

MACHINE LEARNING IN EMOJI

SUPERVISED

UNSUPERVISED


REINFORCEMENT

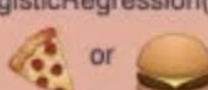
SUPERVISED human builds model based on input / output
human input, machine output
human utilizes if satisfactory

UNSUPERVISED human input, machine output
human reward/punish, cycle continues

REINFORCEMENT


BASIC REGRESSION


LINEAR `linear_model.LinearRegression()`
Lots of numerical data 


LOGISTIC `linear_model.LogisticRegression()`
Target variable is categorical 

CLASSIFICATION


NEURAL NET `neural_network.MLPClassifier()`

Complex relationships. Prone to overfitting
Basically magic. 


K-NN `neighbors.KNeighborsClassifier()`
Group membership based on proximity 


DECISION TREE `tree.DecisionTreeClassifier()`
If/then/else. Non-contiguous data
Can also be regression 

RANDOM FOREST `ensemble.RandomForestClassifier()`

Find best split randomly
Can also be regression 

SVM `svm.SVC()` `svm.LinearSVC()`


Maximum margin classifier. Fundamental
Data Science algorithm 

NAIVE BAYES `GaussianNB()` `MultinomialNB()` `BernoulliNB()`
Updating knowledge step by step with new info 

CLUSTER ANALYSIS

K-MEANS

`cluster.KMeans()`

Similar datum into groups
based on centroids 

ANOMALY DETECTION


Finding outliers
through grouping

`covariance.EllipticalEnvelope()`




FEATURE REDUCTION


T-DISTRIBUT STOCHASTIC NEIB EMBEDDING `manifold.TSNE()`

Visualize high dimensional data. Convert
similarity to joint probabilities 

PRINCIPLE COMPONENT ANALYSIS `decomposition.PCA()`

Distill feature space into components that
describe greatest variance 

CANONICAL CORRELATION ANALYSIS `decomposition.CCA()`

Making sense of cross-correlation
matrices 

LINEAR DISCRIMINANT ANALYSIS

Linear combination of features that
separates classes `lda.LDA()`



OTHER IMPORTANT CONCEPTS

BIAS VARIANCE TRADEOFF

UNDERFITTING / OVERFITTING

INERTIA 

ACCURACY FUNCTION $(TP + TN) / (P + N)$

PRECISION FUNCTION $TP / (TP + FP)$

SPECIFICITY FUNCTION $TN / (FP + TN)$

SENSITIVITY FUNCTION $TP / (TP + FN)$

