Introduction to Machine Learning

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Outline

Types of machine learning

Supervised learning

Learning using examples which have both features and the desired target.

Unsupervised learning

Learning using only features. Don't know the targets

Reinforcement learning

Computer is only given feedback as to whether the answer is right or wrong.

Evolutionary learning

Learning where a solution is evolved from some starting population based on a fitness function.

Problem types

- Regression
- Classification

Algorithms

Supervised learning algorithms

- Naive Bayes
- Support Vector Machines (SVM)
- k-Nearest Neighbors
- Decision trees (C4.5)
- Random forests
- Logistic regression
- Stochastic Gradient Descent
- Artificial Neural networks

Unsupervised learning algorithms

- k-means clustering
- Artificial neural networks
- Self-organizing maps
- Hierarchical clustering
- Mean shift clustering
- Affinity propagation

Languages and libraries

Java

- Apache Mahout
- Weka

Python

- Scikit-learn
- PyBrain
- Natural Language Toolkit (NLTK)
- PyML

C#

- IKVM & Weka
- AForge.NET & Accord.NET

Others

- R stats package w/various add-ons
- libsvm, libFANN (C/C++)
- Incanter (Clojure)

Species classifier

Example (Species Classifier)

- Features: Name, class, sex, age, weight, color, state
- Target: Species

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