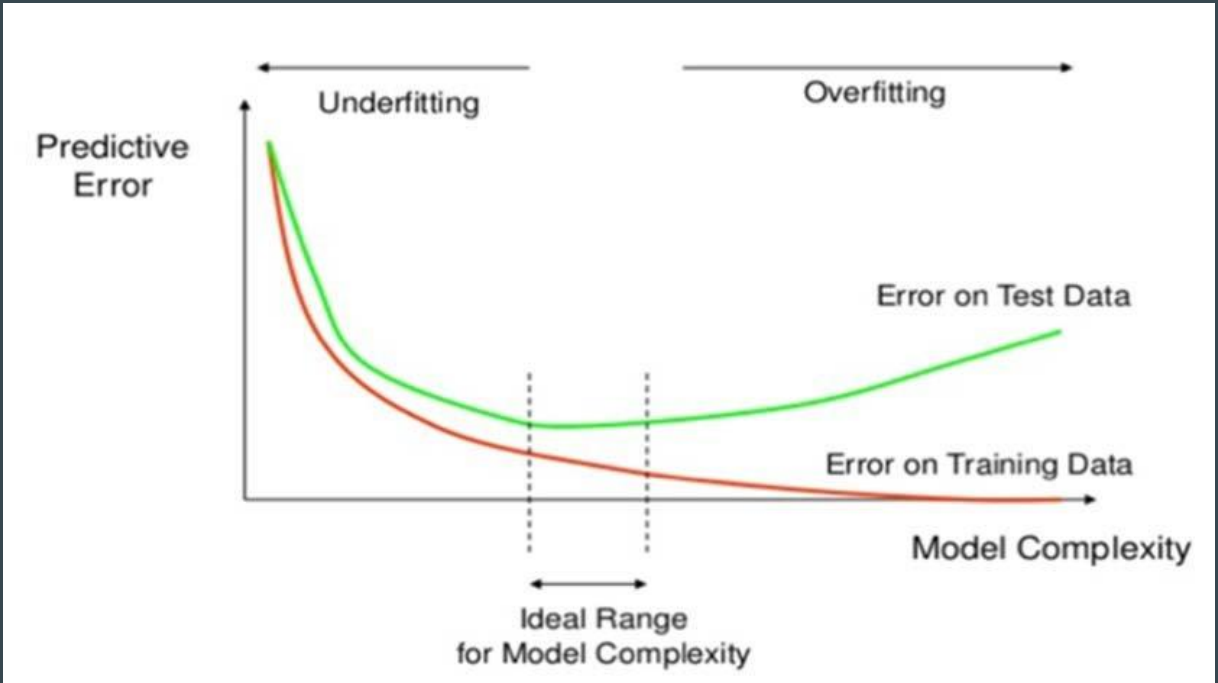
http://www.shanklab.com/machine-learning-getting-started/

Train-test split



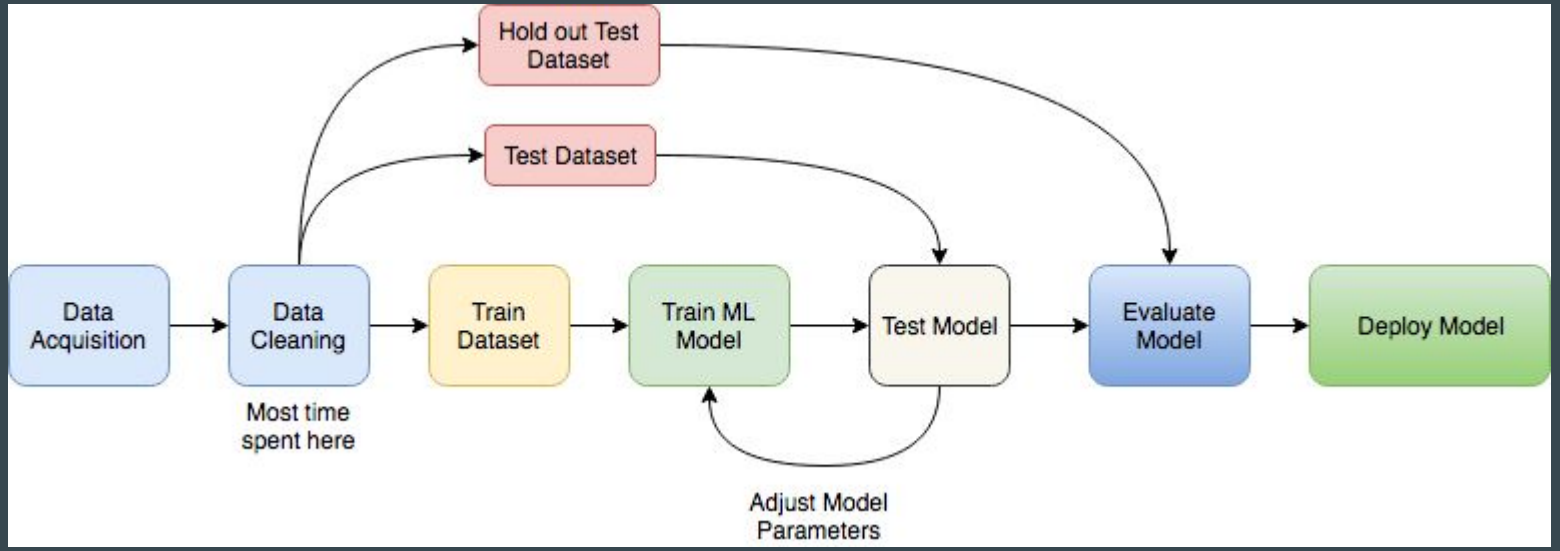
https://www.datacamp.com/community/tutorials/naive-bayes-scikit-learn

Underfitting - Overfitting



https://www.researchgate.net/figure/Overfitting-and-underfitting-effect-on-error_fig4_325999203

The ML Workflow



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Thank you!

Sources:

- Hands on Machine Learning with Scikit Learn and Tensorflow - O'Reilly
- McGill Artificial Intelligence society

Go to: tinyurl.com/aiml-ws1