List of Tables

2.1	Continuous Observations for Illustrative Example.	26
2.2a	The Binary Representation of the Observations in the Illustrative Example (first set of attributes for each example).	28
2.2b	The Binary Representation of the Observations in the Illustrative Example (second set of attributes for each example).	28
2.3	The $NEG(A_k)$ Sets for the Illustrative Example.	40
2.4	Some Computational Results When $n = 30$ and the OCAT Approach Is Used.	48
2.5	Some Computational Results When $n = 16$ and the SAT Approach Is Used.	49
2.6	Some Computational Results When $n = 32$ and the SAT Approach Is Used.	49
3.1	The $NEG(A_k)$ Sets for the Illustrative Example.	58
3.2	The $POS(A_k)$ Sets for the Illustrative Example.	58
3.3	Description of the Boolean Functions Used as Hidden Logic/System in the Computational Experiments.	65
3.4	Solution Statistics.	66
3.5	Solution Statistics of Some Large Test Problems (the Number of Attributes Is Equal to 32).	69
3.6	Descriptions of the Boolean Function in the First Test Problem *(i.e., when ID = 32H1).*	70
4.1	Numerical Results of Using the RA1 Heuristic on the Wisconsin Breast Cancer Database.	87
4.2	Numerical Results of Using the RA2 Heuristic on the Wisconsin Breast Cancer Database.	90
4.3	Comparison of the RA1 Algorithm with the B&B Method (the total number of examples = 18,120; number of attributes = 15).	94
4.4	Comparison of the RA1 Algorithm with the B&B Method (the total number of examples = 3,750; number of attributes = 14).	95

5.1a Some Computational Results Under the Random Strategy. 114
5.1b Some Computational Results Under the Guided Strategy. 115
5.2 Computational Results When the Wisconsin Breast Cancer Data Are Used. 121

6.1 Number of Documents Randomly Selected from Each Class. 135
6.2 Number of Training Documents to Construct a Clause that Classified All 510 Documents. 136
6.3 Statistical Comparison of the Classification Accuracy Between OCAT and IOCAT. 138
6.4 Number of Clauses in the Boolean Functions at the End of an Experiment. 141
6.5 Statistical Comparison of the Number of Clauses Constructed by OCAT and IOCAT. 141
6.6 The CPU Times (in Seconds) Required to Complete an Experiment. . 143
6.7 Statistical Comparison of the CPU Time to Reconstruct/Modify the Boolean Functions. 144

7.1 Some Computational Results When $n = 30$ and the OCAT Approach Is Used. 150

8.1 Solution Statistics for the First Series of Tests. 162
8.2 Solution Statistics When $n = 10$ and the Total Number of Examples Is Equal to 400. 164
8.3 Solution Statistics When $n = 30$ and the Total Number of Examples Is Equal to 600. 166

9.1 Comparison of Sample and Class Sizes for Biopsy and Cancer (from Woman's Hospital in Baton Rouge, Louisiana, Unpublished Data, 1995). 182

10.1 History of Monotone Boolean Function Enumeration. 200
10.2 A Sample Data Set for Problem 3. 211
10.3 Example Likelihood Values for All Functions in M_3. 212
10.4 Updated Likelihood Ratios for $m_z(001) = m_z(001) + 1$. 213
10.5 The Representative Functions Used in the Simulations of Problem 3. 220
10.6 The Average Number of Stage 3 Queries Used by the Selection Criterion max $\Delta\lambda(v)$ to Reach $\lambda > 0.99$ in Problem 3 Defined on $\{0, 1\}^n$ with Fixed Misclassification Probability q. 222

11.1 Ratings of Midsize Cars that Cost Under $25,000 [*Consumer Reports*, 1994, page 160]. 233

12.1 Summary of the Required CPU Times Under Each Method. 255

13.1 Number of Documents Randomly Selected from Each Class. 266
13.2 Average Number of Indexing Words Used in Each Experiment. 266
13.3a Summary of the First Experimental Setting: Leave-One-Out Cross Validation (part a). 269
13.3b Summary of the First Experimental Setting: Leave-One-Out Cross Validation (part b). 269
13.4a Summary of the Second Experimental Setting: 30/30 Cross Validation (part a). 270
13.4b Summary of the Second Experimental Setting: 30/30 Cross Validation (part b). 270
13.5 Statistical Difference in the Classification Accuracy of the VSM and OCAT/RA1 Approaches. 272
13.6 Data for the Sign Test to Determine the Consistency in the Ranking of the VSM and OCAT/RA1 Approaches. 272
13.7 Percentage of Documents from the Population that Were Inspected by the Oracle Before an Accuracy of 100% Was Reached. 275

14.1 A Part of the EMG Data Used in This Study. 278
14.2 Summary of the Prediction Results. 287

15.1a Attributes for the Breast Cancer Data Set from Woman's Hospital in Baton Rouge, LA (Part (a); Attributes 1 to 16). 290
15.1b Attributes for the Breast Cancer Data Set from Woman's Hospital in Baton Rouge, LA (Part (b); Attributes 17 to 26). 291
15.2a Interpretation of the Breast Cancer Diagnostic Classes (Part (a); Malignant Classes Only). 291
15.2b Interpretation of the Breast Cancer Diagnostic Classes (Part (b); Benign Classes Only). 291
15.3 A Part of the Data Set Used in the Breast Cancer Study. 292
15.4a Sets of Conditions for the Inferred Rules for the "Intraductal Carcinoma" Diagnostic Class (Part (a); Rules #1 to #5). 293
15.4b Sets of Conditions for the Inferred Rules for the "Intraductal Carcinoma" Diagnostic Class (Part (b); Rules #6 to #9). 294
15.4c Sets of Conditions for the Inferred Rules for the "Intraductal Carcinoma" Diagnostic Class (Part (c); Rules #10 to #12). 295