An Introduction to Machine Learning

With Python

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Microsoft
Gold Data Analytics
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*We **enable** our **clients** make **sense** of their **data***

DATA ARCHITECTURE

MANAGED SERVICES

DATA STRATEGY

DATA SCIENCE

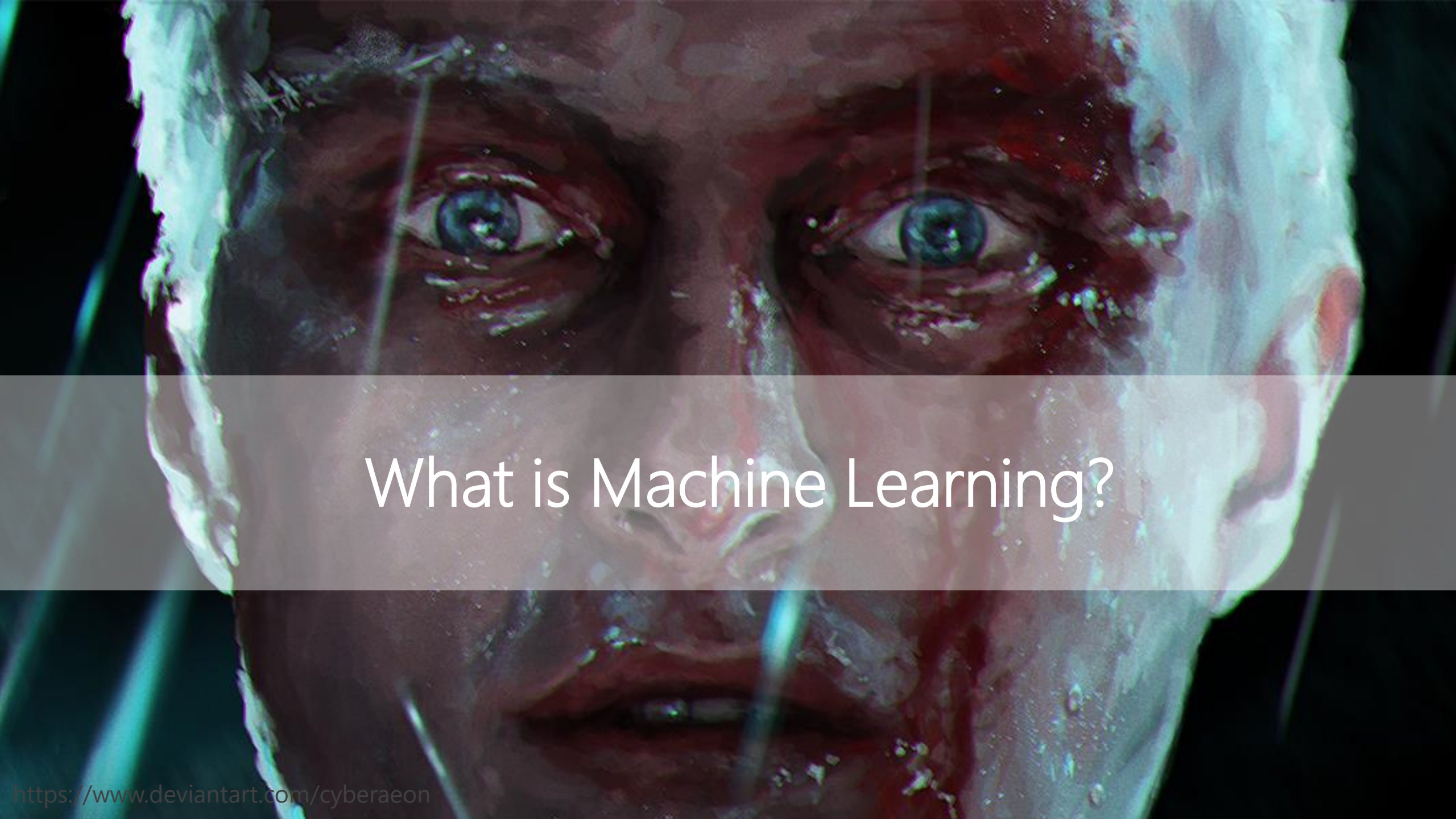
DATA MANAGEMENT

DATA ANALYTICS

In this session we will look to understand what is ***Machine learning***?

We will explore the ***process***, the ***use cases*** and how to get ***started***.

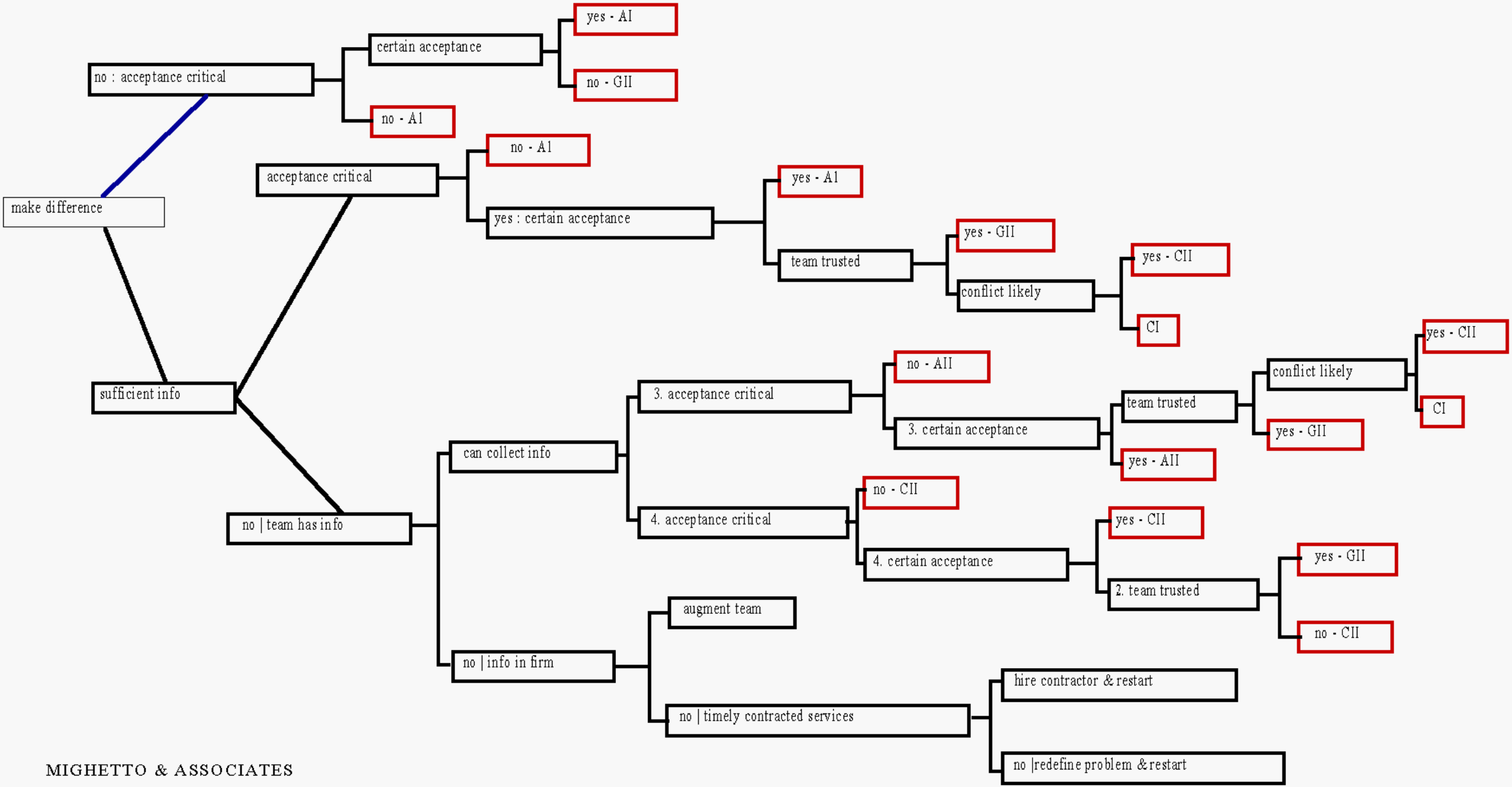
We will understand why ***Python*** is a great Language, and how to advance your skills in machine learning



What is Machine Learning?

https://www.deviantart.com/cyberaeon

Expert systems



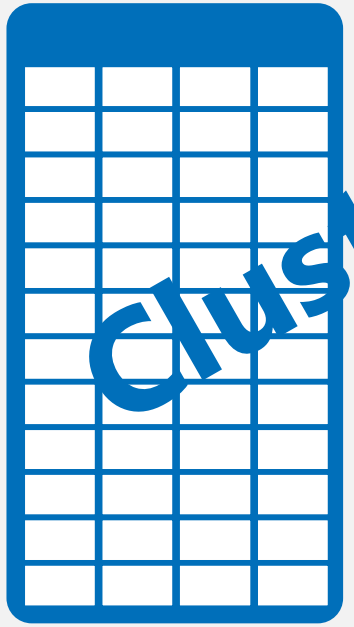
MIGHETTO & ASSOCIATES

A machine is said to learn from experience **E** with respect to some class of tasks **T** and performance measure **P**

Its performance at tasks in **T**, as measured by **P**, improves with experience **E**.

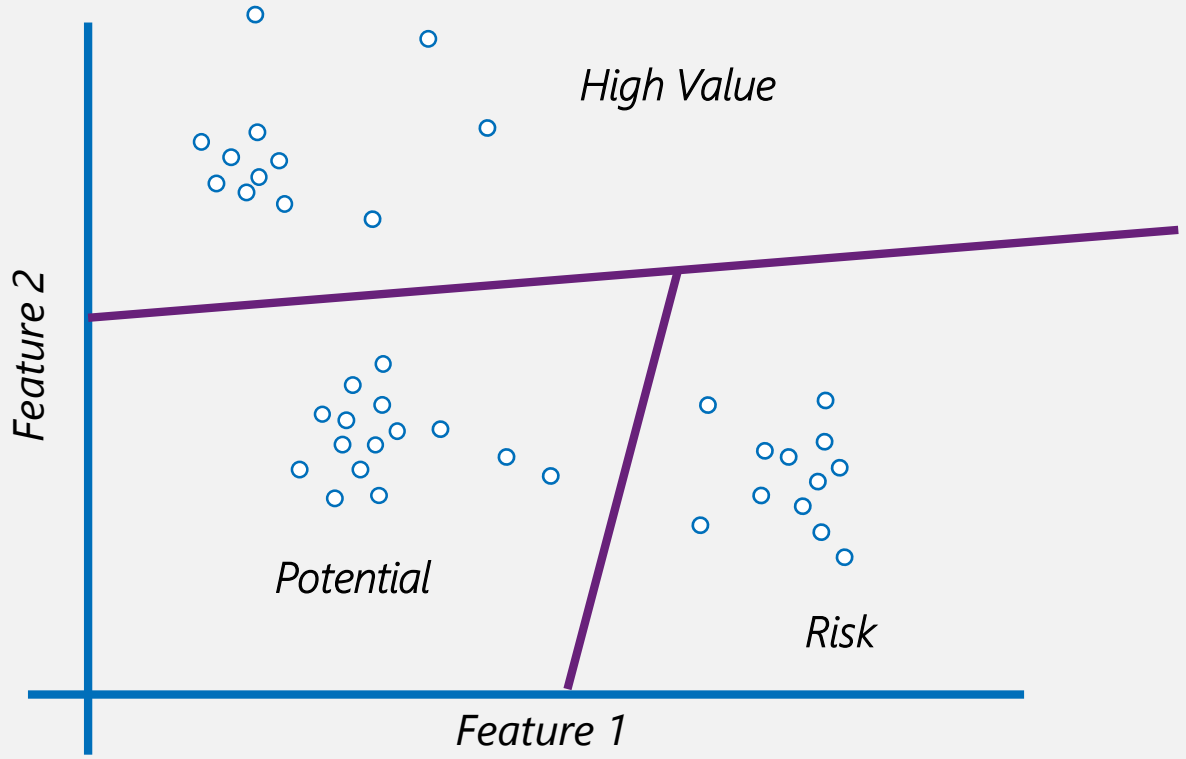
https://www.quora.com/What-is-the-best-definition-for-machine-learning

data

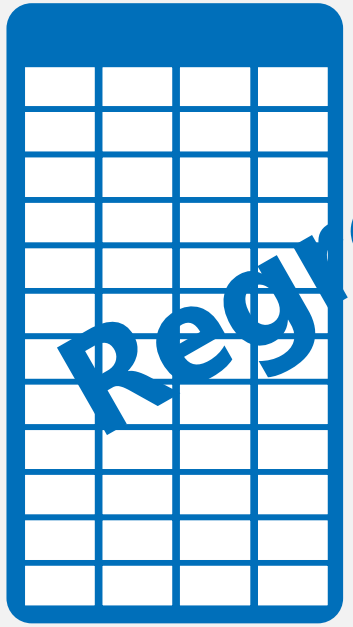


clustering

"Hey, I am trying to better **understand** my customers. I think there might be a **pattern** in their **behaviour**, but I am struggling to see it"

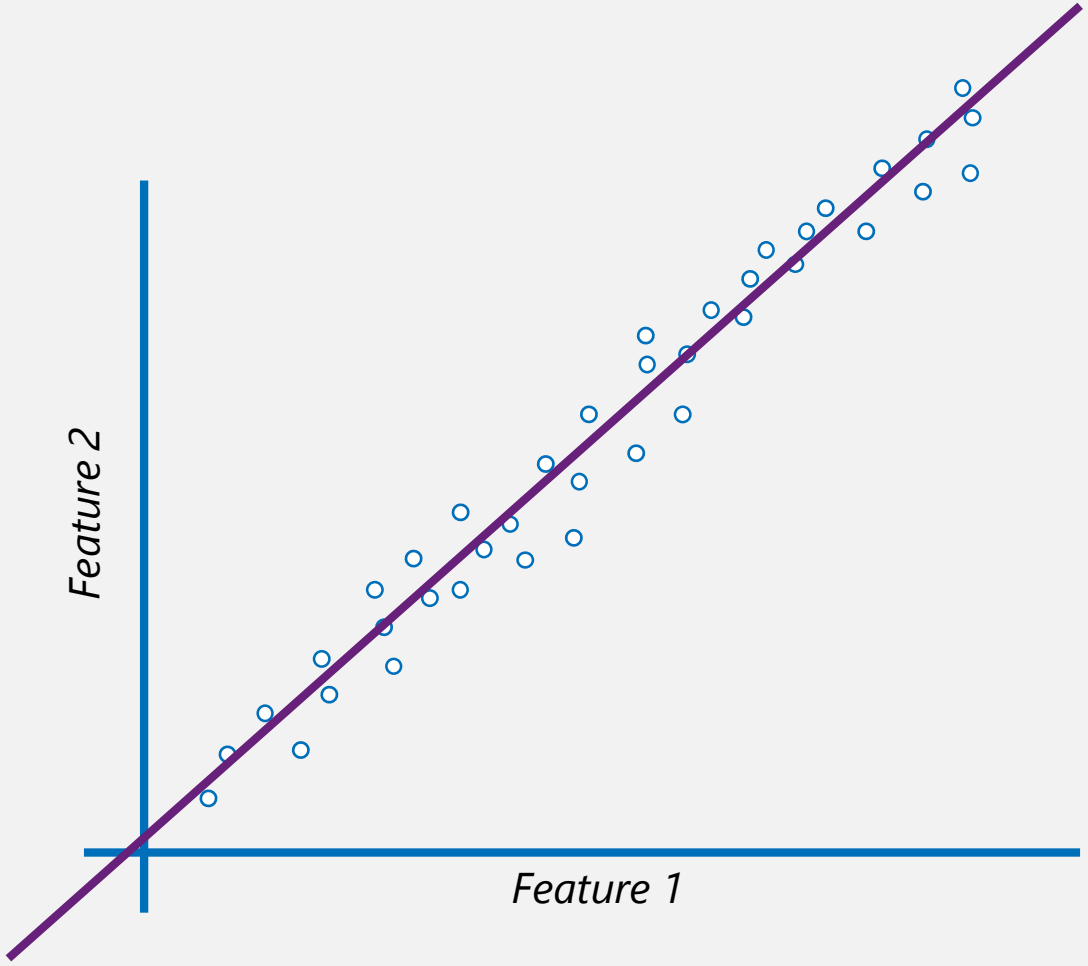


data

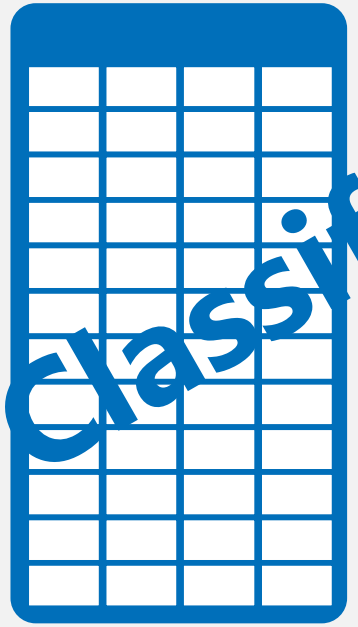


Regression

"Hey, I am trying to **predict** how much someone will **spend** next time they come to my store"

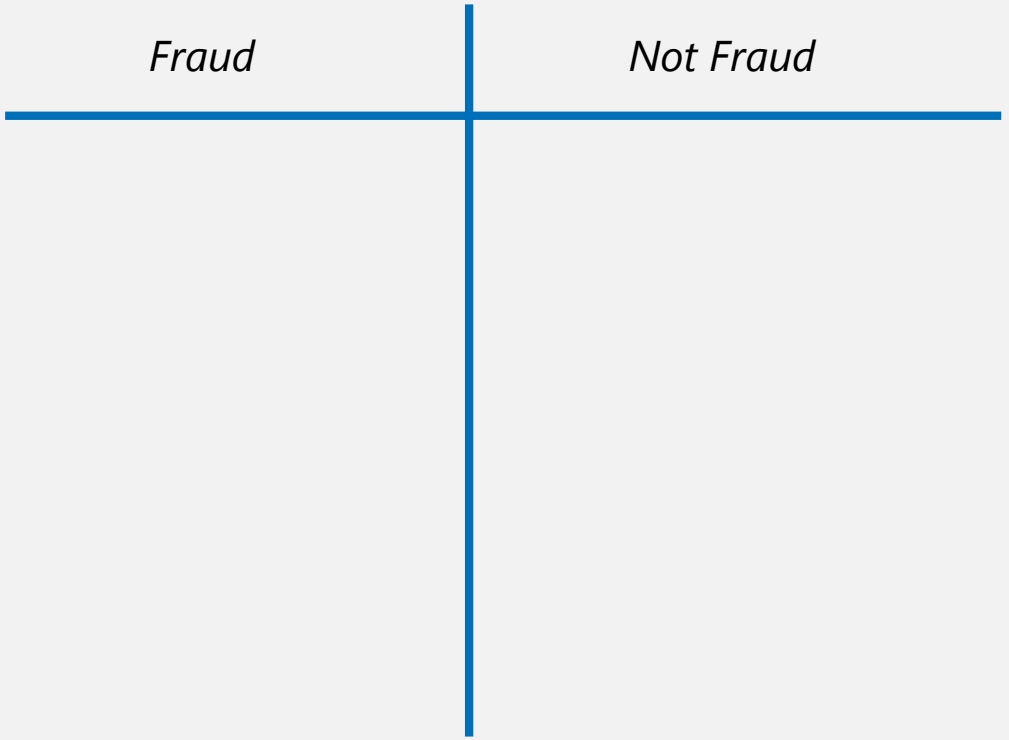


data

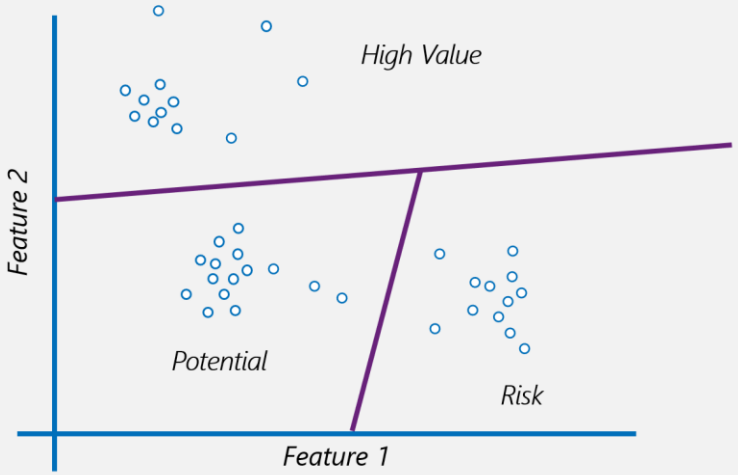


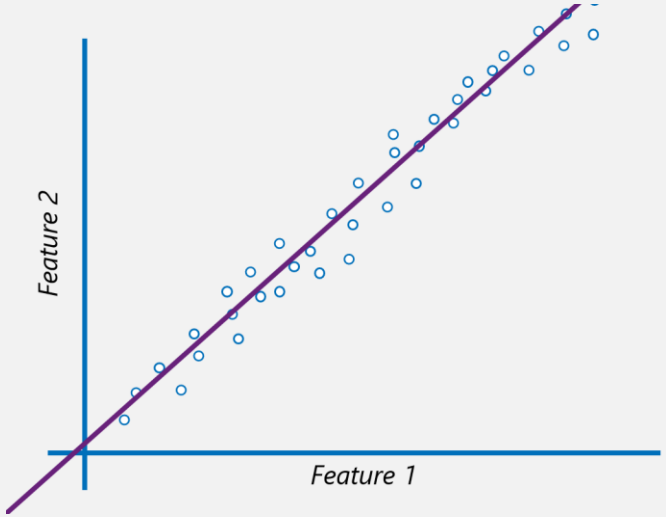
classification

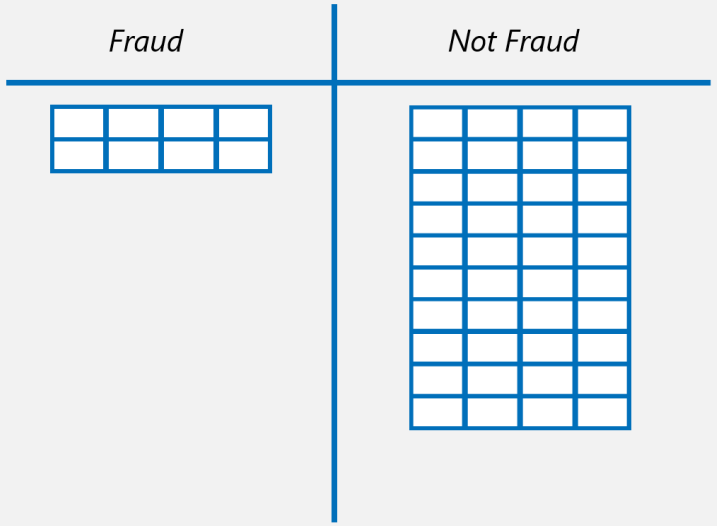
"Hey, I am trying to **predict** if an insurance claim is **fraudulent** or not"



Types of machine learning







Clustering **Regression** **Classification**

Unsupervised

Supervised

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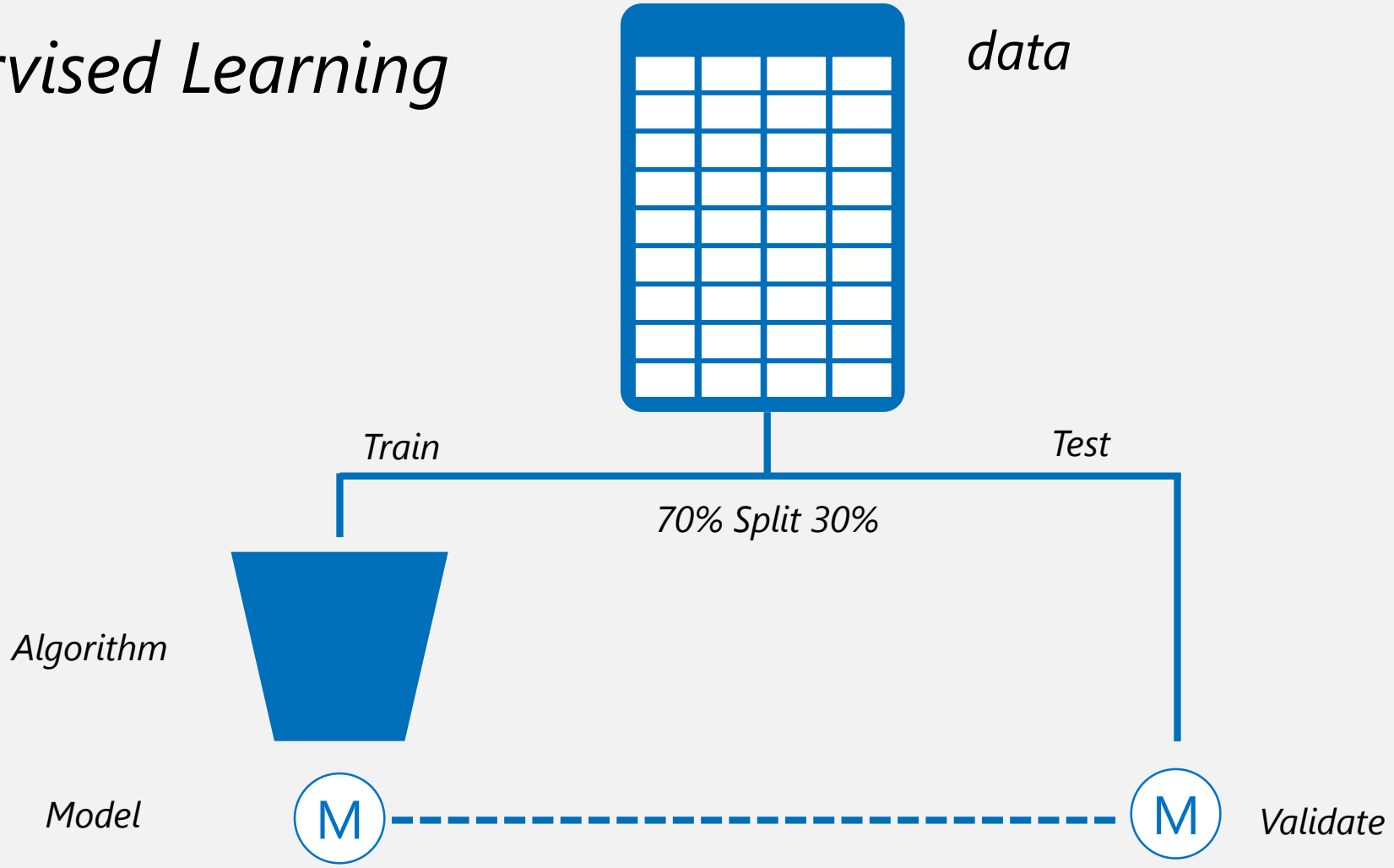
Supervised Learning



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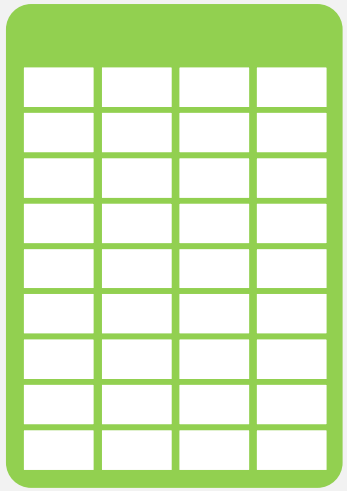
Supervised Learning



New data

Model

Prediction

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R2
D3

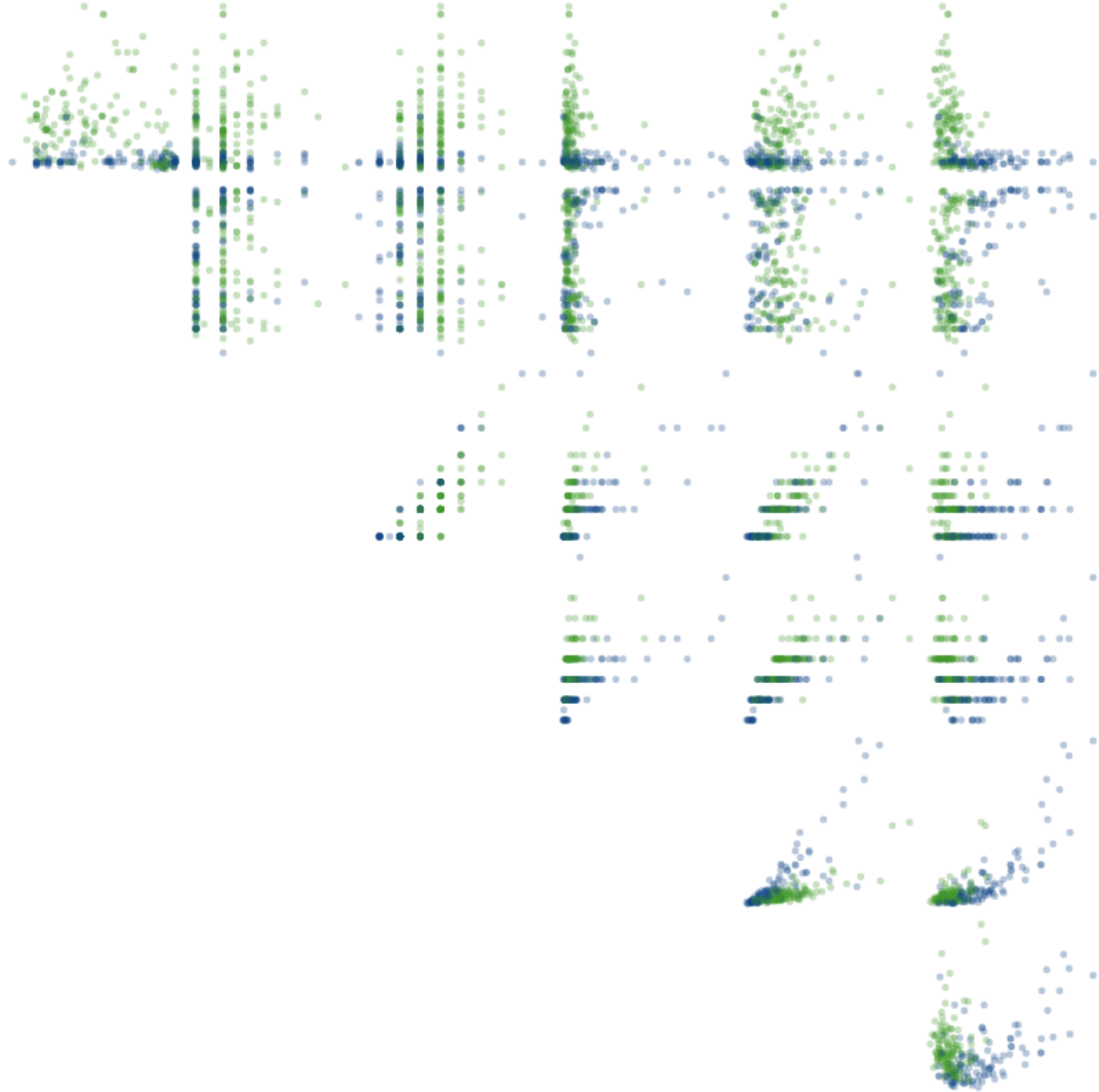
A visual introduction to machine learning

English

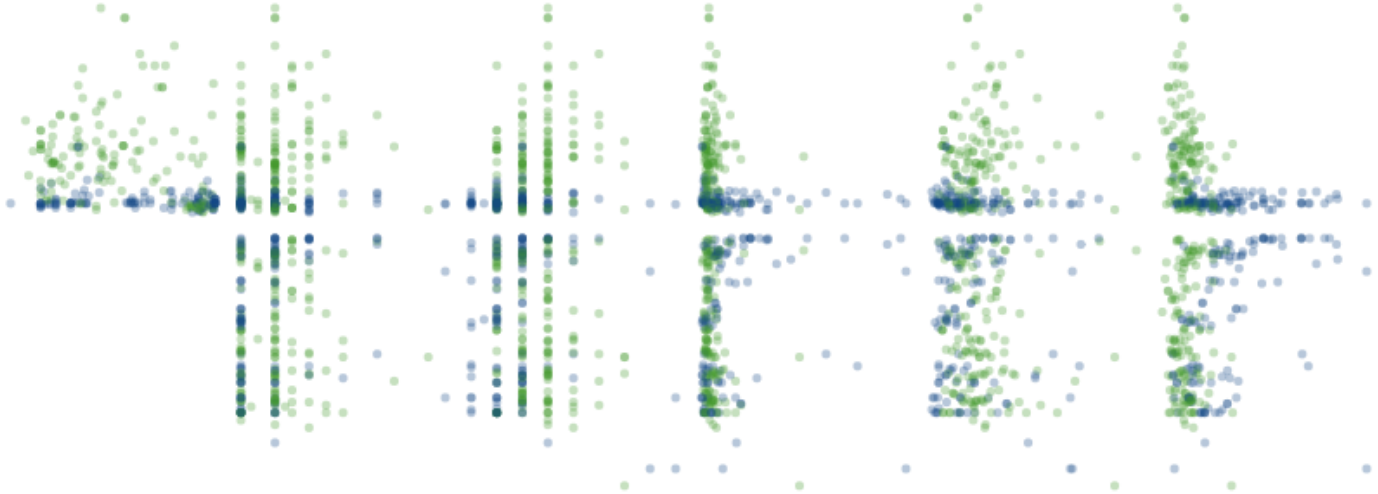
In machine learning, computers apply **statistical learning** techniques to automatically identify patterns in data. These techniques can be used to make highly accurate predictions.

Keep scrolling. Using a data set about homes, we will create a machine learning model to distinguish homes in New York from homes in San Francisco.

SCROLL



R2
D3

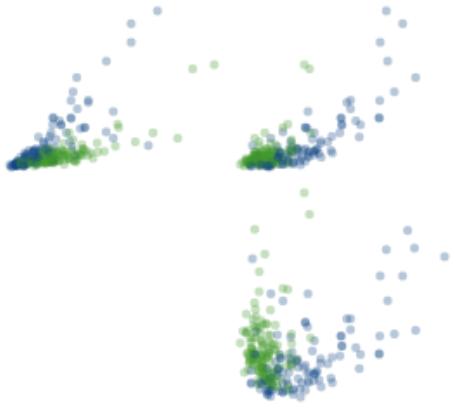


A visual introduction to

http://www.r2d3.us/visual-intro-to-machine-learning-part-1/

Keep scrolling. Using a data set about homes, we will create a machine learning model to distinguish homes in New York from homes in San Francisco.

SCROLL



Python: Fundamentals

```
print("Hello, World!")
```

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Beautiful is better than ugly
Explicit is better than implicit
Simple is better than complex
Complex is better than complicated
Readability counts

The Zen of Python (PEP 20)

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Download Anaconda Distribution

Version 5.2 | Release Date: May 30, 2018

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Anaconda 5.2 For Windows Installer

Python 3.6 version *

Download

Python 2.7 version *

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Python is...

An interpreted language

It has a base language which is extended with modules

Indents are important! Indents over curly brackets

Supports: variables, lists, dictionaries and tuples

Duck typed

Awesome!!

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DS/ML Modules

Numpy	– Numerical Python
SciPy	– Scientific Python
Pandas	- Data wrangling
MatPlotLib	- Data visualisation
Scikit-learn	- Machine learning (shallow)
….	
TensorFlow	- Machine Learning (deep)
NLTK	- Natural Language processing

How to add modules? **PIP**

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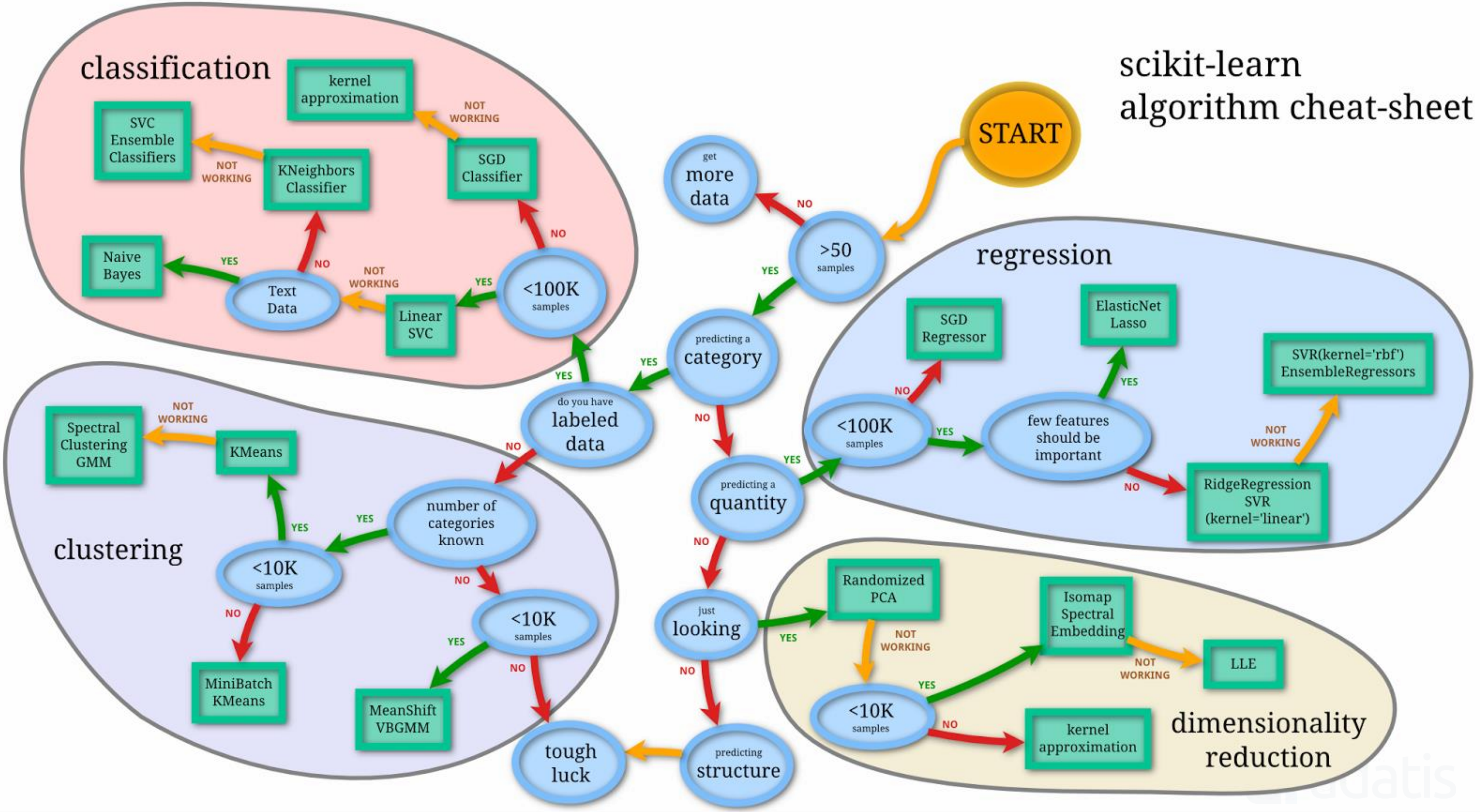

scikit-learn
algorithm cheat-sheet
START
classification
clustering
regression
dimensionality reduction
>50 samples
get more data
predicting a category
do you have labeled data
predicting a quantity
just looking
predicting structure
tough luck
<100K samples
Linear SVC
Text Data
Naive Bayes
KNeighbors Classifier
SVC Ensemble Classifiers
SGD Classifier
kernel approximation
number of categories known
<10K samples
KMeans
Spectral Clustering GMM
MiniBatch KMeans
MeanShift VBGMM
SGD Regressor
few features should be important
ElasticNet Lasso
RidgeRegression SVR (kernel='linear')
SVR(kernel='rbf') EnsembleRegressors
Randomized PCA
Isomap Spectral Embedding
LLE
kernel approximation
YES
NO
NOT WORKING

Python: Demos

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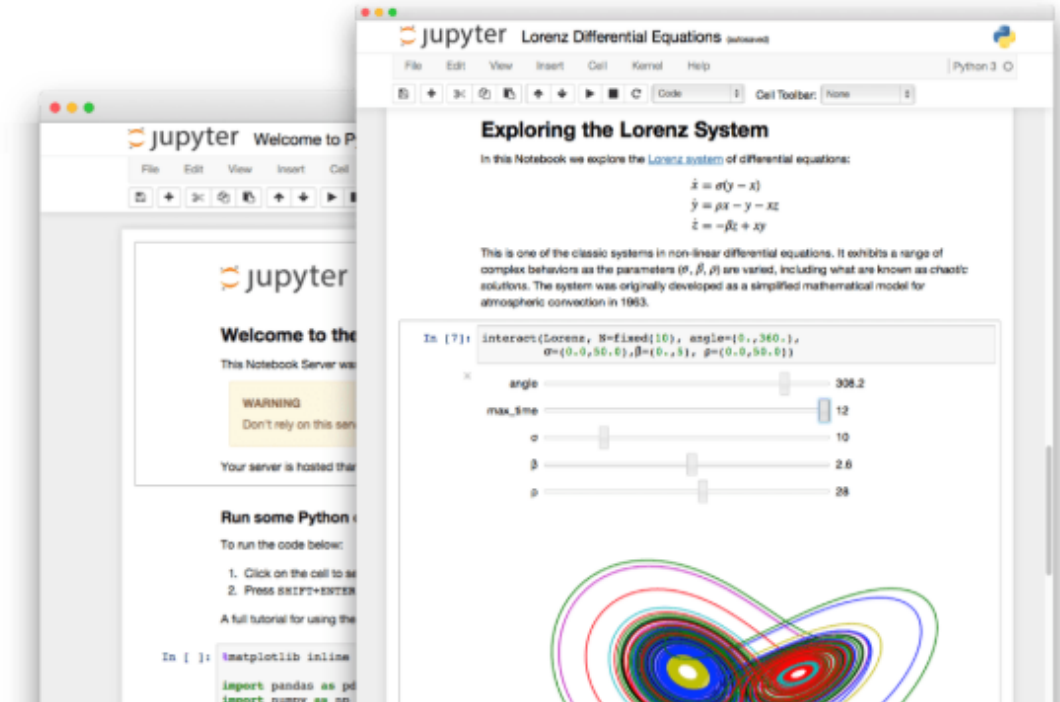
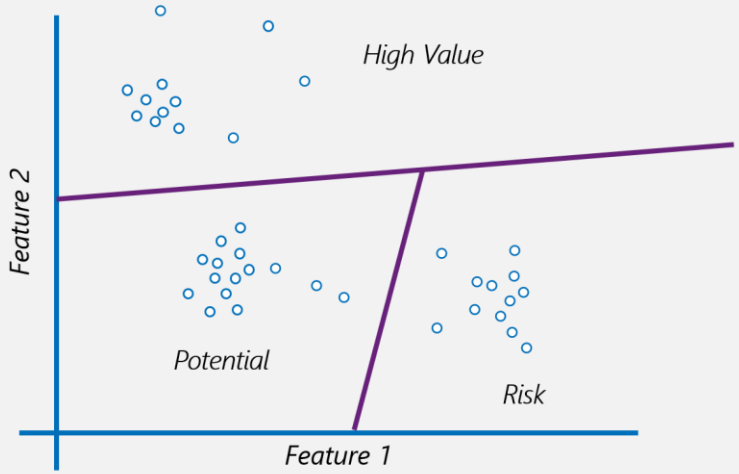


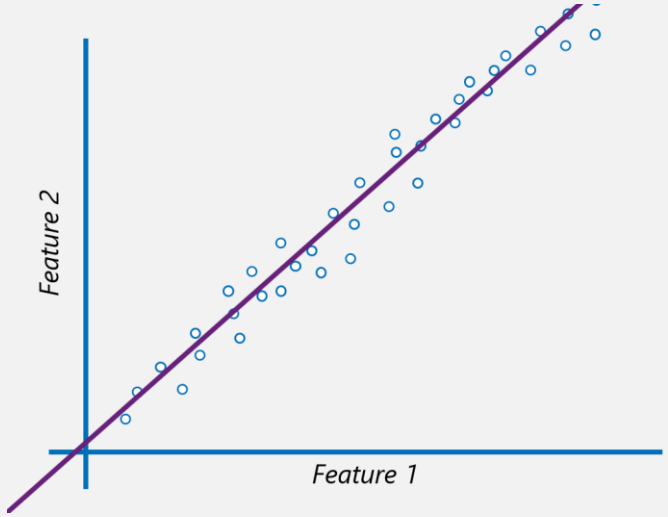
The Jupyter Notebook

The Jupyter Notebook is an open-source web application that allows you to create and share documents that contain live code, equations, visualizations and narrative text. Uses include: data cleaning and transformation, numerical simulation, statistical modeling, data visualization, machine learning, and much more.

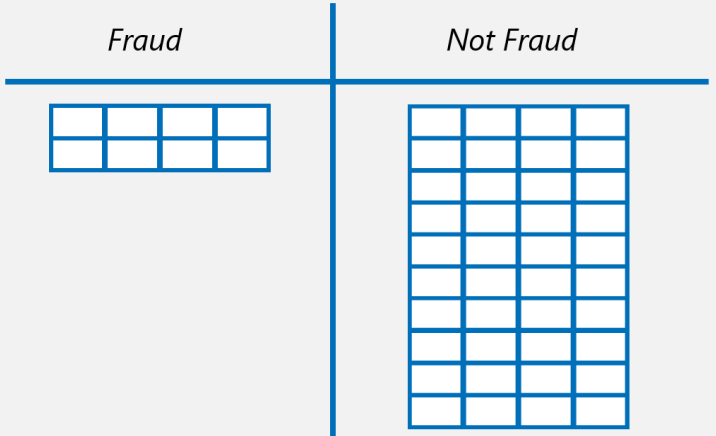
Python Fundamentals



Clustering



Regression



Classification