Machine Learning

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      1. Linear Models
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Supervised: Regression: Linear Models: Basic

Def: Explanation of a continuous variable given a series of independent variables

The simplest version is just a line of best fit: y = mx + b. Explains the relationship between x and y, giving starting point b and explanation power of m.

Linear regression works best when:

* ‣The data is normally distributed (but doesn’t have to be)
* ‣X’s significantly explain y (have low p-values)
* ‣X’s are independent of each other (low multicollinearity)
* ‣Resulting values pass linear assumption (depends upon problem) 🡨["The relationship is actually linear."]

If data is not normally distributed, we could introduce bias.

General format for sklearn model classes and methods

* *# generate an instance of an estimator class*estimator = base\_models.AnySKLearnObject()
* *# fit your data*estimator.fit(X, y)
* *# score it with the default scoring method (recommended to use the metrics module in the future)*  
  estimator.score(X, y)
* *# predict a new set of data*estimator.predict(new\_X)
* *# transform a new X if changes were made to the original X while fitting*estimator.transform(new\_X)

Seaborn has a linear model plot

sns.lmplot(x, y, data, hue=None, col=None, row=None, palette=None, col\_wrap=None, size=5, aspect=1, markers='o', sharex=True, sharey=True, hue\_order=None, col\_order=None, row\_order=None, legend=True, legend\_out=True, x\_estimator=None, x\_bins=None, x\_ci='ci', scatter=True, fit\_reg=True, ci=95, n\_boot=1000, units=None, order=1, logistic=False, lowess=False, robust=False, logx=False, x\_partial=None, y\_partial=None, truncate=False, x\_jitter=None, y\_jitter=None, scatter\_kws=None, line\_kws=None)

example: sns.lmplot('bodywt', 'brainwt', mammals)

Supervised: Regression: Linear Models: Regularized

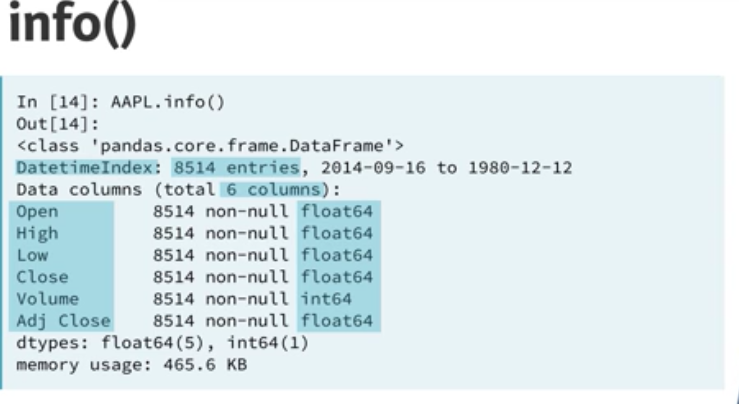
Regularization = a technique to improve the generalizability of a learned model / to reduce the possibility of overfitting the model.

Methods:

1. Lasso [least absolute shrinkage /selection operator] (L1)
   1. Method that performs variable selection and regularization
   2. Weights
2. Ridge (L2)
3. Elastic Net

Useful Pandas DataFrame methods

.info()



Broadcasting is assigning values to cells in DF?