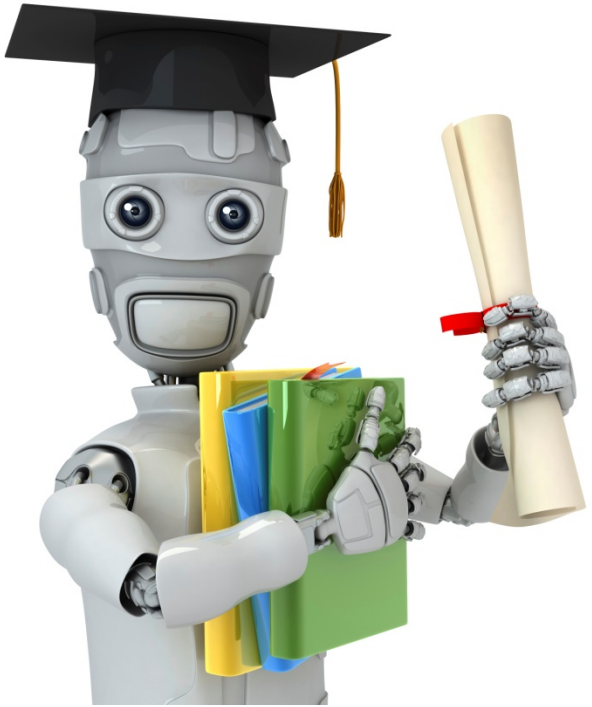


Machine Learning

Machine learning system design

Data for machine learning

Designing a high accuracy learning system

opçoes palavras para completar frase

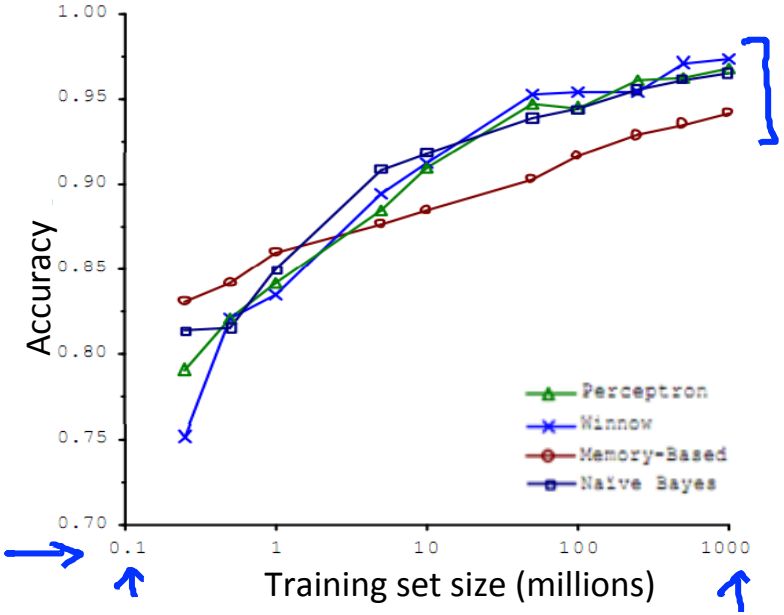
E.g. Classify between confusable words.

{to, two, too}, {then, than}

For breakfast I ate _____ eggs.

Algorithms

- Perceptron (Logistic regression)
- Winnow
- Memory-based
- Naïve Bayes



"It's not who has the best algorithm that wins.

It's who has the most data."

[Banko and Brill, 2001]

Large data rationale

Assume feature $x \in \mathbb{R}^{n+1}$ has sufficient information to predict y accurately.

Example: For breakfast I ate two eggs.

Counterexample: Predict housing price from only size (feet^2) and no other features.

Useful test: Given the input x, can a human expert confidently predict y?

Large data rationale

Use a learning algorithm with many parameters (e.g. logistic regression/linear regression with many features; neural network with many hidden units).

low bias algorithms.

$J_{train}(\theta)$ will be small.

Use a very large training set (unlikely to overfit)

low variance

$J_{train}(\theta) \approx J_{test}(\theta)$

$J_{test}(\theta)$ will be small