

1. Record Nr.	UNINA9910830365503321
Autore	Tuffery Stephane
Titolo	Deep learning : from big data to artificial intelligence with R // Stephane Tuffery
Pubbl/distr/stampa	Chichester, West Sussex : , : Wiley, , 2023
ISBN	1-119-84504-1 1-119-84502-5
Descrizione fisica	1 online resource (542 pages)
Disciplina	006.31
Soggetti	Deep learning (Machine learning) Big data - Statistical methods R (Computer program language)
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Cover -- Title Page -- Copyright -- Contents -- Acknowledgements -- Introduction -- Chapter 1 From Big Data to Deep Learning -- 1.1 Introduction -- 1.2 Examples of the Use of Big Data and Deep Learning -- 1.3 Big Data and Deep Learning for Companies and Organizations -- 1.3.1 Big Data in Finance -- 1.3.1.1 Google Trends -- 1.3.1.2 Google Trends and Stock Prices -- 1.3.1.3 The quantmod Package for Financial Analysis -- 1.3.1.4 Google Trends in R -- 1.3.1.5 Matching Data from quantmod and Google Trends -- 1.3.2 Big Data and Deep Learning in Insurance -- 1.3.3 Big Data and Deep Learning in Industry -- 1.3.4 Big Data and Deep Learning in Scientific Research and Education -- 1.3.4.1 Big Data in Physics and Astrophysics -- 1.3.4.2 Big Data in Climatology and Earth Sciences -- 1.3.4.3 Big Data in Education -- 1.4 Big Data and Deep Learning for Individuals -- 1.4.1 Big Data and Deep Learning in Healthcare -- 1.4.1.1 Connected Health and Telemedicine -- 1.4.1.2 Geolocation and Health -- 1.4.1.3 The Google Flu Trends -- 1.4.1.4 Research in Health and Medicine -- 1.4.2 Big Data and Deep Learning for Drivers -- 1.4.3 Big Data and Deep Learning for Citizens -- 1.4.4 Big Data and Deep Learning in the Police -- 1.5 Risks in Data Processing -- 1.5.1 Insufficient Quantity of Training Data -- 1.5.2 Poor Data Quality -- 1.5.3 NonRepresentative Samples -- 1.5.4 Missing Values in the Data -- 1.5.5 Spurious Correlations -- 1.5.6 Overfitting

-- 1.5.7 Lack of Explainability of Models -- 1.6 Protection of Personal Data -- 1.6.1 The Need for Data Protection -- 1.6.2 Data Anonymization -- 1.6.3 The General Data Protection Regulation -- 1.7 Open Data -- Notes -- Chapter 2 Processing of Large Volumes of Data -- 2.1 Issues -- 2.2 The Search for a Parsimonious Model -- 2.3 Algorithmic Complexity -- 2.4 Parallel Computing -- 2.5 Distributed Computing -- 2.5.1 MapReduce. 2.5.2 Hadoop -- 2.5.3 Computing Tools for Distributed Computing -- 2.5.4 ColumnOriented Databases -- 2.5.5 Distributed Architecture and "Analytics" -- 2.5.6 Spark -- 2.6 Computer Resources -- 2.6.1 Minimum Resources -- 2.6.2 Graphics Processing Units (GPU) and Tensor Processing Units (TPU) -- 2.6.3 Solutions in the Cloud -- 2.7 R and Python Software -- 2.8 Quantum Computing -- Notes -- Chapter 3 Reminders of Machine Learning -- 3.1 General -- 3.2 The Optimization Algorithms -- 3.3 Complexity Reduction and Penalized Regression -- 3.4 Ensemble Methods -- 3.4.1 Bagging -- 3.4.2 Random Forests -- 3.4.3 ExtraTrees -- 3.4.4 Boosting -- 3.4.5 Gradient Boosting Methods -- 3.4.6 Synthesis of the Ensemble Methods -- 3.5 Support Vector Machines -- 3.6 Recommendation Systems -- Notes -- Chapter 4 Natural Language Processing -- 4.1 From Lexical Statistics to Natural Language Processing -- 4.2 Uses of Text Mining and Natural Language Processing -- 4.3 The Operations of Textual Analysis -- 4.3.1 Textual Data Collection -- 4.3.2 Identification of the Language -- 4.3.3 Tokenization -- 4.3.4 PartofSpeech Tagging -- 4.3.5 Named Entity Recognition -- 4.3.6 Coreference Resolution -- 4.3.7 Lemmatization -- 4.3.8 Stemming -- 4.3.9 Simplifications -- 4.3.10 Removal of Stop Words -- 4.4 Vector Representation and Word Embedding -- 4.4.1 Vector Representation -- 4.4.2 Analysis on the DocumentTerm Matrix -- 4.4.3 TFIDF Weighting -- 4.4.4 Latent Semantic Analysis -- 4.4.5 Latent Dirichlet Allocation -- 4.4.6 Word Frequency Analysis -- 4.4.7 Word2Vec Embedding -- 4.4.8 GloVe Embedding -- 4.4.9 FastText Embedding -- 4.5 Sentiment Analysis -- Notes -- Chapter 5 Social Network Analysis -- 5.1 Social Networks -- 5.2 Characteristics of Graphs -- 5.3 Characterization of Social Networks -- 5.4 Measures of Influence in a Graph -- 5.5 Graphs with R -- 5.6 Community Detection. 5.6.1 The Modularity of a Graph -- 5.6.2 Community Detection by Divisive Hierarchical Clustering -- 5.6.3 Community Detection by Agglomerative Hierarchical Clustering -- 5.6.4 Other Methods -- 5.6.5 Community Detection with R -- 5.7 Research and Analysis on Social Networks -- 5.8 The Business Model of Social Networks -- 5.9 Digital Advertising -- 5.10 Social Network Analysis with R -- 5.10.1 Collecting Tweets -- 5.10.2 Formatting the Corpus -- 5.10.3 Stemming and Lemmatization -- 5.10.4 Example -- 5.10.5 Clustering of Terms and Documents -- 5.10.6 Opinion Scoring -- 5.10.7 Graph of Terms with Their Connotation -- Notes -- Chapter 6 Handwriting Recognition -- 6.1 Data -- 6.2 Issues -- 6.3 Data Processing -- 6.4 Linear and Quadratic Discriminant Analysis -- 6.5 Multinomial Logistic Regression -- 6.6 Random Forests -- 6.7 ExtraTrees -- 6.8 Gradient Boosting -- 6.9 Support Vector Machines -- 6.10 Single Hidden Layer Perceptron -- 6.11 H2O Neural Network -- 6.12 Synthesis of "Classical" Methods -- Notes -- Chapter 7 Deep Learning -- 7.1 The Principles of Deep Learning -- 7.2 Overview of Deep Neural Networks -- 7.3 Recall on Neural Networks and Their Training -- 7.4 Difficulties of Gradient Backpropagation -- 7.5 The Structure of a Convolutional Neural Network -- 7.6 The Convolution Mechanism -- 7.7 The Convolution Parameters -- 7.8 Batch Normalization -- 7.9 Pooling -- 7.10 Dilated Convolution -- 7.11 Dropout and DropConnect -- 7.12 The Architecture of a Convolutional Neural Network -- 7.13 Principles of

Deep Network Learning for Computer Vision -- 7.14 Adaptive Learning Algorithms -- 7.15 Progress in Image Recognition -- 7.16 Recurrent Neural Networks -- 7.17 Capsule Networks -- 7.18 Autoencoders -- 7.19 Generative Models -- 7.19.1 Generative Adversarial Networks -- 7.19.2 Variational Autoencoders -- 7.20 Other Applications of Deep Learning.

7.20.1 Object Detection -- 7.20.2 Autonomous Vehicles -- 7.20.3 Analysis of Brain Activity -- 7.20.4 Analysis of the Style of a Pictorial Work -- 7.20.5 Go and Chess Games -- 7.20.6 Other Games -- Notes -- Chapter 8 Deep Learning for Computer Vision -- 8.1 Deep Learning Libraries -- 8.2 MXNet -- 8.2.1 General Information about MXNet -- 8.2.2 Creating a Convolutional Network with MXNet -- 8.2.3 Model Management with MXNet -- 8.2.4 CIFAR10 Image Recognition with MXNet -- 8.3 Keras and TensorFlow -- 8.3.1 General Information about Keras -- 8.3.2 Application of Keras to the MNIST Database -- 8.3.3 Application of PreTrained Models -- 8.3.4 Explain the Prediction of a Computer Vision Model -- 8.3.5 Application of Keras to CIFAR10 Images -- 8.3.6 Classifying Cats and Dogs -- 8.4 Configuring a Machine's GPU for Deep Learning -- 8.4.1 Checking the Compatibility of the Graphics Card -- 8.4.2 NVIDIA Driver Installation -- 8.4.3 Installation of Microsoft Visual Studio -- 8.4.4 NVIDIA CUDA Toolkit Installation -- 8.4.5 Installation of cuDNN -- 8.5 Computing in the Cloud -- 8.6 PyTorch -- 8.6.1 The Python PyTorch Package -- 8.6.2 The R torch Package -- Notes -- Chapter 9 Deep Learning for Natural Language Processing -- 9.1 Neural Network Methods for Text Analysis -- 9.2 Text Generation Using a Recurrent Neural Network LSTM -- 9.3 Text Classification Using a LSTM or GRU Recurrent Neural Network -- 9.4 Text Classification Using a H2O Model -- 9.5 Application of Convolutional Neural Networks -- 9.6 Spam Detection Using a Recurrent Neural Network LSTM -- 9.7 Transformer Models, BERT, and Its Successors -- Notes -- Chapter 10 Artificial Intelligence -- 10.1 The Beginnings of Artificial Intelligence -- 10.2 Human Intelligence and Artificial Intelligence -- 10.3 The Different Forms of Artificial Intelligence.

10.4 Ethical and Societal Issues of Artificial Intelligence -- 10.5 Fears and Hopes of Artificial Intelligence -- 10.6 Some Dates of Artificial Intelligence -- Notes -- Conclusion -- Annotated Bibliography -- On Big Data and High Dimensional Statistics -- On Deep Learning -- On Artificial Intelligence -- On the Use of R and Python in Data Science and on Big Data -- Index -- EULA.
