

Diving Into AI/ML Algorithms

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What is Artificial Intelligence ?



What is Artificial Intelligence?

Artificial intelligence is a technology using which we can create intelligent systems that can simulate human intelligence.

Examples:

- Siri
- Google's AlphaGO.
- Game Bots..... and list goes



What is Machine Learning ?



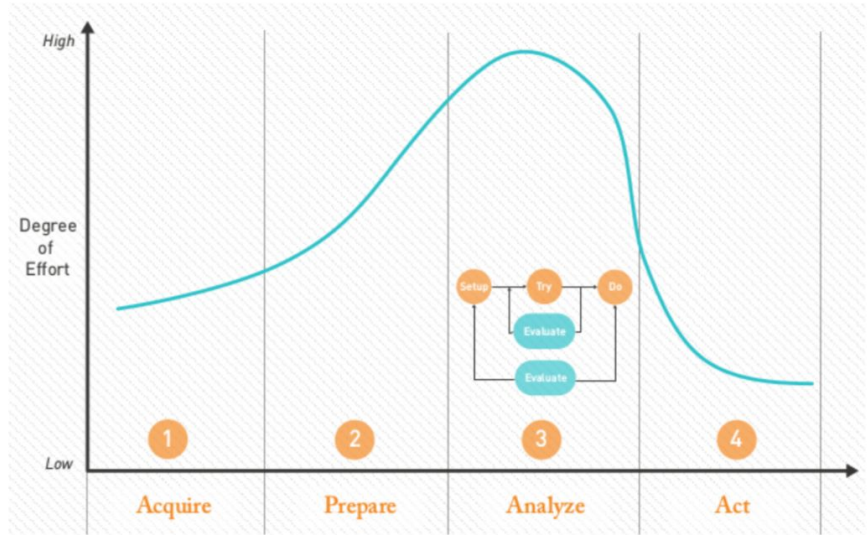
What is Machine Learning?

Machine learning is about extracting knowledge from the data.

It can also be defined as a subfield of artificial intelligence, which enables machines to learn from past data or experiences without being explicitly programmed.

Machine Learning PipeLine

1. Data Generation / Collection
2. Data Cleaning / Feature Engineering
3. Algorithms to find interesting patterns or extract Knowledge
4. Deployment



Thanks: Booz Allen Hamilton



Types of Machine Learning Algorithms

1. Supervised Learning
2. Un-Supervised Learning
3. Semi-Supervised Learning
4. Reinforcement Learning



Supervised Learning

Estimating a function or Finding a Pattern.

Given some inputs (x) and outputs (y), we want to learn a function f such that $f(x) = y...$

Depending on outputs, there are two sub-categories:

- Regression
- Classification



Quiz

Find the function given the inputs and outputs ?

Input			Output
2	4	5	3
5	2	8	2
2	2	1	3
4	2	2	6
10	20	30	?



Un-Supervised Learning

- No “SuperVision”
- Grouping Similar Data Points into Clusters
- Find Patterns...
- How Many Clusters?



Semi-Supervised Learning

- Mix of labelled and unlabeled points
- Used in case when there is too much data and we don't have the resources to label all the data.



Reinforcement Learning

- Use: Building bots to play a game, robotics.
- Similar to how we learn to ride a bicycle.
- Some required terms:
 - Agent/Object
 - Environment
 - State of Environment
 - Action
 - Reward



Some Real World Projects of AI/ML...



Projects

1. Self driven Cars
2. Health Care: Cancer Detection, self-diagnosis
3. Snapchat Filters
4. Google Photos
5. Mail/Spam filtering
6. Auto replies/ Auto correct
7. Gesture/Facial Recognition
8. Alexa,Siri....
9. And the list goes on and on.....



Inputs/Outputs of....

1. Self Driving Cars
2. SnapChat
3. Predicting Student Marks



Python Libraries used in ML

- Numpy
- Pandas
- Matplotlib
- Scikit-learn (sklearn)
- Tensorflow
- Pytorch
- and many more.....



Numpy

- Numpy is a python library used for working with multi-dimensional arrays.
- It provides us with multiple functions that helps us in scientific computing, linear algebra, matrix operations, random number generation and much more.



Pandas

- Pandas is a python library used for working with tabular data.
- It provides us with Data Structures (DataFrame) that helps us in manipulating and visualizing data more intuitively.



Matplotlib

- It is a comprehensive library used to create Visualizations in python.
- It's main utility lies in pyplot submodule which is used to visualize various plots, graphs, charts, etc.



KNN - K Nearest Neighbours

- Very Simple and Intuitive Algorithm.
- Used in both classification and regression.
- Type of Supervised Learning
- Algo: Find k nearest Points to the queried point and take a majority vote.
- No Training.
- QueryTime ?
- Non-Parametric Algo
- BaseLine Algo for many others



Questions ???



Thank you for joining everyone...