

## CONTENTS

### [Acknowledgments](#)

### [I. Machine Learning with Scikit-Learn](#)

#### [1. Machine Learning](#)

##### [What Is Machine Learning?](#)

##### [Machine Learning Versus Artificial Intelligence](#)

##### [Supervised Versus Unsupervised Learning](#)

##### [Unsupervised Learning with k-Means Clustering](#)

##### [Applying k-Means Clustering to Customer Data](#)

##### [Segmenting Customers Using More Than Two Dimensions](#)

##### [Supervised Learning](#)

##### [k-Nearest Neighbors](#)

##### [Using k-Nearest Neighbors to Classify Flowers](#)

##### [Summary](#)

#### [2. Regression Models](#)

##### [Linear Regression](#)

##### [Decision Trees](#)

##### [Random Forests](#)

##### [Gradient-Boosting Machines](#)

##### [Support Vector Machines](#)

##### [Accuracy Measures for Regression Models](#)

##### [Using Regression to Predict Taxi Fares](#)

##### [Summary](#)

#### [3. Classification Models](#)

##### [Logistic Regression](#)

##### [Accuracy Measures for Classification Models](#)

##### [Categorical Data](#)

##### [Binary Classification](#)

##### [Classifying Passengers Who Sailed on the Titanic](#)

##### [Detecting Credit Card Fraud](#)

##### [Multiclass Classification](#)

##### [Building a Digit Recognition Model](#)

##### [Summary](#)

#### [4. Text Classification](#)

##### [Preparing Text for Classification](#)

##### [Sentiment Analysis](#)

##### [Naive Bayes](#)

##### [Spam Filtering](#)

##### [Recommender Systems](#)

##### [Cosine Similarity](#)

##### [Building a Movie Recommendation System](#)

##### [Summary](#)

#### [5. Support Vector Machines](#)

##### [How Support Vector Machines Work](#)

##### [Kernels](#)

##### [Kernel Tricks](#)

##### [Hyperparameter Tuning](#)

##### [Data Normalization](#)

[Pipelining](#)

[Using SVMs for Facial Recognition](#)

[Summary](#)

[6. Principal Component Analysis](#)

[Understanding Principal Component Analysis](#)

[Filtering Noise](#)

[Anonymizing Data](#)

[Visualizing High-Dimensional Data](#)

[Anomaly Detection](#)

[Using PCA to Detect Credit Card Fraud](#)

[Using PCA to Predict Bearing Failure](#)

[Multivariate Anomaly Detection](#)

[Summary](#)

[7. Operationalizing Machine Learning Models](#)

[Consuming a Python Model from a Python Client](#)

[Versioning Pickle Files](#)

[Consuming a Python Model from a C# Client](#)

[Containerizing a Machine Learning Model](#)

[Using ONNX to Bridge the Language Gap](#)

[Building ML Models in C# with ML.NET](#)

[Sentiment Analysis with ML.NET](#)

[Saving and Loading ML.NET Models](#)

[Adding Machine Learning Capabilities to Excel](#)

[Summary](#)

[II. Deep Learning with Keras and TensorFlow](#)

[8. Deep Learning](#)

[Understanding Neural Networks](#)

[Training Neural Networks](#)

[Summary](#)

[9. Neural Networks](#)

[Building Neural Networks with Keras and TensorFlow](#)

[Sizing a Neural Network](#)

[Using a Neural Network to Predict Taxi Fares](#)

[Binary Classification with Neural Networks](#)

[Making Predictions](#)

[Training a Neural Network to Detect Credit Card Fraud](#)

[Multiclass Classification with Neural Networks](#)

[Training a Neural Network to Recognize Faces](#)

[Dropout](#)

[Saving and Loading Models](#)

[Keras Callbacks](#)

[Summary](#)

[10. Image Classification with Convolutional Neural Networks](#)

[Understanding CNNs](#)

[Using Keras and TensorFlow to Build CNNs](#)

[Training a CNN to Recognize Arctic Wildlife](#)

[Pretrained CNNs](#)

[Using ResNet50V2 to Classify Images](#)

[Transfer Learning](#)

[Using Transfer Learning to Identify Arctic Wildlife](#)

[Data Augmentation](#)

[Image Augmentation with ImageDataGenerator](#)

[Image Augmentation with Augmentation Layers](#)

[Applying Image Augmentation to Arctic Wildlife](#)

[Global Pooling](#)

[Audio Classification with CNNs](#)

[Summary](#)

[11. Face Detection and Recognition](#)

[Face Detection](#)

[Face Detection with Viola-Jones](#)

[Using the OpenCV Implementation of Viola-Jones](#)

[Face Detection with Convolutional Neural Networks](#)

[Extracting Faces from Photos](#)

[Facial Recognition](#)

[Applying Transfer Learning to Facial Recognition](#)

[Boosting Transfer Learning with Task-Specific Weights](#)

[ArcFace](#)

[Putting It All Together: Detecting and Recognizing Faces in Photos](#)

[Handling Unknown Faces: Closed-Set Versus Open-Set Classification](#)

[Summary](#)

[12. Object Detection](#)

[R-CNNs](#)

[Mask R-CNN](#)

[YOLO](#)

[YOLOv3 and Keras](#)

[Custom Object Detection](#)

[Training a Custom Object Detection Model with the Custom Vision Service](#)

[Using the Exported Model](#)

[Summary](#)

[13. Natural Language Processing](#)

[Text Preparation](#)

[Word Embeddings](#)

[Text Classification](#)

[Automating Text Vectorization](#)

[Using TextVectorization in a Sentiment Analysis Model](#)

[Factoring Word Order into Predictions](#)

[Recurrent Neural Networks \(RNNs\)](#)

[Using Pretrained Models to Classify Text](#)

[Neural Machine Translation](#)

[LSTM Encoder-Decoders](#)

[Transformer Encoder-Decoders](#)

[Building a Transformer-Based NMT Model](#)

[Using Pretrained Models to Translate Text](#)

[Bidirectional Encoder Representations from Transformers \(BERT\)](#)

[Building a BERT-Based Question Answering System](#)

[Fine-Tuning BERT to Perform Sentiment Analysis](#)

[Summary](#)

[14. Azure Cognitive Services](#)

[Introducing Azure Cognitive Services](#)

[Keys and Endpoints](#)

[Calling Azure Cognitive Services APIs](#)

[Azure Cognitive Services Containers](#)

[The Computer Vision Service](#)

[The Language Service](#)

[The Translator Service](#)

[The Speech Service](#)

[Putting It All Together: Contoso Travel](#)

[Summary](#)

[Index](#)

[About the Author](#)