# Data Mining and Business Intelligence: A Guide to Productivity

## Table of Contents

<table>
<thead>
<tr>
<th>Preface</th>
<th>i</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Part I: Laying the Groundwork for Data Mining Technology</strong></td>
<td></td>
</tr>
<tr>
<td>Chapter 1. An Introduction to Information Technology and Business Intelligence</td>
<td>2</td>
</tr>
<tr>
<td>I) A Driving Source of Productivity (IT, Economic Theory and Business Strategy)</td>
<td>2</td>
</tr>
<tr>
<td>II) An Introduction to Business Intelligence</td>
<td>5</td>
</tr>
<tr>
<td>a) The BI Spectrum: Data Extraction and Report Writing, OLAP, Internets, Extranets and the Internet</td>
<td>5</td>
</tr>
<tr>
<td>III) Business Intelligence Extended (An Introduction to Data Mining)</td>
<td>7</td>
</tr>
<tr>
<td>a) An Introduction to Data Mining Methodologies</td>
<td>8</td>
</tr>
<tr>
<td>b) Visualization Tools for Reporting and Monitoring: The Humble Chart</td>
<td>12</td>
</tr>
<tr>
<td>IV) The Business Intelligence Cycle</td>
<td>17</td>
</tr>
<tr>
<td>a) Using Mining to Extend OLAP</td>
<td>18</td>
</tr>
<tr>
<td>V) Closing Thoughts on Business Intelligence and Productivity</td>
<td>19</td>
</tr>
<tr>
<td>a) Reducing Uncertainty by Minimizing the Variance</td>
<td>20</td>
</tr>
<tr>
<td>Chapter 2. Data Mining Defined</td>
<td>23</td>
</tr>
<tr>
<td>I) The Roots of Data Mining</td>
<td>23</td>
</tr>
<tr>
<td>a) A Closer Look at the Mining Process: (The Traditional Method)</td>
<td>24</td>
</tr>
<tr>
<td>II) Segmentation and Classification Revisited</td>
<td>28</td>
</tr>
<tr>
<td>III) Neural Network and Regression Mining (The Robust Approach)</td>
<td>32</td>
</tr>
<tr>
<td>a) A Brief History of Neural Networks</td>
<td>32</td>
</tr>
<tr>
<td>b) Back to Regression and Neural Nets</td>
<td>34</td>
</tr>
</tbody>
</table>
Chapter 3. Steps To Success for the Mining Process ........................................ 43
   I) Mining the Right Data (Garbage In, Garbage Out) .................... 43
      a) How Much Is My Existing Data Worth? .......................... 44
   II) Think First, Mine Later (Nine Easy Steps for Success) .......... 45
   III) Pitfalls: Torturing the Data to Get the Answer
      You Want to Hear .................................................................. 53
   IV) Pitfall: The Pursuit of Statistical Perfection ........................ 54
   V) Bridging the Steps to Success to 6 Sigma
      Applications (Productivity Enhancing Strategies) ................... 56

Chapter 4. Essential Mining Approaches to Problem Solving ....................... 58
   I) Forecasting Tools ................................................................ 58
      a) Forecasting: Univariate and Multivariate .......................... 58
   II) From Analysis Over Time to Analysis of a
      Snapshot in Time .................................................................... 64
      a) Target Measures and Probability Mining ......................... 67

Part II : Prevalent Applications
   in the World of Commerce

Chapter 5. A Closer Look at Marketing/Advertising,
   Promotions and Pricing Policies Using
   Econometric Based Modeling ................................................. 70
   I) Regression/Neural Networks for Marketing
      Analysis ............................................................................. 71
   II) Measuring the Immediate Impact of Advertising  ................. 75
   III) Measuring the Impact of Price and Promotions .................. 79
   IV) Measuring the Longer Term Impact of Advertising .............. 81
      a) Other Techniques to Measure Longer Term
         Impacts of Advertising on Target Measures ..................... 84
   V) A Closer Look at Pricing Strategies ................................. 85
      a) Price Optimization Using Cross-Sections:
         Data Mining for Pricing ............................................... 85
      b) Price Elasticity ............................................................ 86
      c) Finding the Optimum and Break-Even Prices ................. 87
   IV) A Brief Mention of Other Regression
      and Neural Network Applications ...................................... 90
      a) Market Research Analysis .............................................. 90
      b) Personnel Performance and Retention (HR) .................... 90
      c) Personnel Selection ...................................................... 91
Chapter 6. Turning Your Brick and Mortar into a Click and Mortar by Engage Inc. .................................................... 94
I) The Establishment Goes Wired ......................................................... 94
II) Online Profiling is the Key ................................................................. 96
III) The 360 Degree Customer View ........................................................ 98
IV) Modify and Convert .......................................................................... 100
V) A Word on Privacy ............................................................................ 102
VI) To Infinity...And Beyond.................................................................. 103
VII) Did You Ever Think Your Data Would Be This Valuable?.................. 105

Chapter 7. Improving the Web Experience through Real-Time Analysis (A Market Basket Approach) by Macromedia ........................................ 106
I) An Introduction to Internet Personalization ...................................... 107
a) Basic Personalization ...................................................................... 108
b) Collaborative Filtering Brings New Dimension of Pattern Recognition to Personalization ............................................................. 109
c) Item Affinity: An Extension to Traditional Market Basket Analysis ...................................................................................... 110
d) One Advantage of Market Basket Analysis Over Item Affinity ......... 110
e) Item Affinity: Taking the Best of Market Basket Theory to the Internet ...................................................................................... 111
f) How an Implementation of Item Affinity Works in Comparison to Market Basket Analysis ......................................................... 111
g) A Recap of Why Item Affinity is Superior to Market Basket Analysis for Online Marketing ......................................................... 112
h) Feature Comparisons of Market Basket Analysis and an Implementation of Real-Time Item Affinity ........................................... 113
II) A More Detailed Description of Item Affinity ................................... 114
a) Counting Basics — How Item Affinity Goes About Its Tasks .......... 114
b) Multiple Baskets: Telling Item Affinity How to Count By Compressing Time ................................................................. 114
c) Multiple Events: Telling Item Affinity What to Count by Expanding Events ................................................................................... 116
III) Item Affinity in the Real World ....................................................... 116
IV) Conclusion ......................................................................................... 118

Chapter 8. Bringing It All Together (Data Mining on an Enterprise Level) ........................................................................... 119