Introduction to Machine Learning

Stock Prediction with Python

Introduction to Python

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Jupyter Notebook

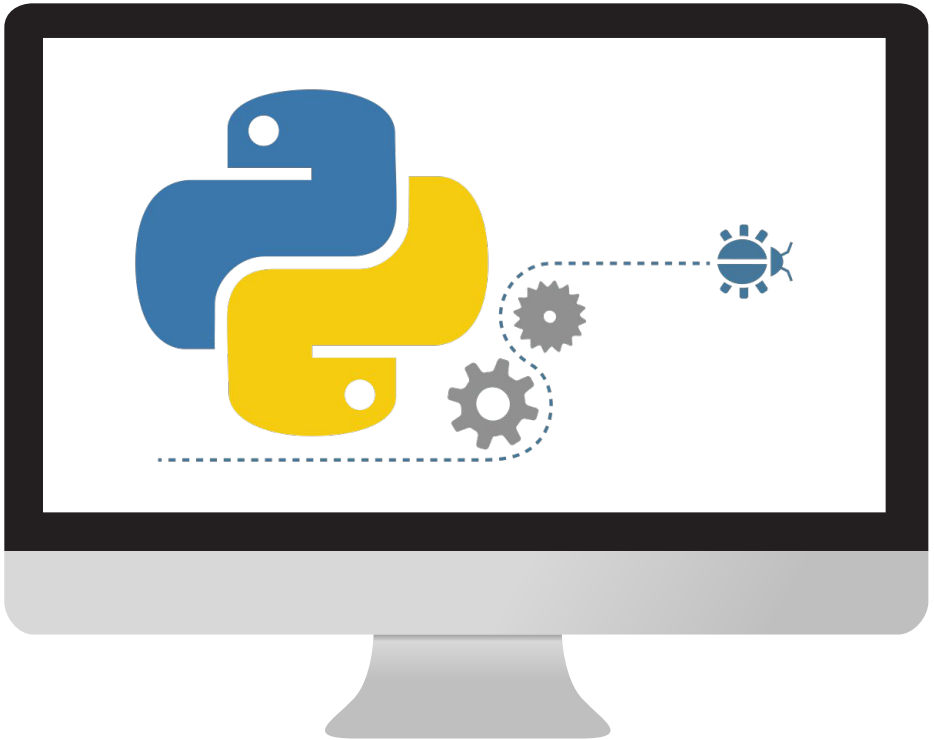
How to use Azure notebook and Jupyter Notebook, setting up your cloud IDE

Basic Syntax

Simple Mathematical Operation with Python

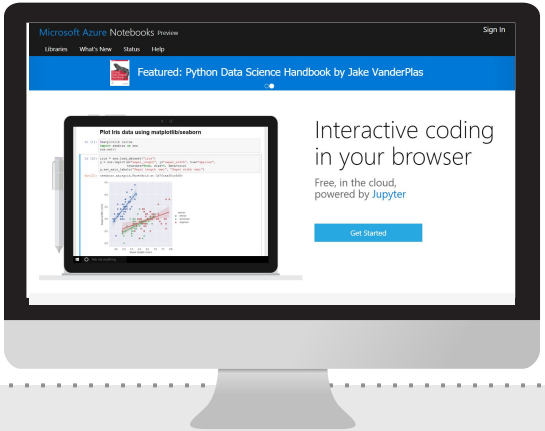
Packages and Libraries

What are libraries, how do we use them and what libraries are we using today?



Make your own Azure Notebook

With your UWO account



Google “Azure Notebook”

Click the first result, should look like the above. Login with your UWO email.

Create New Library

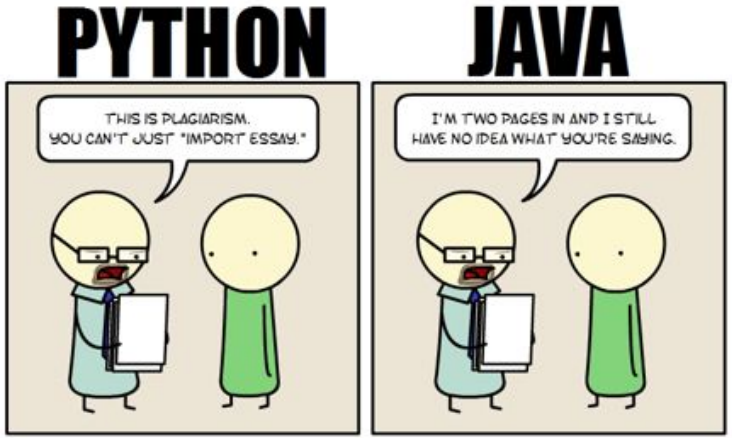
A Library is a set of files, acts like just a folder in this case. Name it FoundersNetwork.

Create New File

Click the new button, make a new file named StockPrediction, a Python 3.5 file. Click to open it!

What Are Libraries?

Pieces of code someone has already written for us



Math

APIs

Data

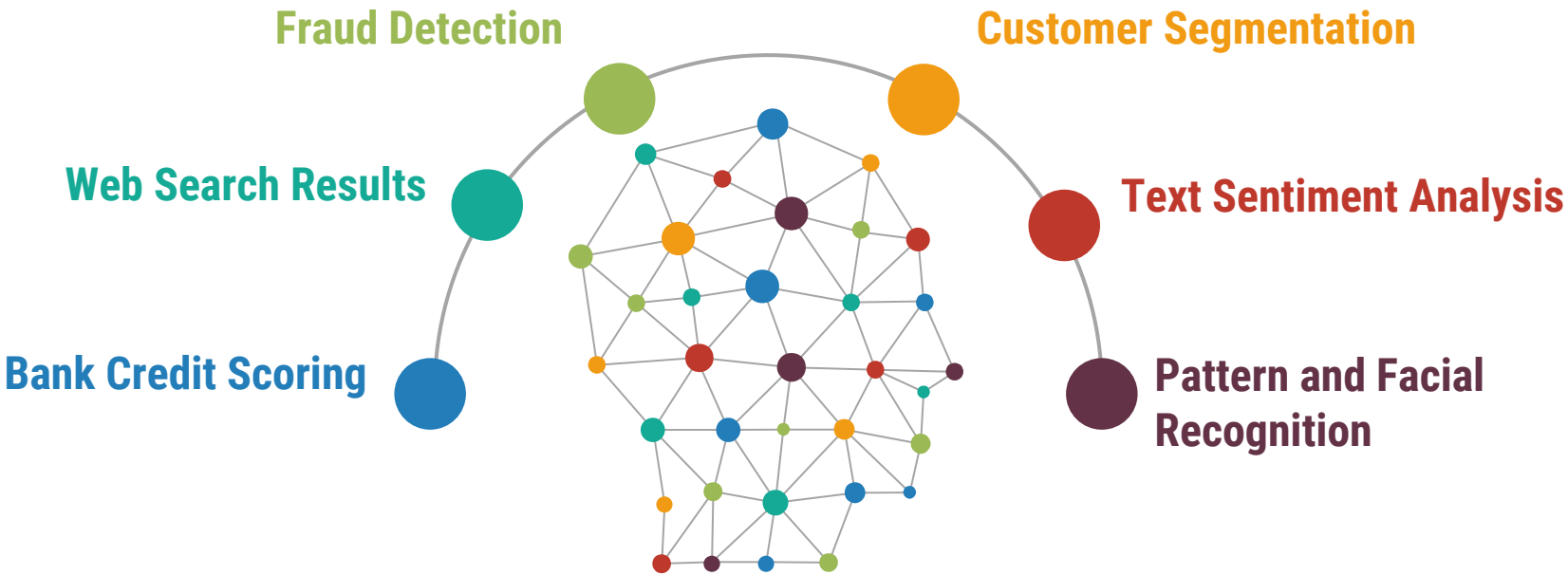
Std Libs

Today we will use data management and machine learning libraries.

What is Machine Learning?

- Method of Analysis that automates model building
- Algorithm Iteratively learns from data
- Find hidden insights without being told where to look

Where is Machine Learning Used?



The Machine Learning Process

A High Level Overlook

01

Gathering data from various sources

Data Gathering

02

Cleaning

Cleaning data to have homogeneity

03

Model Building - selecting the right ML algorithm

Modelling

04

Insights

Gaining insights from the model results

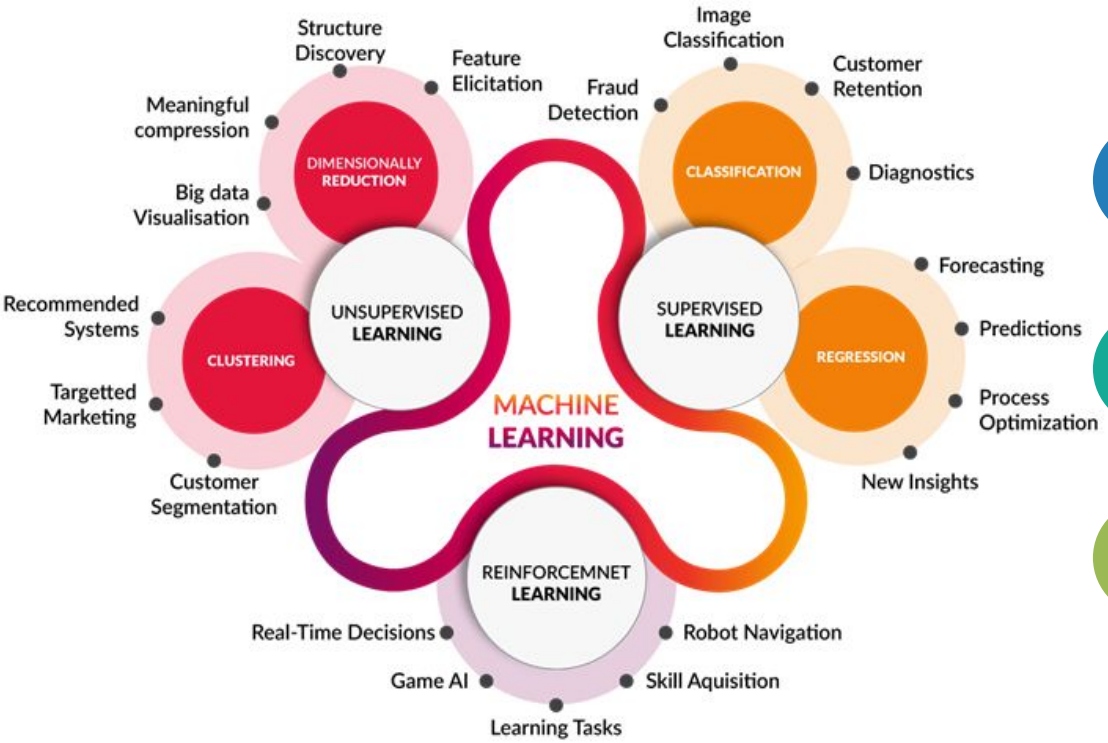
05

Data Visualization- Transforming results Into visual graphs

Visualization

Types of Machine Learning

Summary



Supervised Learning

Given labeled data, predict based on learned results

Unsupervised Learning

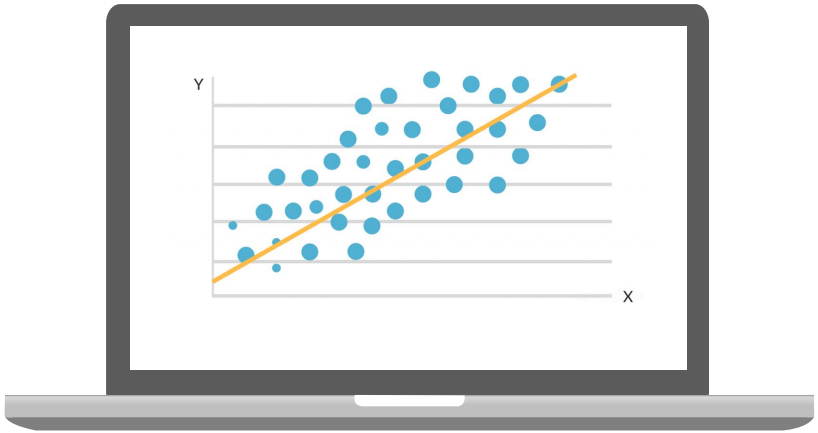
Group together similar data based on features the machine identifies

Reinforcement Learning

Algorithm learning to perform based on past experience

Supervised Learning

A simple example



Linear Regression

The simpler, less robust little brother of ML techniques

Can use python or Excel though it's a lot less elegant

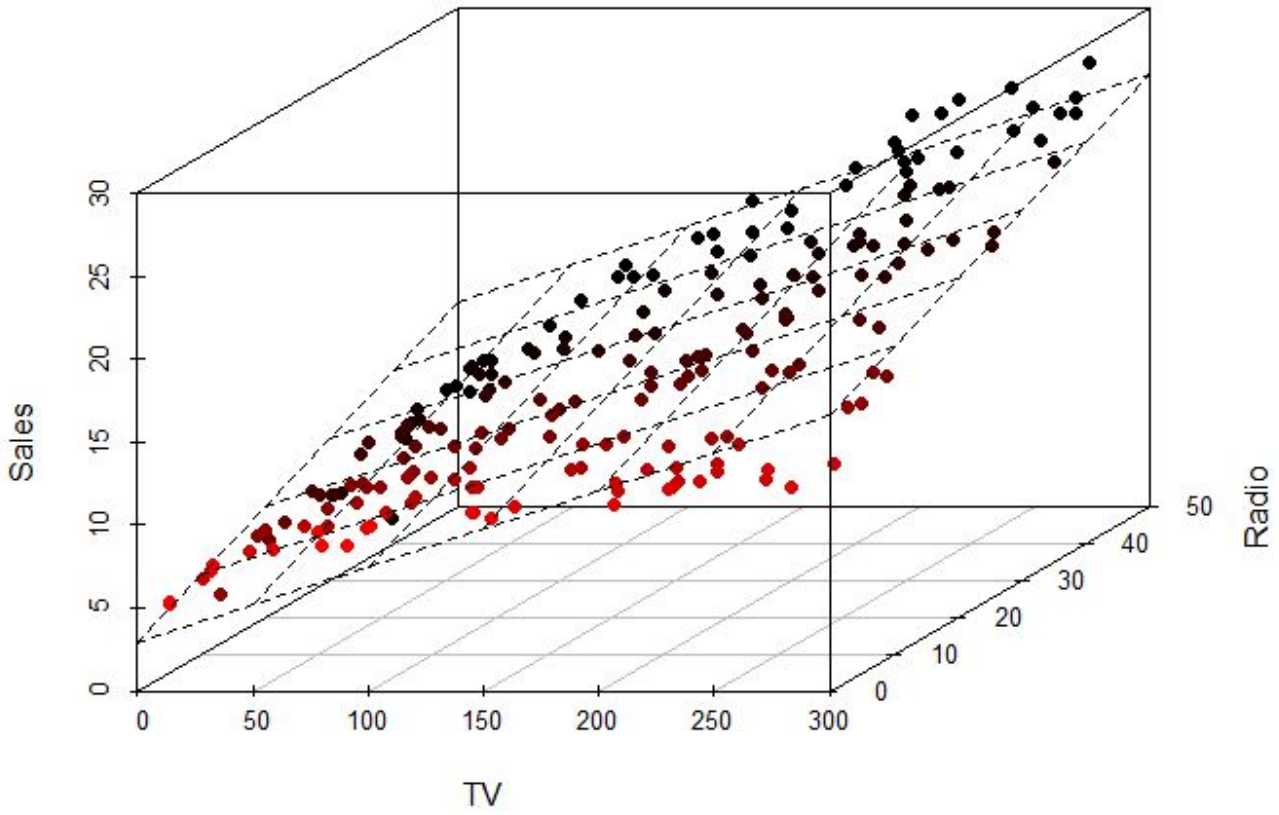
Data Cleaning

Linear Regression

Predictive Label

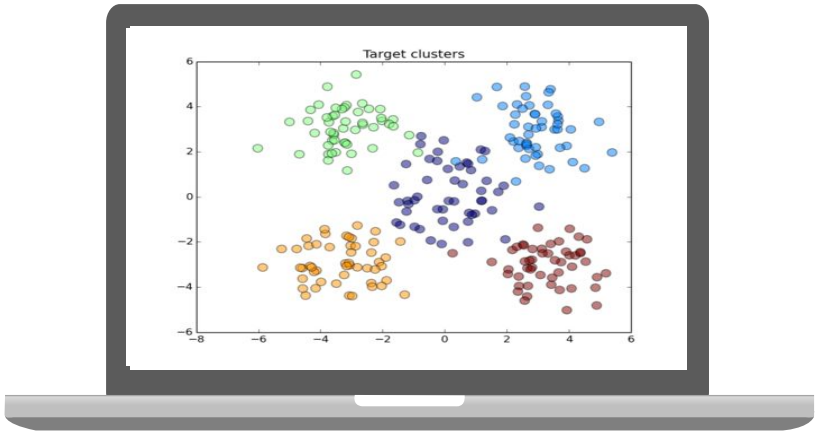
Unnamed: 0	address	info	z_address	bathrooms	bedrooms	finishedsqft	lastsolddate	lastsoldprice	latitude	longitude	neighborhood	totalrooms
2	Address: 1160 Mission Street #2007	San FranciscoSales price: 1300000Sales date: ...	1160 Mission St UNIT 2007	2.0	2.0	1043.0	02/17/2016	1300000.0	37.778705	-122.412635	South of Market	4.0
5	Address: 260 King Street #475	San FranciscoSales price: 750000Sales date: 0...	260 King St UNIT 475	1.0	1.0	903.0	02/17/2016	750000.0	37.777641	-122.393417	South of Market	3.0
7	Address: 560 Missouri Street #B	San FranciscoSales price: 1495000Sales date: ...	560 Missouri St # B	4.0	3.0	1425.0	02/17/2016	1495000.0	37.759198	-122.396516	Potrero Hill	6.0
9	Address: 350 Missouri Street	San FranciscoSales price: 2700000Sales date: ...	350 Missouri St	3.0	3.0	2231.0	02/17/2016	2700000.0	37.761886	-122.396769	Potrero Hill	10.0
11	Address: 3658 Folsom Street	San FranciscoSales price: 1530000Sales date: ...	3658 Folsom St	3.0	3.0	1300.0	02/17/2016	1530000.0	37.740795	-122.413453	Bernal Heights	4.0

Multivariable Linear Regression



UnSupervised Learning

A simple example



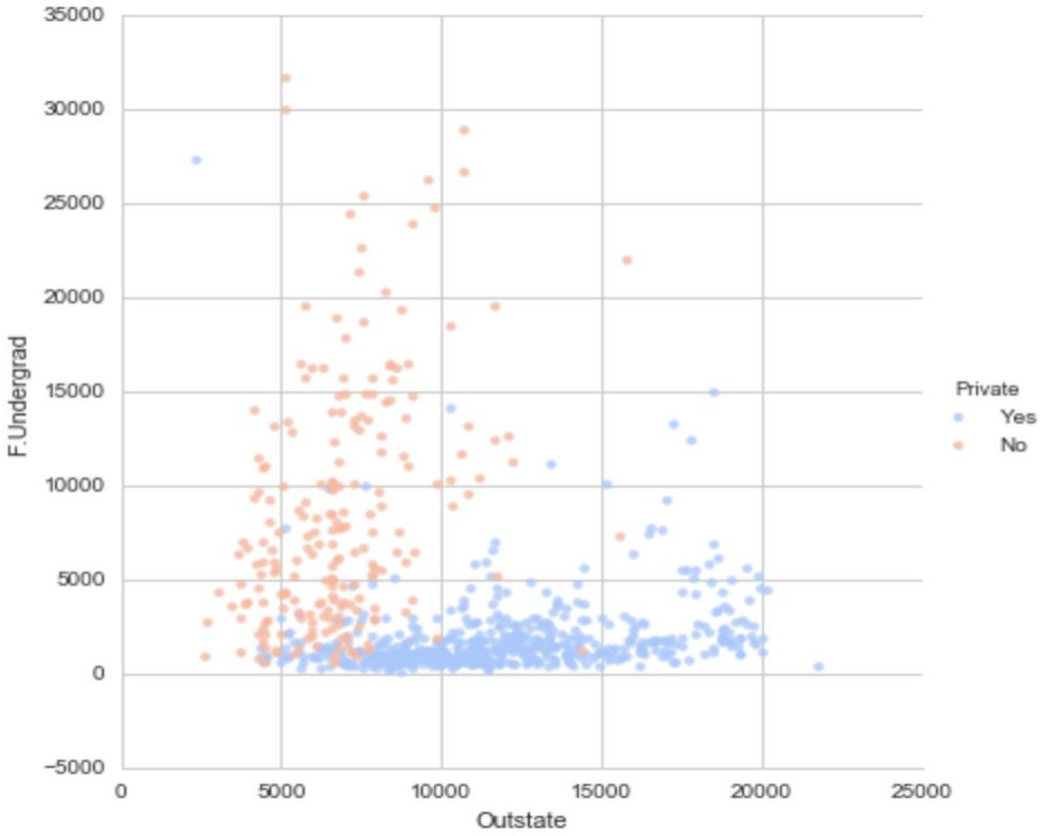
K Means Clustering

For when your data is not labeled

K Means Clustering

	Apps	Accept	Enroll	Top10perc	Top25perc	F.Undergrad	P.Undergrad	Outstate	Room.Board	Books	Personal	PhD	Terminal	S.F.Ratio
Abilene Christian University	1660	1232	721	23	52	2885	537	7440	3300	450	2200	70	78	18.1
Adelphi University	2186	1924	512	16	29	2683	1227	12280	6450	750	1500	29	30	12.2
Adrian College	1428	1097	336	22	50	1036	99	11250	3750	400	1165	53	66	12.9
Agnes Scott College	417	349	137	60	89	510	63	12960	5450	450	875	92	97	7.7
Alaska Pacific University	193	146	55	16	44	249	869	7560	4120	800	1500	76	72	11.9
Albertson College	587	479	158	38	62	678	41	13500	3335	500	675	67	73	9.4

K Means Clustering



Reinforcement Learning

Learning to Play Mario

2009 Reinforcement Learning Competition

Industry Insights - OP Trust Summer Analyst

How is ML used in Finance?

Trading

Use ML to make investment decisions

Algorithms using ML are used in a lot of ways, from simple forecasting, to order book predictions, to hedging and execution

Research

Use ML to go through things, faster

Instead of listening to a Shareholder's Call or going through equity research reports, ML can quickly go through both and change your model

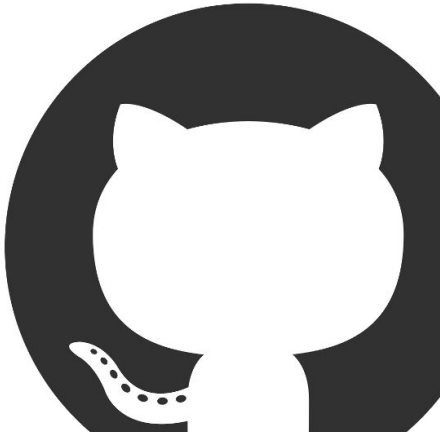
Alternative Analysis

Analyze things you never would have

Satellite Imagery Analysis, Location Tracking, Client Location Data, Sales Forecasting, Weather Predictions, Sentiment Analysis

Save the Dates!

Educations Portfolio



Supreme Autofill Bot and Personal Website Workshop