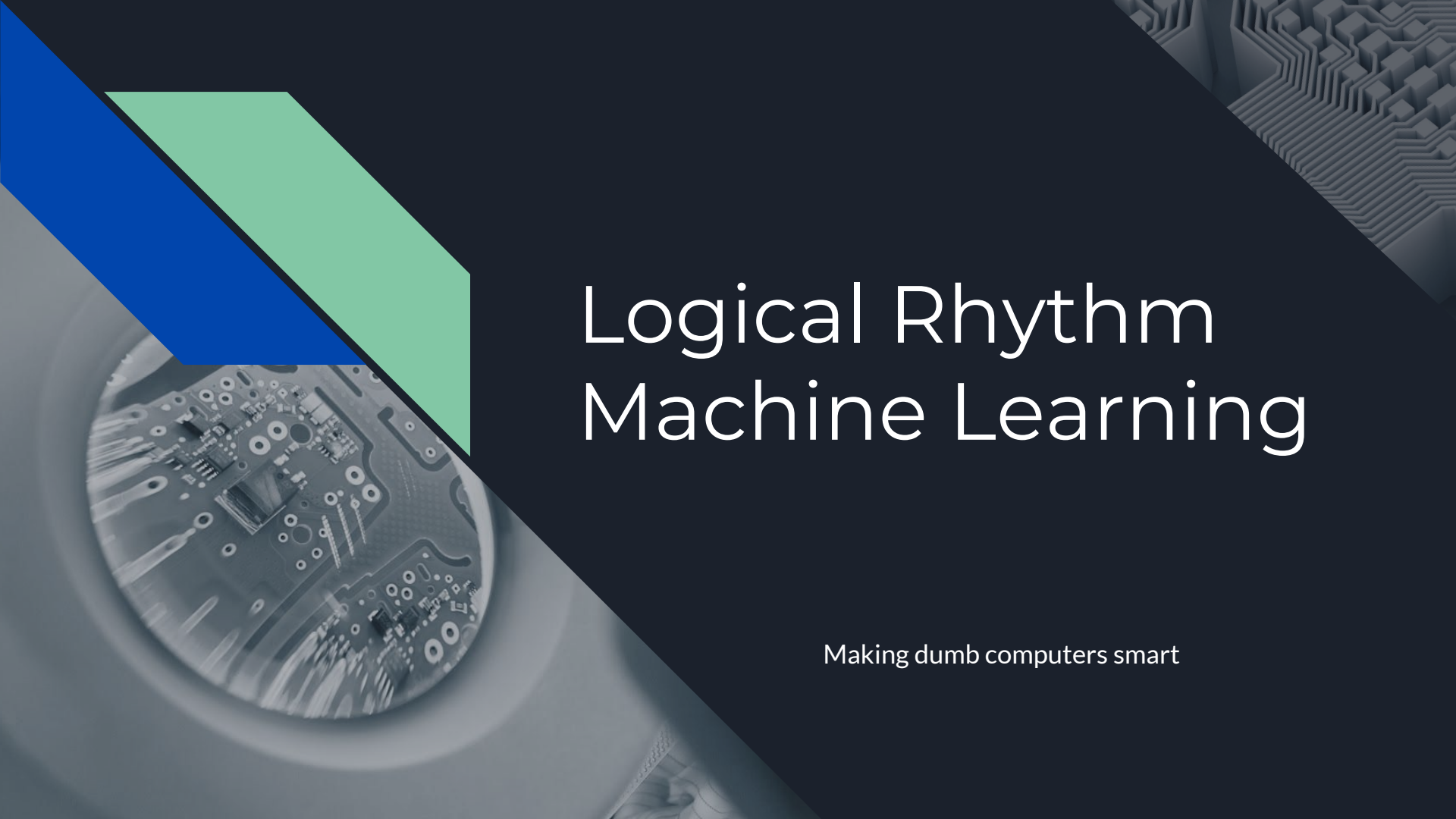


Logical Rhythm Machine Learning

Making dumb computers smart

TOC

Why Learn Machine Learning
What is Machine Learning
When to apply ML
Demonstrate Linear Regression/ Gradient Descent
What is an ML Algorithm
Types and Classification of ML Algorithm

Overview

Most problems in real world are mathematical or can be reduced to one. These problems reduce to converting an input, after applying some form of logic, to a desired output(i.e. A finding a functional mapping). Now if the underlying logic of the function :

1) Is Known -> easy to crack -> then Explicitly program the logic
    - Eg. problems on codechef / SPOJ etc. hard-logic

2) Is Not known
    - ML can be attempted.

Why Learn ML ?

According to report from IBM, in 2015 there were 2.35 million openings for data analytics jobs in the US. It estimates that number will rise to 2.72 million by 2020.

What is ML ??

Provides machines the ability to automatically **learn and improve from experience** (which can be in form of data) without being explicitly programmed.

Examples

ML is not Memorisation !!

When to apply ML ?

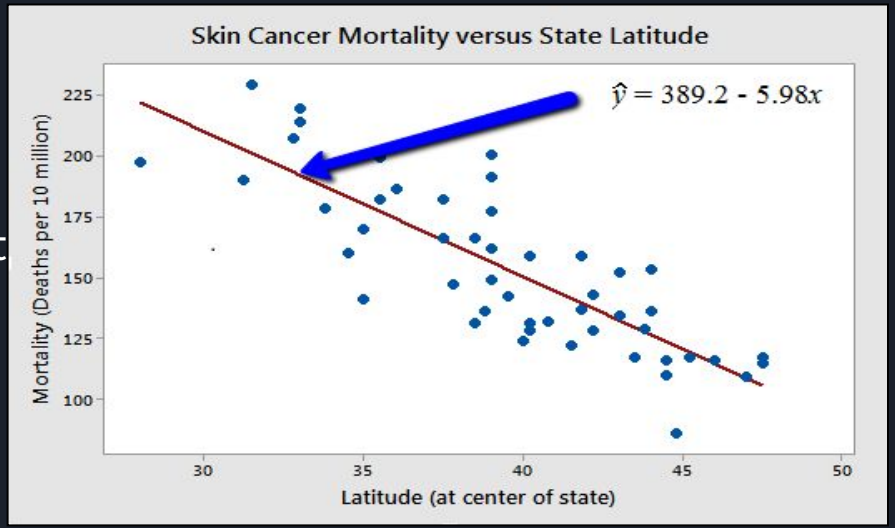
1) Pattern Exists
2) Cannot pin down the pattern mathematically
3) Have enough data.

Linear Regression

For given dataset(x,y) where x is an independent variable, and y is a continuous target variable.

Statistical Relationship

The plot exhibits some trend, but it also exhibits some scatter.

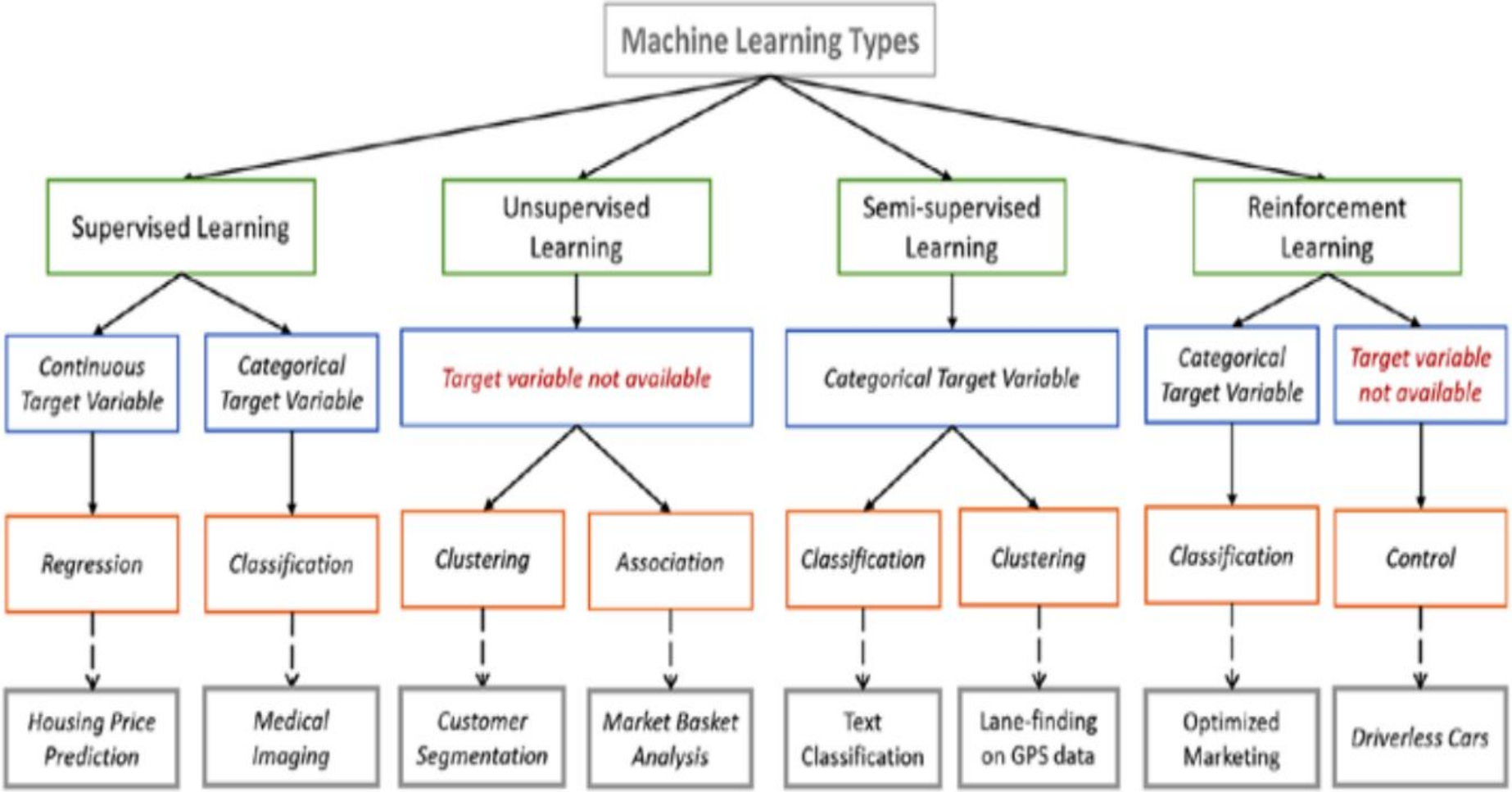


General Anatomy of an ML algorithm

1. Model
   - Input data points
   - Examples of Expected Output(supervised learning)
   - Values that the model generates at the supplied input data points
2. Performance Metric(a feedback signal to adjust the way ML algorithm works)
   - This is what is called LEARNING -or- MACHINE LEARNING.
3. Loss Function
4. Optimiser

A few popular ML Algorithms:

1. Linear Regression
2. Logistic Regression
3. Decision Tree
4. SVM
5. Naive Bayes
6. kNN
7. K-means
8. Random Forest
9. Dimensionality Reduction Algorithm
10. Gradient Boosting Algorithm

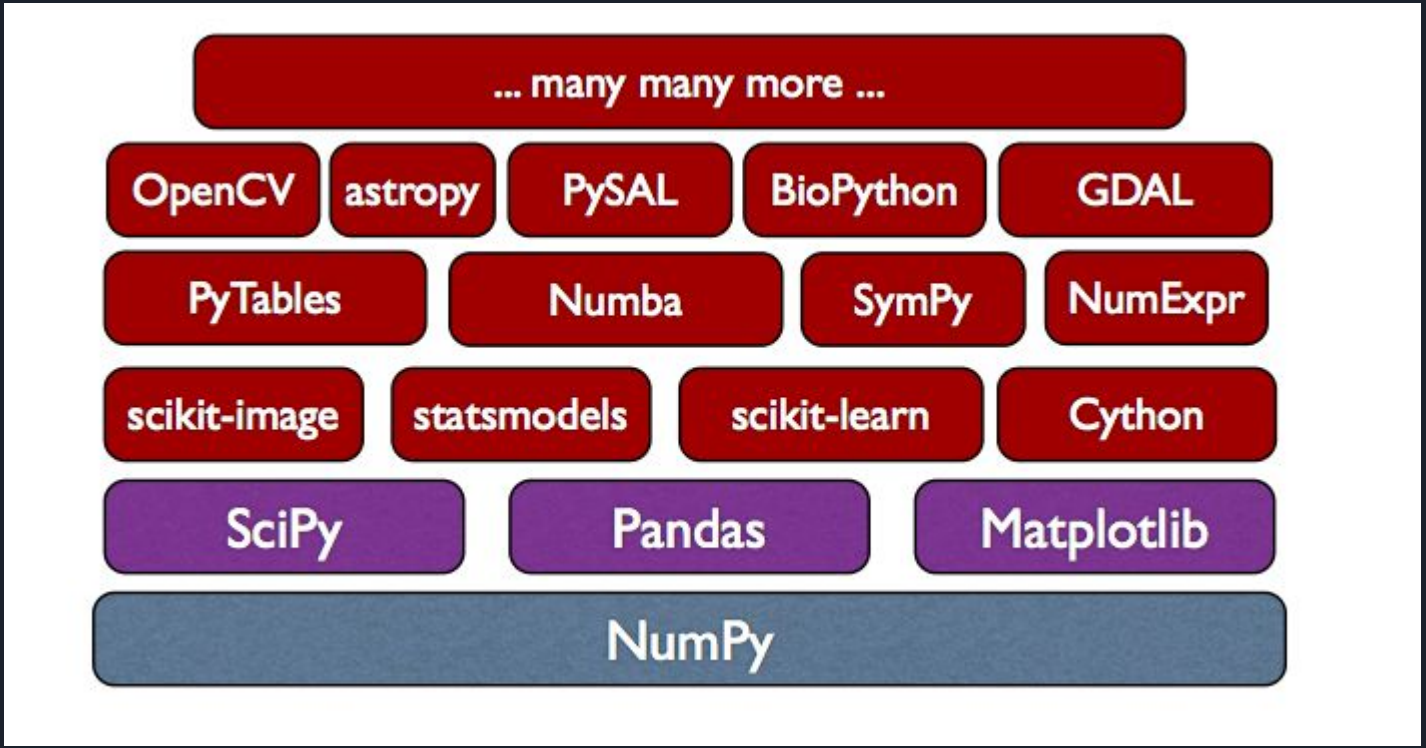

Machine Learning Types
Supervised Learning
Unsupervised Learning
Semi-supervised Learning
Reinforcement Learning
Continuous Target Variable
Categorical Target Variable
Target variable not available
Categorical Target Variable
Categorical Target Variable
Target variable not available
Regression
Classification
Clustering
Association
Classification
Clustering
Classification
Control
Housing Price Prediction
Medical Imaging
Customer Segmentation
Market Basket Analysis
Text Classification
Lane-finding on GPS data
Optimized Marketing
Driverless Cars

Machine Learning Frameworks

1. scikit-learn (easy of use,experimentation)
2. tensorflow
3. theano
4. keras (HIGH-level framework for mainly for DL)
5. pytorch
6. caffe
7. microsoft's CNTK

Python Libraries for handling and visualising data

1. numpy
2. scipy
3. pandas
4. matplotlib

5. seaborn
6. plotly

Python Libraries