

Table of Contents

Contents

Preface

## SECTION I: INTRODUCTION

Introduction

Data mining

Data mining steps

Data collection

Data pre-processing

Data analysis

Data post-processing

Machine learning basics

Supervised learning

Unsupervised learning

Semi-supervised learning

Function approximation

Generative and discriminative models

Evaluation of learner

## SECTION II: MACHINE LEARNING

Data pre-processing

Feature extraction

Sampling

Data transformation

Outlier removal

Data deduplication

Relevance filtering

Normalization, discretization and aggregation

Entity resolution

Supervised learning

Classification

Regression analysis

Logistic regression

Evaluation of learner

Evaluating a learner

Unsupervised learning

Types of clustering

k-means clustering

Hierarchical clustering

Visualizing clusters

Evaluation of clusters

Semi-supervised learning

7.1 Expectation maximization

7.2 Pseudo labeling

## SECTION III: DEEP LEARNING

Deep Learning

8.1 Deep Learning Basics

8.2 Convolutional neural networks

8.3 Recurrent neural networks

8.4 Restricted Boltzmann machines

8.5 Deep belief networks

8.6 Deep autoencoders

#### SECTION IV: LEARNING TECHNIQUES

Learning techniques

Learning issues

Cross-validation

Ensemble learning

Reinforcement learning

Active learning

Machine teaching

Automated machine learning

#### SECTION V: MACHINE LEARNING APPLICATIONS

Machine Learning Applications

Anomaly detection

Biomedicale applications

Natural language processing

Other applications

Future development

Research directions

References

Index