# Machine Learning Projects

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Questions:

- what is machine learning
- why is it useful
- common categories of machine learning
- what is the workflow?

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1. study data
2. select model
3. train model w- data (learning algo w- utility/cost func)
4. apply mode to make predictions.

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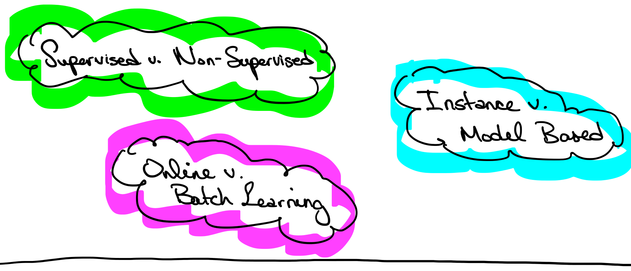
A map of main regions of ML.

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## WHAT IS ML?

The process by which the performance of a task is improved through use of additional data.

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## WHY ML?

- ML is a concise solution to systems which are complex and have a large number of cases.
- ML accounts for more data, more accurately than a programmer could.
- ML is dynamic and can morph with new data, classical programs can not.

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## TYPES OF ML

they can be combined and are not exclusive. ⇒ Attrib is data-type "mileage" Feature is attrib w- val mileage = 15

① Supervised v. Non Supervised — the amount and type of human supervision, during training.

Four Categories,

1. Supervised - includes labels (classif. + regression)
2. UnSupervised
3. Semi-Supervised
4. Reinforcement.

- Classification + Regression Algos can sometimes be exchanged

- Important Supervised-Algos
  1. k-nearest neighbours
  2. Linear regression
  3. Logistic regression
  4. Support Vector Machines (SVMs)
  5. Decision Trees & Random Forests
  6. Neural Network.

- Important Unsupervised, (also has anomaly detection).
  1. k-Means
  2. Hierarchical Cluster Analysis (HCA) } Clustering
  3. Expectation Maximization
  4. Principal Component Analysis
  5. Kernel PCA
  6. Locally-Linear Embedding (LLE)
  7. t-distributed Stochastic Neighbour Embedding (t-SNE) } Viz. and Dimensionality Reduction
  8. Apriori } Association Rule Learning → discovering interesting relationships
  9. Eclat }

- merging several correlated features into 1, is called feature extraction.

② Batch v. Online Learning.