Basic Statistics for Machine Learning

You Could Call It "Statistical Learning"

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A First Approximation For The Difference Between ML and SL

- Some algorithms are built off of statistical concepts.
- Others seem ad hoc, with no immediate relationship to a statistical theory
- I would call the former *statistical learning algorithms* and the latter *machine learning algorithms*.

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A First Approximation For The Difference Between ML and SL

The name "machine learning" is an unfortunate name. The machine "learns" the neccesary associations in both types of learning.

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A First Approximation For The Difference Between ML and SL

E.g. * Generalized Linear Models are Statistical Learning * Neural Nets are Machine Learning

Goals

- Be able to understand what the chosen algorithm does
- Be able to explain it in laymen's/sophmoric terminology

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Will Require an Understanding of The Following

- Manipulation of Probabilities
- Expectations and Covariance
- The Very Basics of Likelihood Theory

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Probability

Sum Rule

$$P(X) = \sum_{Y} P(X, Y)$$

Product/Chain Rule

$$P(X, Y) = P(Y|X)P(X)$$

Probability

We can recover some very powerful rules just from these.
Bayes' Rule

$$P(Y|X) = \frac{P(X|Y)P(Y)}{\sum_{Y} P(X|Y)P(Y)}$$

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