

CONTENTS

PART 1 Overview of Marketing Analytics and Data Management	1	<i>Data Preparation</i>	43
		<i>Data Transformation</i>	46
1 Introduction to Marketing Analytics	2	CASE STUDY: AVOCADO TOAST: A RECIPE TO LEARN SQL	47
1.1 Introduction to Marketing Analytics	3	<i>Getting Started</i>	47
<i>Marketing Analytics Defined</i>	3	<i>Understanding the Dataset</i>	47
<i>Analytics Levels and Their Impact on Competitive Advantage</i>	5	<i>Applying the Concepts</i>	48
1.2 Defining the Right Business Problems	7	<i>Aggregation</i>	55
1.3 Data Sources	11	<i>Build Your Own Supplier Table</i>	56
1.4 Data Types	13	<i>Add Data to Your Table</i>	57
<i>Types of Data</i>	13	<i>Join the Two Tables (MERGE)</i>	57
<i>Data Measurement</i>	13	<i>Update the Data</i>	58
<i>Metric Measurement Scales</i>	15	<i>Delete Values</i>	59
1.5 Predictors versus Target Variable	15	Summary of Learning Objectives and Key Terms	61
<i>Types of Variables</i>	15	Discussion and Review Questions	61
1.6 Modeling Types: Supervised Learning versus Unsupervised Learning	15	Critical Thinking and Marketing Applications	61
1.7 The 7-Step Marketing Analytics Process	17		
<i>Step 1: Business Problem Understanding</i>	17	PART 2 Exploring and Visualizing Data Patterns	64
<i>Step 2: Data Understanding and Collection</i>	18	3 Exploratory Data Analysis Using Cognitive Analytics	65
<i>Step 3: Data Preparation and Feature Selection</i>	19	3.1 The Importance of Exploratory Data Analysis	66
<i>Step 4: Modeling Development</i>	20	3.2 Defining Cognitive Analytics and Knowledge Discovery	67
<i>Step 5: Model Evaluation and Interpretation</i>	20	<i>The Cognitive Analytics Technology that Won Jeopardy</i>	67
<i>Step 6: Model and Results Communication</i>	20	3.3 Discovering Different Use Cases for Cognitive Analytics	69
<i>Step 7: Model Deployment</i>	21	<i>Cognitive Analytics to Interface with the Customer</i>	69
1.8 Setting Yourself Apart	22	<i>Cognitive Analytics to Support Internal Operations and Decision Making</i>	69
Summary of Learning Objectives and Key Terms	25	3.4 Combining Internal and External Data Sources for Improved Insights	72
Discussion and Review Questions	25	CASE STUDY: A CLOSER LOOK AT ONLINE CUSTOMER EXPERIENCE	75
Critical Thinking and Marketing Applications	25	<i>Understanding the Business Problem</i>	75
		<i>Understanding the Dataset</i>	75
2 Data Management	28	<i>Applying the Concepts</i>	76
2.1 The Era of Big Data Is Here	29	<i>Insights Learned from Applying the Concepts</i>	91
2.2 Database Management Systems (DBMS)	33	Summary of Learning Objectives and Key Terms	93
2.3 Enterprise Data Architecture	35	Discussion and Review Questions	93
<i>Traditional ETL</i>	36	Critical Thinking and Marketing Applications	93
<i>ETL Using Hadoop</i>	36		
<i>A Closer Look at Data Storage</i>	36		
2.4 Data Quality	39		
2.5 Data Understanding, Preparation, and Transformation	42		
<i>Data Understanding</i>	42		

4 Data Visualization	95	<i>Step 3: Evaluating the Model Results</i>	174
4.1 What Is Data Visualization?	96	<i>Step 4: Applying the Model to New Dataset</i>	175
4.2 Principles and Elements of Design for Data Visualization	98	<i>Insights Learned from Applying the Concepts</i>	181
<i>Principles of Design</i>	99	Summary of Learning Objectives and Key Terms	183
<i>The Basic Elements of Design</i>	100	Discussion and Review Questions	183
4.3 Fundamental Considerations When Developing Data Visualizations	104	Critical Thinking and Marketing Applications	183
<i>Common Types of Charts and Graphs</i>	104		
4.4 So, What's Your Story?	112		
CASE STUDY: TELECOMMUNICATIONS: OPTIMIZING CUSTOMER ACQUISITION	114	6 Neural Networks	184
<i>Understanding the Business Problem</i>	114	6.1 Introduction to Neural Networks	185
<i>Understanding the Dataset</i>	114	6.2 How Are Neural Networks Used in Practice?	186
<i>Data Preparation</i>	116	6.3 What Are the Basic Elements of a Neural Network?	188
<i>Applying the Concepts</i>	117	6.4 How Does a Neural Network Learn? <i>What Does This Process Look Like in Action?</i>	191
<i>Insights Learned from Applying the Concepts</i>	137	<i>How Does the Network Learn?</i>	194
Summary of Learning Objectives and Key Terms	138	<i>When Does the Network Stop Learning?</i>	195
Discussion and Review Questions	138	6.5 Key Reminders When Using Neural Networks	195
Critical Thinking and Marketing Applications	138	CASE STUDY: AIRLINE INDUSTRY: UNDERSTANDING CUSTOMER SATISFACTION	197
		<i>Understanding the Business Problem</i>	197
		<i>Understanding the Dataset</i>	197
		<i>Preparing the Data</i>	198
		<i>Applying the Concepts</i>	199
		<i>Stage 1: Preparing the Data for Modeling</i>	201
		<i>Stage 2: Setting Up the Training Model and Cross Validation</i>	212
		<i>Stage 3: Evaluating the Model Results</i>	218
		<i>Stage 4: Applying the Model to a New Dataset</i>	221
		<i>Insights Learned from Applying the Concepts</i>	227
		Summary of Learning Objectives and Key Terms	228
		Discussion and Review Questions	228
		Critical Thinking and Marketing Applications	228
PART 3 Analytical Methods for Supervised Learning	140		
5 Regression Analysis	141	7 Automated Machine Learning	230
5.1 What Is Regression Modeling?	142	7.1 What Is Automated Machine Learning (AutoML)?	231
<i>Simple Linear Regression</i>	143	<i>What Questions Might Arise?</i>	232
<i>Multiple Linear Regression</i>	145	7.2 AutoML in Marketing	234
<i>Evaluating the Ability of the Regression Model to Predict</i>	145	<i>Which Companies Are Actively Using AutoML?</i>	234
5.2 The Predictive Regression Model	147	7.3 What Are Key Steps in the Automated Machine Learning Process?	237
5.3 Predictive Regression Performance	148	<i>Data Preparation</i>	237
5.4 Model Validation	150	<i>Model Building</i>	237
5.5 Modeling Categorical Variables	151	<i>Creating Ensemble Models</i>	238
5.6 Model Independent Variable Selection	152		
<i>Detecting Multicollinearity</i>	153		
<i>Feature Selection</i>	153		
CASE STUDY: NEED A RIDE? PREDICTING PRICES THAT CUSTOMERS ARE WILLING TO PAY FOR RIDESHARING SERVICES	155		
<i>Understanding the Business Problem</i>	155		
<i>Understanding the Dataset</i>	155		
<i>Data Preparation</i>	156		
<i>Applying the Concepts</i>	157		
<i>Step 1: Preparing the Data for Modeling</i>	158		
<i>Step 2: Setting Up the Training Model and Cross Validation</i>	169		

<i>Advanced Ensemble Methods</i>	239	9.3 Association Rules: How Does a Market Basket Analysis Identify Product Relationships?	308
<i>Model Recommendation</i>	240	9.4 Special Topics in Market Basket Analysis	311
CASE STUDY: LOAN DATA: UNDERSTANDING WHEN AND HOW TO SUPPORT FISCAL RESPONSIBILITY IN CUSTOMERS	242	CASE STUDY: ONLINE DEPARTMENT STORE: UNDERSTANDING CUSTOMER PURCHASE PATTERNS	314
<i>Understanding the Business Problem</i>	242	<i>Understanding the Business Problem</i>	314
<i>Understanding the Dataset</i>	242	<i>Understanding the Dataset</i>	314
<i>Uploading the Data</i>	243	<i>Data Preparation</i>	315
<i>Examining the Features</i>	246	<i>Applying the Concepts</i>	315
<i>Defining the Target Variable</i>	249	<i>Loading Data</i>	321
<i>Running the Model</i>	252	<i>Preparing the Data</i>	323
<i>Evaluating the Model Results</i>	256	<i>Running FP-Growth</i>	326
<i>Applying the Model to Predict New Cases</i>	259	<i>Creating Association Rules</i>	327
<i>Insights Learned from Applying the Concepts</i>	262	<i>Insights Learned from Applying the Concepts</i>	331
Summary of Learning Objectives and Key Terms	263	Summary of Learning Objectives and Key Terms	332
Discussion and Review Questions	263	Discussion and Review Questions	332
Critical Thinking and Marketing Applications	263	Critical Thinking and Marketing Applications	332
PART 4 Analytical Methods for Unsupervised Learning	265	PART 5 Emerging Analytical Approaches	334
8 Cluster Analysis	266	10 Natural Language Processing	335
8.1 What Is Cluster Analysis?	267	10.1 What Is Natural Language Processing?	336
8.2 How Is Cluster Analysis Used in Practice?	268	10.2 How Is Natural Language Processing Used in Practice?	338
8.3 How Does a Cluster Analysis Function?	269	<i>Optimize Inventory and Engage Customers in Marketing Campaigns</i>	338
8.4 What Are the Types of Cluster Analysis?	271	<i>Produce New Products to Meet Customer Needs</i>	338
<i>K-Means Clustering</i>	271	<i>Simplify Guest Travel to Improve Hospitality</i>	339
<i>K-Means Issues to Remember</i>	273	<i>Create a Better Experience for Customers</i>	339
<i>Hierarchical Clustering</i>	273	<i>Add Unique Features to Products</i>	339
<i>Hierarchical Clustering Issues to Remember</i>	276	<i>Improve Customer Service</i>	339
CASE STUDY: ONLINE PERFUME AND COSMETIC SALES: UNDERSTANDING CUSTOMER SEGMENTATION THROUGH CLUSTER ANALYSIS	277	<i>Facilitate Customer Ordering</i>	339
<i>Understanding the Business Problem</i>	277	<i>Strengthen Customer Relationships</i>	340
<i>Understanding the Dataset</i>	277	10.3 How Is Text Analytics Applied?	340
<i>Applying the Concepts</i>	278	<i>Step 1: Text Acquisition and Aggregation</i>	340
<i>Opening Python Using Anaconda</i>	279	<i>Step 2: Text Preprocessing</i>	341
<i>Preparing the Python Environment</i>	283	<i>Tokenization</i>	341
<i>Insights Learned from Applying the Concepts</i>	302	<i>Stemming</i>	341
Summary of Learning Objectives and Key Terms	303	<i>Lemmatization</i>	342
Discussion and Review Questions	303	<i>Stop Words Removal</i>	342
Critical Thinking and Marketing Applications	303	<i>N-Grams</i>	342
9 Market Basket Analysis	304	<i>Bag of Words</i>	342
9.1 What Is Market Basket Analysis?	305	<i>Term-Document Matrix</i>	342
9.2 How Is Market Basket Analysis Used in Practice?	306		

<i>Step 3: Text Exploration</i>	344	<i>Step 6: Running a Network Report and</i>	
<i>Frequency Bar Chart</i>	344	<i>Downloading Results</i>	400
<i>Word Clouds</i>	345	<i>Insights Learned from Applying the Concepts</i>	403
<i>Step 4: Text Modeling</i>	345	Summary of Learning Objectives and	
10.4 Special Topics in Text Analytics	347	Key Terms	404
CASE STUDY: SPECIALTY FOOD ONLINE		Discussion and Review Questions	404
REVIEW: UNDERSTANDING CUSTOMER		Critical Thinking and Marketing Applications	404
SENTIMENTS	349		
<i>Understanding the Business Problem</i>	349	12 Fundamentals of Digital	
<i>Understanding the Dataset</i>	349	Marketing Analytics	406
<i>Data Preparation</i>	350	12.1 What Are the Basics of Digital Marketing?	407
<i>Applying the Concepts</i>	350	<i>What Is Owned Digital Media?</i>	407
<i>Opening Python Using Anaconda</i>	351	<i>What Is Paid Digital Media?</i>	407
<i>Preparing the Python Environment</i>	355	<i>What Is Earned Digital Media?</i>	407
<i>Text Preprocessing</i>	361	<i>How Is Digital Marketing Used?</i>	408
<i>Topic Modeling</i>	364	12.2 Digital Marketing Analytics in Practice	408
<i>Sentiment Analysis Using TextBlob</i>	365	<i>Owned Digital Marketing Media</i>	410
<i>Sentiment Analysis Using Vader</i>	366	<i>Paid Digital Marketing Media</i>	412
<i>Insights Learned from Applying</i>		<i>Earned Digital Marketing Media</i>	413
<i>the Concepts</i>	368	12.3 Digital Marketing Analytics Measures	415
Summary of Learning Objectives and		<i>Audience Analysis</i>	416
Key Terms	369	<i>Acquisition Analysis</i>	417
Discussion and Review Questions	369	<i>Behavior Analysis</i>	417
Critical Thinking and Marketing Applications	369	<i>Conversion Analysis</i>	418
		<i>A/B Testing</i>	419
11 Social Network Analysis	372	<i>Multivariate Testing</i>	419
11.1 What Is Social Network Analysis?	373	<i>Multichannel Attribution</i>	419
11.2 Social Network Analysis in Practice	374	12.4 How Does A/B Testing Work?	420
11.3 How Does a Social Network		CASE STUDY: E-COMMERCE:	
Analysis Function?	379	THE GOOGLE ONLINE MERCHANDISE	
<i>Network Measures</i>	380	STORE	422
<i>Measures of Centrality</i>	381	<i>Understanding the Business Problem</i>	422
<i>Network Structures</i>	383	<i>Understanding the Dataset</i>	422
11.4 Link Prediction Using Social		<i>Applying the Concepts</i>	423
Network Analysis	384	<i>Getting Started with Google Analytics</i>	423
CASE STUDY: AUTO INDUSTRY:		<i>Step 1: Accessing the Demo Account</i>	424
UNDERSTANDING NETWORK		<i>Step 2: Reviewing the Main Dashboard</i>	426
INFLUENCERS	386	<i>Step 3: Reviewing the Reports</i>	428
<i>Understanding the Business Problem</i>	386	<i>Insights Learned from Applying the Concepts</i>	440
<i>Understanding the Dataset</i>	386	<i>A Final Note</i>	441
<i>Data Preparation</i>	386	Summary of Learning Objectives and	
<i>Applying the Concepts</i>	388	Key Terms	442
<i>Step 1: Getting Started with Polinode</i>	388	Discussion and Review Questions	442
<i>Step 2: Uploading Data to Polinode</i>	389	Critical Thinking and Marketing Applications	442
<i>Step 3: Viewing the Network Graph</i>	391		
<i>Step 4: Measuring Network Properties</i>	394	Glossary	444
<i>Step 5: Updating Nodes Graph View</i>	397	Index	451