Machine learning

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1 Introduction

2 Linear regression with one variable

2.1 Model and cost function

2.2 Parameter learning

3 Linear regression with multiple variables

3.1 Multivariate linear regression

3.2 Computing parameters analytically

4 Logistic regression

4.1 Classification and representation

4.2 Logistic regression model

4.3 Multiclass classification

5 Regularization

Regularization helps prevent models from overfitting the training data.

5.1 Solving the problem of overfitting

6 Neural networks: representation

7 Neural networks: learning

7.1 Cost function and backpropagation

7.2 Backpropagation in practice

7.3 Application of neural networks

8 Advice for applying machine learning

8.1 Evaluating a learning algorithm

8.2 Bias vs. variance

9 Machine learning system design

9.1 Building a spam classifier

9.2 Handling skewed data

9.3 Using large data sets

10 Support vector machines

10.1 Large margin classification

10.2 Kernels

10.3 SVMs in practice

11 Unsupervised learning

While supervised learning algorithms need labeled examples (x, y), unsupervised learning algorithms need only the input (x). Clustering is used for market segmentation, text summarization, among many other applications.
Principal Compoent Analysis (PCA) is used to speed up learning algorithms, and is sometimes incredibly useful for visualizing and helping to understand the data.

11.1 Clustering

12 Dimensionality reduction

12.1 Principal Component Analysis

12.2 Applying PCA

13 Anomaly detection

13.1 Density estimation

13.2 Building an anomaly detection system

13.3 Multivariate gaussian distribution

14 Recommender systems

14.1 Predicting movie ratings

14.2 Collaborative filtering

14.3 Low rank matrix factorization

15 Large scale machine learning

15.1 Gradient descent with large datasets

15.2 Advanced topics

16 Application example: photo OCR