

# 1 Supervised Learning

## 1.1 Basics

### 1.1.1 Linear Regression

### 1.1.2 Logistic Regression

### 1.1.3 Nearest Neighbour Classification

## 1.2 Optimisation Algorithms

## 1.3 Parametric Methods

## 1.4 Kernel Machines

## 1.5 Bayesian Networks

## 1.6 Gaussian Processes

## 1.7 Combining Learners

## 2 Unsupervised Learning

### 2.1 Density Estimation

#### 2.1.1 Mixture Models

#### 2.1.2 Expectation Maximisation (EM)

#### 2.1.3 Histogram

#### 2.1.4 Kernel Density Estimator

#### 2.1.5 K-Nearest Neighbours Estimator

### 2.2 Clustering

#### 2.2.1 K-Means

#### 2.2.2 Hierarchical

#### 2.2.3 Mean Shift

### 2.3 Dimensionality Reduction

#### 2.3.1 Subset Selection

#### 2.3.2 Principal Component Analysis

#### 2.3.3 Multidimensional Scaling

#### 2.3.4 Fisher's LDA

#### 2.3.5 Isomap

#### 2.3.6 t-distributed Stochastic Neighbour Embedding

## **3 Neural Networks**

### **3.1 Multilayer Perceptrons (MLPs)**

### **3.2 Backpropagation**

### **3.3 Autoencoders**

### **3.4 Deep Learning**