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## References

- [1] R. Agrawal, J. Gehrke, D. Gunopulos, and P. Raghavan. Automatic subspace clustering of high dimensional data for data mining applications. In *Proc. ACM SIGMOD Conf.*, pages 94–105, Washington, 1998.
- [2] R. Agrawal, T. Imielinski, and A. Swami. Mining association rules between sets of items in large databases. In *Proc. 1993 ACM SIGMOD Intl. Conf. Management of Data*, pages 207–216, Washington D.C., May 1993.
- [3] R. Agrawal, H. Mannila, R. Srikant, H. Toivonen, and I. Verkamo. Fast discovery of association rules. In U. M. Fayyad, G. Piatetsky-Shapiro, P. Smyth, and R. Uthuruswamy, editors, *Advances in Knowledge Discovery and Data Mining*, pages 307–328. MIT Press, Cambridge, MA, 1996.
- [4] D. W. Aha. Tolerating noisy, irrelevant and novel attributes in instance based learning algorithms. *International Journal of Man Machine Studies*, 36:266–287, 1992.
- [5] D. W. Aha. Editorial on lazy learning. *AI Review, Spl. issue on lazy learning*, 11(1-5):7–10, 1997.
- [6] D. W. Aha and R. L. Bankert. A comparative evaluation of sequential feature selection algorithms. In D. Fisher and J.-H. Lenz, editors, *Artificial Intelligence and Statistics V*. Springer Verlag, New York, 1996.
- [7] D. W. Aha, D. Kibler, and M. K. Albert. Instance-based learning algorithms. *Machine Learning*, 6:37–66, 1991.
- [8] D. Alahakoon, S. K. Halgamuge, and B. Srinivasan. Dynamic self organizing maps with controlled growth for knowledge discovery. *IEEE Transactions on Neural Networks*, 11:601–614, 2000.
- [9] R. Andrews, J. Diederich, and A. B. Tickle. A survey and critique of techniques for extracting rules from trained artificial neural networks. *Knowledge-Based Systems*, 8:373–389, 1995.
- [10] D. Angluin. Queries and concept learning. *Machine Learning*, 2:319–342, 1988.
- [11] S. Arya, D. M. Mount, N. S. Netanyahu, R. Silverman, and A. Y. Wu. An optimal algorithm for approximate nearest neighbor searching. *Journal of the ACM*, 45:891–923, 1998.

- [12] A. Aspin. Tables for use in comparisons whose accuracy involves two variances. *Biometrika*, 36:245–271, 1949.
- [13] M. M. Astrahan. Speech analysis by clustering, or the hyperphoneme method. In *Stanford A.I. Project Memo*. Stanford University, CA, 1970.
- [14] W. H. Au and K. C. C. Chan. An effective algorithm for discovering fuzzy rules in relational databases. In *Proc. IEEE Intl. Conf. Fuzzy Systems FUZZ IEEE 98*, pages 1314–1319, Alaska, 1998.
- [15] P. Baldi and S. Brunak. *Bioinformatics: The Machine Learning Approach*. MIT Press, Boston, MA, 1998.
- [16] J. F. Baldwin. Knowledge from data using fuzzy methods. *Pattern Recognition Letters*, 17:593–600, 1996.
- [17] M. Banerjee, S. Mitra, and S. K. Pal. Rough fuzzy MLP: Knowledge encoding and classification. *IEEE Trans. Neural Networks*, 9(6):1203–1216, 1998.
- [18] D. Barbará, W. DuMouchel, C. Faloutsos, P. J. Haas, J. M. Hellerstein, Y. E. Ioannidis, H. V. Jagadish, T. Johnson, R. T. Ng, V. Poosala, K. A. Ross, and K. C. Sevcik. The New Jersey data reduction report. *IEEE Data Engineering Bulletin*, 20(4):3–45, 1997.
- [19] E. B. Baum and D. Haussler. What size nets give valid generalization? *Neural Computation*, 1:151–160, 1989.
- [20] L. M. Belue and K. W. Bauer. Determining input features for multilayer perceptrons. *Neurocomputing*, 7:111–121, 1995.
- [21] Y. Bengio, J. M. Buhmann, M. Embrechts, and J. M. Zurada. Introduction to the special issue on neural networks for data mining and knowledge discovery. *IEEE Transactions on Neural Networks*, 11:545–549, 2000.
- [22] J. L. Bentley. Multidimensional divide and conquer. *Comm. ACM*, 23(4):214–219, 1980.
- [23] M. Berthold and D. J. Hand, editors. *Intelligent Data Analysis: An Introduction*. Springer-Verlag, Berlin, 1999.
- [24] J. C. Bezdek and S. K. Pal, editors. *Fuzzy Models for Pattern Recognition: Methods that Search for Structures in Data*. IEEE Press, New York, 1992.
- [25] C. L. Blake and C. J. Merz. *UCI Repository of machine learning databases*. University of California, Irvine, Dept. of Information and Computer Sciences, <http://www.ics.uci.edu/~mlearn/MLRepository.html>, 1998.

- [26] H. Blockeel and L. De Raedt. Top-down induction of first-order logical decision trees. *Artificial Intelligence*, 101(1-2):285–297, 1997.
- [27] R. L. Blum. *Discovery and Representation of Causal Relationships from a Large Time-Oriented Clinical Database: The RX Project*, volume 19 of *Lecture Notes in Medical Informatics*. Springer-Verlag, 1982.
- [28] P. Bosc, O. Pivert, and L. Ughetto. Database mining for the discovery of extended functional dependencies. In *Proc. NAFIPS 99*, pages 580–584, New York, USA, 1999. IEEE Press, Piscataway, NJ.
- [29] P. Bradley, U. M. Fayyad, and C. Reina. Scaling clustering algorithms to large databases. In *Proc. 4th Intl. Conf. Knowledge Discovery and Data Mining*, pages 9–15, NY, 1998. AAAI Press, Menlo Park, CA.
- [30] P. S. Bradley and O. L. Mangasarian. Massive data discrimination via linear support vector machines. *Optimization Methods and Software*, 13(1):1–10, 2000.
- [31] L. Breiman. Arcing classifiers. *Annals of Statistics*, 26(3):801–849, 1998.
- [32] L. Breiman, J. H. Friedman, R. A. Olshen, and C. J. Stone. *Classification and Regression Trees*. Wadsworth and Brooks/Cole, Monterey, CA, 1984.
- [33] S. Brin, R. Motwani, J. D. Ullman, and S. Tsur. Dynamic itemset counting and implication rules for market basket data. In *SIGMOD 1997, Proc. ACM SIGMOD Int. Conf. Management of Data*, pages 255–264, Tucson, AR, 1997. ACM Press, NY.
- [34] H. Bunke and A. Kandel, editors. *Neuro-Fuzzy Pattern Recognition*. World Scientific, Singapore, 2001.
- [35] C. J. C. Burges. A tutorial on support vector machines for pattern recognition. *Data Mining and Knowledge Discovery*, 2(2):1–47, 1998.
- [36] C. Campbell, N. Cristianini, and A. Smola. Query learning with large margin classifiers. In *Proc. 17th Intl. Conf. Machine Learning*, pages 111–118, Stanford, CA, 2000. Morgan Kaufmann, San Mateo, CA.
- [37] J. Catlett. *Megainduction: Machine learning on very large databases*. PhD thesis, Department of Computer Science, University of Sydney, Australia, 1991.
- [38] C. Chatterjee and V. P. Roychowdhury. On self-organizing algorithms and networks for class-separability features. *IEEE Trans. Neural Networks*, 8:663–678, 1997.
- [39] D. Chaudhuri, C. A. Murthy, and B. B. Chaudhuri. Finding a subset of representative points in a dataset. *IEEE Trans. Syst. Man. Cybern.*, 24:1416–1424, 1994.

- [40] P. Cheeseman, J. Kelly nad M. Self, and J. Stutz. Autoclass: A bayesian classification system. In *Proc. 5th Intl. Conf. Machine Learning*, Ann Arbor, MI, 1988. Morgan Kaufmann, San Mateo, CA.
- [41] D.-A. Chiang, L. R. Chow, and Y.-F. Wang. Mining time series data by a fuzzy linguistic summary system. *Fuzzy Sets and Systems*, 112:419–432, 2000.
- [42] V. Ciesielski and G. Palstra. Using a hybrid neural/expert system for database mining in market survey data. In *Proc. Second Intl. Conf. Knowledge Discovery and Data Mining (KDD-96)*, page 38, Portland, OR, 1996. AAAI Press, Menlo Park, CA.
- [43] K. Cios, W. Pedrycz, and R. Swiniarski. *Data Mining Methods for Knowledge Discovery*. Kluwer Academic Publishers, Boston, MA, 1998.
- [44] K. J. Cios, W. Pedrycz, and R. M. Swiniarski. Data mining methods for knowledge discovery. *IEEE Trans. Neural Networks*, 9(6):1533–1534, 1998.
- [45] D. Cohn, L. Atlas, and R. Ladner. Improving generalization with active learning. *Machine Learning*, 15:201–221, 1994.
- [46] M. Craven and J. Shavlik. Using neural networks for data mining. *Future Generation Computer Systems*, 13:211–219, 1997.
- [47] S. K. Das. Feature selection with a linear dependence measure. *IEEE Trans. Computers*, 20:1106–1109, 1971.
- [48] B. V. Dasarathy. *Nearest Neighbor (NN) Norms: NN Patterns Classification Techniques*. IEEE Computer Society Press, Los Alamitos, 1991.
- [49] R. K. De, J. Basak, and S. K. Pal. Neuro-fuzzy feature evaluation with theoretical analysis. *Neural Networks*, 12(10):1429–1455, 1999.
- [50] R. K. De, J. Basak, and S. K. Pal. Unsupervised feature extraction using neuro-fuzzy approaches. *Fuzzy Sets and Systems*, 176:277–291, 2002.
- [51] R. K. De and S. K. Pal. A connectionist model for selection of cases. *Information Sciences*, 132:179–194, 2001.
- [52] P. Demartines and J. Herault. Curvilinear component analysis: A self-organizing neural network for nonlinear mapping of data sets. *IEEE Trans. Neural Network*, 8:148–160, 1997.
- [53] A. P. Dempster, N. M. Laird, and D. B. Rubin. Maximum likelihood from incomplete data via the EM algorithm. *Journal of the Royal Statistical Society, Series B*, 39:1–38, 1977.
- [54] K. Deng and A. W. Moore. Multiresolution instance-based learning. In *Proc. Intl. Joint Conf. Artificial Intelligence (IJCAI-95)*, pages 1233–1242, Montreal, Canada, 1995. Morgan Kaufmann, San Mateo, CA.

- [55] P. A. Devijver and J. Kittler. *Pattern Recognition: A Statistical Approach*. Prentice Hall, Englewood Cliffs, 1982.
- [56] S. Dick. Granular computing in neural networks. In W. Pedrycz, editor, *Granular Computing*, pages 275–305. Physica Verlag, Heidelberg, 2001.
- [57] C. Domeniconi and D. Gunopulos. Adaptive nearest neighbor classification using support vector machines. In *Advances in Neural Information Processing System 14 (NIPS'2001)*, Vancouver, Canada, 2001. MIT Press, Boston, MA.
- [58] G. Dong and J. Li. Interestingness of discovered association rules in terms of neighborhood-based unexpectedness. In *Proc. 2nd Pacific-Asia Conf. Knowledge Discovery and Data Mining*, pages 72–86. Springer Verlag, Singapore, 1998.
- [59] R. O. Duda, P. E. Hart, and D. G. Stork. *Pattern Classification (2nd Edition)*. Wiley-Interscience, New York, 2000.
- [60] W. DuMouchel, C. Volinsky, T. Johnson, C. Cortes, and D. Pregibon. Squashing flat files flatter. In *Proc. 5th ACM Conf. Knowledge Discovery and Data Mining*, pages 6–15, San Diego, CA, 1999. ACM Press, NY.
- [61] J. Ester, H.-P. Kriegel, J. Sander, and X. Xu. A density-based algorithm for discovering clusters in large spatial databases with noise. In *Proc. 2nd Intl. Conf. Knowledge Discovery and Data Mining (KDD'96)*, pages 226–231, Portland, OR, 1996. AAAI Press, Menlo Park, CA.
- [62] O. Etzioni. The world-wide web: Quagmire or goldmine? *Comm. ACM*, 39:65–68, 1996.
- [63] A. Faragó, T. Linder, and G. Lugosi. Nearest neighbor search and classification in  $\mathcal{O}(1)$  time. *Problems of Control and Information Theory*, 20(6):383–395, 1991.
- [64] U. M. Fayyad, D. Haussler, and P. Stolorz. Mining scientific data. *Comm. ACM*, 39:51–57, 1996.
- [65] U. M. Fayyad, G. Piatetsky-Shapiro, P. Smyth, and R. Uthurusamy, editors. *Advances in Knowledge Discovery and Data Mining*. MIT Press, Menlo Park, CA, 1996.
- [66] U. M. Fayyad and R. Uthurusamy. Data mining and knowledge discovery in databases. *Comm. ACM*, 39(11):24–27, 1996.
- [67] D. Fisher. Knowledge acquisition via conceptual clustering. *Machine Learning*, 2:139–172, 1987.
- [68] I. W. Flockhart and N. J. Radcliffe. A genetic algorithm-based approach to data mining. In *The 2nd Intl. Conf. Knowledge Discovery and Data*

*Mining (KDD-96)*, page 299, Portland, OR, 1996. AAAI Press, Menlo Park, CA.

- [69] Y. Freund and R. E. Schapire. Large margin classification using the perceptron algorithm. *Machine Learning*, 37(3):277–296, 1999.
- [70] T. Friess, N. Cristianini, and C. Campbell. The kernel adatron algorithm: A fast and simple learning procedure for support vector machine. In *Proc. 15th Intl. Conf. Machine Learning*, pages 188–196, Madison, WI, 1998. Morgan Kaufmann, San Mateo, CA.
- [71] H. Frigui. Adaptive image retrieval using the fuzzy integral. In *Proc. NAFIPS 99*, pages 575–579, New York, 1999. IEEE Press, Piscataway, NJ.
- [72] K. S. Fu. *Syntactic Pattern Recognition and Applications*. Academic Press, London, 1982.
- [73] L. M. Fu. Knowledge-based connectionism for revising domain theories. *IEEE Trans. Systems, Man, and Cybernetics*, 23:173–182, 1993.
- [74] K. Fukunaga and J. M. Mantock. Nonparametric data reduction. *IEEE Trans. Pattern Analysis and Machine Intelligence*, 6:115–118, 1984.
- [75] J. Gehrke, R. Ramakrishnan, and V. Ganti. RainForest – a framework for large decision tree construction for large datasets. In *Proc. 24th Intl. Conf. Very Large Databases*, pages 416–427, San Francisco, 1998. Morgan Kaufmann, San Mateo, CA.
- [76] R. George and R. Srikanth. Data summarization using genetic algorithms and fuzzy logic. In F. Herrera and J. L. Verdegay, editors, *Genetic Algorithms and Soft Computing*, pages 599–611. Physica-Verlag, Heidelberg, 1996.
- [77] J. Ghosh. Multiclassifier systems: Back to the future. In J. Kittler and F. Roli, editors, *Multiple Classifier Systems*, volume 2364 of *Lecture Notes in Computer Science*, pages 1–15. Springer Verlag, London, 2002.
- [78] A. Giani, F. Baiardi, and A. Starita. PANIC: A parallel evolutionary rule based system. In D. Fogel, J. McDonell, and R. Reynolds, editors, *Evolutionary Programming IV. Proc. Fourth Annual Conf. Evolutionary Programming*, pages 753–771, San Diego, CA, 1995. MIT Press, Cambridge, MA.
- [79] C. Glymour, D. Madigan, D. Pregibon, and P. Smyth. Statistical inference and data mining. *Comm. ACM*, 39:35–41, 1996.
- [80] D. E. Goldberg. *Genetic Algorithms in Search, Optimization and Machine Learning*. Addison-Wesley, Reading, MA, 1989.
- [81] B. Gray and M.E. Orlowska. CCAIIA: Clustering categorical attributes into interesting association rules. In *Proc. 2nd Pacific-Asia Conf.*

- Knowledge Discovery and Data Mining*, pages 132–143. Springer Verlag, Singapore, 1998.
- [82] J. Gray, S. Chaudhuri, A. Bosworth, A. Layman, D. Reichart, M. Venkata Rao, F. Pellow, and H. Pirahesh. Data cube: A relational aggregation operator generalizing group-by, cross-tab, and sub-totals. *Data Mining and Knowledge Discovery*, 1(1):29–53, 1997.
  - [83] R. M. Gray. Vector quantization. *IEEE ASSP Mag.*, 1:4–29, 1984.
  - [84] S. Guha, R. Rastogi, and K. Shim. CURE: An efficient clustering algorithm for large databases. In *Proc. ACM SIGMOD Intl. Conf. Management of Data*, pages 73–84, New York, 1998. ACM Press, NY.
  - [85] D. Gusfield. *Algorithms on Strings, Trees, and Sequences: Computer Science and Computational Biology*. Cambridge University Press, Cambridge, UK, 1997.
  - [86] J. Hale and S. Shenoi. Analyzing FD inference in relational databases. *Data and Knowledge Engineering*, 18:167–183, 1996.
  - [87] M. A. Hall. Correlation based feature selection for discrete and numeric class machine learning. In *Proc. 17th Intl. Conf. Machine Learning*, Stanford, CA, 2000. Morgan Kaufmann, CA.
  - [88] J. Han and M. Kamber. *Data Mining: Concepts and Techniques*. Morgan Kaufmann, San Mateo, CA, 2000.
  - [89] D. Hand, H. Mannila, and P. Smyth. *Principles of Data Mining*. MIT Press, Menlo Park, CA, 2001.
  - [90] B. M. Happel and J. J. Murre. Design and Evolution of Modular Neural Network Architectures. *Neural Networks*, 7:985–1004, 1994.
  - [91] P. E. Hart. The condensed nearest neighbor rule. *IEEE Trans. Information Theory*, 14:515–516, 1968.
  - [92] T. Hastie, R. Tibshirani, and J. Friedman. *The Elements of Statistical Learning: Data Mining, Inference, and Prediction*. Springer Verlag, NY, 2001.
  - [93] Y. Hayashi. A neural expert system with automated extraction of fuzzy if-then rules and its application to medical diagnosis. In R. P. Lippmann, J. E. Moody, and D. S. Touretzky, editors, *Advances in Neural Information Processing Systems*, pages 578–584. Morgan Kaufmann, Los Altos, CA, 1991.
  - [94] R. Heider. Troubleshooting CFM 56-3 engines for the Boeing 737 – using CBR and data-mining. *Lecture Notes in Computer Science*, 1168:512–523, 1996.

- [95] S. Hettich and S. D. Bay. *The UCI KDD Archive*. University of California, Irvine, Dept. of Information and Computer Sciences, <http://kdd.ics.uci.edu>, 1999.
- [96] R. P. Heydorn. Redundancy in feature extraction. *IEEE Trans. Computers*, 21:1051–1054, 1971.
- [97] K. Hornik and C.-M. Kuan. Convergence analysis of local feature extraction algorithms. *Neural Networks*, 5:229–240, 1992.
- [98] X. Hu and N. Cercone. Mining knowledge rules from databases: A rough set approach. In *Proceedings of the 12th International Conference on Data Engineering*, pages 96–105, Washington, February 1996. IEEE Computer Society Press, NY.
- [99] T. Imeliensky and H. Mannila. A database perspective on knowledge discovery. *Comm. ACM*, 39:58–64, 1996.
- [100] C. Z. Jaikow. A knowledge intensive genetic algorithm for supervised learning. *Machine Learning*, 13:198–228, 1993.
- [101] A. K. Jain, R. P. W. Duin, and J. Mao. Statistical pattern recognition: A review. *IEEE Trans. Pattern Analysis and Machine Intelligence*, 22:4–37, 2000.
- [102] F. V. Jensen. *Bayesian Networks and Decision Diagrams*. Springer Verlag, New York, 2001.
- [103] J. Kacprzyk and S. Zadrożny. Data mining via linguistic summaries of data: An interactive approach. In *Proc. IIZUKA 98*, pages 668–671, Fukuoka, Japan, 1998.
- [104] L. Kanal. Patterns in pattern recognition. *IEEE Trans. Information Theory*, 20:697–722, 1974.
- [105] A. Kandel. *Fuzzy Techniques in Pattern Recognition*. Wiley Interscience, New York, 1982.
- [106] H. Kargupta and P. Chan, editors. *Advances in Distributed and Parallel Knowledge Discovery*. MIT/AAAI Press, Menlo Park, CA, 2001.
- [107] L. Kaufmann. Solving the quadratic programming problem arising in support vector classification. In B. Scholkopf, C. J. C. Burges, and A. J. Smola, editors, *Advances in Kernel Methods – Support Vector Learning*, pages 147–168. MIT Press, Boston, MA, 1998.
- [108] M. J. Kearns. Efficient noise-tolerant learning from statistical queries. In *Proc. 25th ACM Symposium on Theory of Computing*, pages 392–401, San Diego, CA, 1993. ACM Press, NY.
- [109] R. L. Kennedy, Y. Lee, B. van Roy, C. D. Reed, and R. P. Lippman. *Solving Data Mining Problems Through Pattern Recognition*. Prentice Hall, NJ, 1998.

- [110] R. Khosla and T. S. Dillon. Welding symbolic AI systems with neural networks and their applications. In *Proc. IEEE Int. Joint Conf. Neural Networks (IJCNN'98)*, pages 29–34, Anchorage, AL, 1998. IEEE Press, NJ.
- [111] H. Kiem and D. Phuc. Using rough genetic and Kohonen's neural network for conceptual cluster discovery in data mining. In *Proc. RSFD-GrC'99*, pages 448–452, Yamaguchi, Japan, 1999.
- [112] B. King. Step-wise clustering procedures. *Journal of American Statistical Association*, 62:86–101, 1967.
- [113] K. Kira and L. Rendell. A practical approach to feature selection. In *Proc. 9th Intl. Workshop on Machine Learning*, pages 249–256, San Mateo, CA, 1992. Morgan Kaufmann, San Mateo, CA.
- [114] J. Kivinen and H. Mannila. The power of sampling in knowledge discovery. In *Proc. 1994 ACM SIGACT-SIGMOD Symposium on Principles of Database Theory (PODS'94)*, pages 77–85, Minneapolis, MN, 1994. ACM Press, NY.
- [115] M. Klemettinen, H. Mannila, P. Ronkainen, H. Toivonen, and A. Inkeri Verkamo. Finding interesting rules from large sets of discovered association rules. In *Proc. 3rd Intl. Conf. Information and Knowledge Management (CIKM'94)*, pages 401–407. ACM Press, NY, 1994.
- [116] A. Koenig. Interactive visualization and analysis of hierarchical neural projections for data mining. *IEEE Trans. Neural Networks*, 11:615–624, 2000.
- [117] R. Kohavi and G. John. Wrappers for feature selection. *Artificial Intelligence*, 97(1-2):273–324, 1997.
- [118] T. Kohonen. The Self-Organizing Map. *Proc. IEEE*, 78:1464–1480, 1990.
- [119] T. Kohonen. *Self-Organizing Maps*. Springer, Heidelberg, 2001.
- [120] T. Kohonen, S. Kaski, K. K. Lagusand J. Salojarvi, V. Paatero, and A. Saarela. Organization of a massive document collection. *IEEE Trans. Neural Networks*, 11(3):574–585, 2000.
- [121] D. Koller and M. Sahami. Towards optimal feature selection. In *Proc. 13th Intl. Conf. Machine Learning*, pages 284–292, San Fransico, CA, 1996. Morgan Kaufmann, San Mateo, CA.
- [122] J. L. Kolodner. *Case-Based Reasoning*. Morgan Kaufmann, San Mateo, 1993.
- [123] J. Komorowski, Z. Pawlak, L. Polkowski, and A. Skowron. A rough set perspective on data and knowledge. In W. Klosgen and J. Zytkow, ed-

itors, *The Handbook of Data Mining and Knowledge Discovery*. Oxford University Press, Oxford, UK, 1999.

- [124] I. Kononenko. Estimating attributes: Analysis and extension of Relief. In *Proc. 7th European Machine Learning Conference*, pages 171–182, Berlin, 1994. Springer Verlag, Berlin.
- [125] M. A. Kraaijveld, J. Mao, and A. K. Jain. A non-linear projection method based on Kohonen’s topology preserving maps. *IEEE Trans. Neural Networks*, 6:548–559, 1995.
- [126] M. Kudo and J. Sklansky. Comparison of algorithms that selects features for pattern classifiers. *Pattern Recognition*, 33:25–41, 2000.
- [127] L. I. Kuncheva. Combining classifiers: Soft computing solutions. In S. K. Pal and A. Pal, editors, *Pattern Recognition: From Classical to Modern Approaches*, pages 429–448. World Scientific, Singapore, 2001.
- [128] J. Lampinen and E. Oja. Distortion tolerant pattern recognition based on self-organizing feature extraction. *IEEE Trans. Neural Networks*, 6:539–547, 1995.
- [129] M. Last, A. Kandel, and O. Maimon. Information-theoretic algorithm for feature selection. *Pattern Recognition Letters*, 22(6/7):799–811, 2001.
- [130] M. Last, Y. Klein, and A. Kandel. Knowledge discovery in time series databases. *IEEE Trans. Systems, Man, and Cybernetics*, 31(1):160–169, 2001.
- [131] C. Lee and D. A. Landgrebe. Feature extraction based on decision boundaries. *IEEE Trans. Patt. Anal. and Mach. Intell.*, 15:388–400, 1993.
- [132] C. Lee and D. A. Landgrebe. Decision boundary feature extraction for neural networks. *IEEE Trans. Neural Network*, 8:75–83, 1997.
- [133] D. H. Lee and M. H. Kim. Database summarization using fuzzy ISA hierarchies. *IEEE Trans. Systems Man and Cybernetics B*, 27:68–78, 1997.
- [134] R. S. T. Lee and J. N. K. Liu. Tropical cyclone identification and tracking system using integrated neural oscillatory leastic graph matching and hybrid RBF network track mining techniques. *IEEE Trans. Neural Networks*, 11:680–689, 2000.
- [135] Y. Leung, J.-S. Zhang, and Z.-B. Xu. Clustering by scale-space filtering. *IEEE Trans. Pattern Analysis and Machine Intelligence*, 22:1396–1410, 2000.

- [136] D. D. Lewis and J. Catlett. Heterogeneous uncertainty sampling for supervised learning. In *Proc. 11th Intl. Conf. Machine Learning (ICML-1994)*, pages 148–156, San Francisco, CA, 1994. Morgan Kaufmann, CA.
- [137] T. Y. Lin and N. Cercone, editors. *Rough Sets and Data Mining: Analysis of Imprecise Data*. Kluwer Academic Publications, Boston, MA, 1997.
- [138] T. Y. Lin, Y. Y. Yao, and L. Zadeh, editors. *Data Mining, Rough Sets and Granular Computing*. Physica Verlag, Berlin, 2002.
- [139] B. Liu, W. Hsu, L.-F. Mun, and H. Y. Lee. Finding interesting patterns using user expectation. *IEEE Trans. Knowledge and Data Engineering*, 11:817–832, 1999.
- [140] H. Liu, H. Lu, L. Feng, and F. Hussain. Efficient search of reliable exceptions. In *Pacific-Asia Conf. Knowledge Discovery and Data Mining*, pages 194–203. Springer Verlag, 1999.
- [141] H. Liu and H. Motoda. *Feature Selection for Knowledge Discovery and Data Mining*. Kluwer Academic Publication, Boston, MA, 1998.
- [142] H. Liu and H. Motoda. On issues of instance selection. *Data Mining and Knowledge Discovery, Spl. issue on instance selection*, 6(2):115–130, 2002.
- [143] H. Liu and S. T. Tan. X2R: A fast rule generator. In *Proc. IEEE Intl. Conf. System Man Cybernetics*, pages 215–220, Vancouver, Canada, 1995.
- [144] J. N. K. Liu, B. N. L. Li, and T. S. Dillon. An improved naive Bayesian classifier technique coupled with a novel input solution method. *IEEE Trans. Systems, Man and Cybernetics*, 31(2):249–256, 2001.
- [145] D. O. Loftsgaarden and C. P. Quesenberry. A nonparametric estimate of a multivariate density function. *Annals of Math. Statistics*, 36:1049–1051, 1965.
- [146] C. Lopes, M. Pacheco, M. Vellasco, and E. Passos. Rule-evolver: An evolutionary approach for data mining. In *Proc. RSFDGrC'99*, pages 458–462, Yamaguchi, Japan, 1999.
- [147] D. Lowe and A. R. Webb. Optimized feature extraction and Bayes decision in feed-forward classifier networks. *IEEE Trans. Pattern Analysis and Machine Intelligence*, 13:355–364, 1991.
- [148] H. Lu, R. Setiono, and H. Liu. Effective data mining using neural networks. *IEEE Trans. Knowledge and Data Engineering*, 8(6):957–961, 1996.

- [149] A. Maeda, H. Ashida, Y. Taniguchi, and Y. Takahashi. Data mining system using fuzzy rule induction. In *Proc. IEEE Intl. Conf. Fuzzy Systems FUZZ IEEE 95*, pages 45–46, Yokohama, Japan, 1995.
- [150] J. Main, T. S. Dillon, and R. Khosla. Use of fuzzy feature vectors and neural networks for case retrieval in case based systems. In *Proc. Biennial Conf. North American Fuzzy Information Processing Society (NAFIPS'96)*, pages 438–443, Berkeley, CA, 1996. IEEE Press, NJ.
- [151] J. A. Major and D. R. Riedinger. EFD – A hybrid knowledge statistical-based system for the detection of fraud. *International Journal of Intelligent Systems*, 7:687–703, 1992.
- [152] D. P. Mandal, C. A. Murthy, and S. K. Pal. Determining the shape of a pattern class from sampled points in  $R^2$ . *International Journal of General Systems*, 20(4):307–339, 1992.
- [153] H. Mannila. Theoretical frameworks for data mining. *SIGKDD Explorations*, 1(2):30–32, 2000.
- [154] J. Mao and A. K. Jain. Artificial neural networks for feature extraction and multivariate data projection. *IEEE Trans. Neural Networks*, 6:296–317, 1995.
- [155] P. Masson and W. Pieczynski. SEM algorithm and unsupervised statistical segmentation of satellite images. *IEEE Trans. Geoscience and Remote Sensing*, 31:618–633, 1993.
- [156] L. J. Mazlack. Softly focusing on data. In *Proc. NAFIPS 99*, pages 700–704, New York, 1999. IEEE Press, Piscataway, NJ.
- [157] S. Medasani and R. Krishnapuram. A fuzzy approach to complex linguistic query based image retrieval. In *Proc. NAFIPS 99*, pages 590–594, New York, 1999. IEEE Press, Piscataway, NJ.
- [158] M. Mehta, R. Agrawal, and J. Rissanen. SLIQ: A fast scalable classifier for data mining. In *Intl. Conf. Extending Database Technology*, pages 18–32, Avignon, France, 1996.
- [159] M. Meila and D. Heckerman. An experimental comparison of several clustering and initialization methods. *Microsoft Research Technical Report*, MSR-TR-98-06, <ftp://ftp.research.microsoft.com/pub/tr/TR-98-06.PS>, 1998.
- [160] S. Mika, B. Schölkopf, A. J. Smola, K.-R. Müller, M. Scholz, and G. Rätsch. Kernel PCA and de-noising in feature spaces. In M. S. Kearns, S. A. Solla, and D. A. Cohn, editors, *Advances in Neural Information Processing Systems 11*, pages 536–542, Denver, CO, 1999. MIT Press, Cambridge, MA.

- [161] T. Mitchell. Machine learning and data mining. *Comm. ACM*, 42(11):30–36, 1999.
- [162] P. Mitra, S. Mitra, and S. K. Pal. Rough fuzzy MLP: Evolutionary design. In N. Zhong, A. Skowron, and S. Ohsuga, editors, *Recent Advances in Rough Sets, Fuzzy Sets, Data Mining and Granular Computing*, volume 1711 of *Lecture Notes in Artificial Intelligence*, pages 128–136. Springer Verlag, Singapore, 1999.
- [163] P. Mitra, S. Mitra, and S. K. Pal. Staging of cervical cancer with soft computing. *IEEE Trans. Biomedical Engineering*, 47(7):934–940, 2000.
- [164] P. Mitra, C. A. Murthy, and S. K. Pal. Data condensation in large databases by incremental learning with support vector machines. In *Proc. Intl. Conf. Pattern Recognition (ICPR2000)*, pages 712–715, Barcelona, Spain, 2000.
- [165] P. Mitra, C. A. Murthy, and S. K. Pal. Density based multiscale data condensation. *IEEE Trans. Pattern Analysis and Machine Intelligence*, 24(6):734–747, 2002.
- [166] P. Mitra, C. A. Murthy, and S. K. Pal. Unsupervised feature selection using feature similarity. *IEEE Trans. Pattern Analysis and Machine Intelligence*, 24(3):301–312, 2002.
- [167] P. Mitra, C. A. Murthy, and S. K. Pal. A probabilistic active support vector learning algorithm. *IEEE Trans. Pattern Analysis and Machine Intelligence*, 26(2), 2004.
- [168] P. Mitra, S. K. Pal, and M. A. Siddiqi. Nonconvex clustering using expectation maximization algorithm with rough set initialization. *Pattern Recognition Letters*, 24(6):863–873, 2003.
- [169] S. Mitra, R. K. De, and S. K. Pal. Knowledge-based fuzzy MLP for classification and rule generation. *IEEE Trans. Neural Networks*, 8:1338–1350, 1997.
- [170] S. Mitra and Y. Hayashi. Neuro-fuzzy rule generation: Survey in soft computing framework. *IEEE Trans. Neural Network*, 11:748–768, 2000.
- [171] S. Mitra, P. Mitra, and S. K. Pal. Evolutionary modular design of rough knowledge-based network using fuzzy attributes. *Neurocomputing*, 36:45–66, 2001.
- [172] S. Mitra and S. K. Pal. Self-organizing neural network as a fuzzy classifier. *IEEE Trans. Systems, Man and Cybernetics*, 24(3):385–399, 1994.
- [173] S. Mitra and S. K. Pal. Fuzzy multi-layer perceptron, inferencing and rule generation. *IEEE Trans. Neural Networks*, 6:51–63, 1995.

- [174] S. Mitra and S. K. Pal. Fuzzy self organization, inferencing and rule generation. *IEEE Trans. Systems, Man and Cybernetics, Part A: Systems and Humans*, 26:608–620, 1996.
- [175] S. Mitra, S. K. Pal, and P. Mitra. Data mining in soft computing framework: A survey. *IEEE Trans. Neural Networks*, 13(1):3–14, 2002.
- [176] T. Mollestad and A. Skowron. A rough set framework for data mining of propositional default rules. In Z. W. Ras and M. Michalewicz, editors, *Foundations of Intelligent Systems*, volume 1079 of *Lecture Notes in Computer Science*, pages 448–457. Springer Verlag, Berlin, 1996.
- [177] A. W. Moore and M. S. Lee. Cached sufficient statistics for efficient machine learning with large datasets. *Journal of Artificial Intelligence Research*, 8:67–91, 1998.
- [178] A. W. Moore, J. Schneider, and K. Deng. Efficient locally weighted polynomial regression predictions. In *Proc. 14th Int. Conf. Machine Learning*, pages 236–244, Nashville, TN, 1997. Morgan Kaufmann, San Mateo, CA.
- [179] S. Muggleton, editor. *Inductive Logic Programming*. Academic Press, London, 1992.
- [180] S. Muggleton. Inverse entailment and PROGOL. *New Generation Computing*, 13:245–286, 1995.
- [181] S. Muggleton and C. Feng. Efficient induction of logic programs. In *Proc. 1st Conf. Algorithmic Learning Theory*, pages 368–381. Ohmsma, Tokyo, Japan, 1990.
- [182] O. Nasraoui, R. Krishnapuram, and A. Joshi. Relational clustering based on a new robust estimator with application to web mining. In *Proc. NAFIPS 99*, pages 705–709, New York, 1999.
- [183] D. Nauck. Using symbolic data in neuro-fuzzy classification. In *Proc. NAFIPS 99*, pages 536–540, New York, 1999.
- [184] R. T. Ng and J. Han. Efficient and effective clustering methods for spatial data mining. In *Proc. 20th Intl. Conf. Very Large Databases*, pages 144–155, San Francisco, 1994. Morgan Kaufmann, San Mateo, CA.
- [185] E. Noda, A. A. Freitas, and H. S. Lopes. Discovering interesting prediction rules with a genetic algorithm. In *Proc. IEEE Congress on Evolutionary Computation CEC 99*, pages 1322–1329, Washington DC, 1999.
- [186] D. W. Opitz and J. W. Shavlik. Generating accurate and diverse members of a neural-network ensemble. In *Advances in Neural Information*

- Processing Systems*, volume 8, pages 535–541. MIT Press, Cambridge, MA, 1996.
- [187] D. W. Opitz and J. W. Shavlik. Connectionist theory refinement: Genetically searching the space of network topologies. *Journal of Artificial Intelligence Research*, 6:177–209, 1997.
- [188] E. Osuna, R. Freund, and F. Girosi. An improved training algorithm for support vector machines. In *Proc. IEEE Workshop on Neural Networks for Signal Processing*, pages 276–285, Brisbane, Australia, 1997. IEEE Press, NJ.
- [189] A. Pal and S. K. Pal. Pattern recognition: Evolution of methodologies and data mining. In S. K. Pal and A. Pal, editors, *Pattern Recognition: From Classical to Modern Approaches*, pages 1–23. World Scientific, Singapore, 2001.
- [190] S. K. Pal. Soft computing pattern recognition: Principles, integrations and data mining. In T. Terano, T. Nishida, A. Namatame, S. Tsumoto, Y. Ohswa, and T. Washio, editors, *Advances in Artificial Intelligence*, volume 2253 of *Lecture Notes in Artificial Intelligence*, pages 261–268. Springer Verlag, Berlin, 2002.
- [191] S. K. Pal. Soft data mining, computational theory of perceptions, and rough-fuzzy approach. *Information Sciences*, 2004 (to appear).
- [192] S. K. Pal and D. Bhandari. Selection of optimum set of weights in a layered network using genetic algorithms. *Information Sciences*, 80:213–234, 1994.
- [193] S. K. Pal, B. Dasgupta, and P. Mitra. Rough self organizing map. *Applied Intelligence*, 2004 (to appear).
- [194] S. K. Pal, R. K. De, and J. Basak. Unsupervised feature evaluation: A neuro-fuzzy approach. *IEEE Trans. Neural Networks*, 11(2):366–376, 2000.
- [195] S. K. Pal, T. S. Dillon, and D. S. Yeung, editors. *Soft Computing in Case Based Reasoning*. Springer Verlag, London, 2000.
- [196] S. K. Pal and A. Ghosh. Image segmentation using fuzzy correlation. *Information Sciences*, 62:223–250, 1992.
- [197] S. K. Pal and A. Ghosh. Neuro-fuzzy computing for image processing and pattern recognition. *International Journal of System Science*, 27(12):1179–1193, 1996.
- [198] S. K. Pal, A. Ghosh, and B. Uma Shankar. Segmentation of remotely sensed images with fuzzy thresholding, and quantitative evaluation. *International Journal of Remote Sensing*, 21(11):2269–2300, 2000.

- [199] S. K. Pal and D. Dutta Majumder. Fuzzy sets and decision making approaches in vowel and speaker recognition. *IEEE Trans. Systems, Man, and Cybernetics*, 7:625–629, 1977.
- [200] S. K. Pal and D. Dutta Majumder. *Fuzzy Mathematical Approach to Pattern Recognition*. John Wiley (Halsted Press), New York, 1986.
- [201] S. K. Pal and P. Mitra. Multispectral image segmentation using rough set initialized EM algorithm. *IEEE Trans. Geoscience and Remote Sensing*, 40(11):2495–2501, 2002.
- [202] S. K. Pal and P. Mitra. Case generation using rough sets with fuzzy representation. *IEEE Trans. Knowledge and Data Engineering*, 16(3), 2004.
- [203] S. K. Pal and S. Mitra. Multi-layer perceptron, fuzzy sets and classification. *IEEE Trans. Neural Networks*, 3:683–697, 1992.
- [204] S. K. Pal and S. Mitra. *Neuro-fuzzy Pattern Recognition: Methods in Soft Computing*. John Wiley, New York, 1999.
- [205] S. K. Pal, S. Mitra, and P. Mitra. Rough fuzzy MLP: Modular evolution, rule generation and evaluation. *IEEE Trans. Knowledge and Data Engineering*, 15(1):14–25, 2003.
- [206] S. K. Pal and A. Pal, editors. *Pattern Recognition: From Classical to Modern Approaches*. World Scientific, Singapore, 2001.
- [207] S. K. Pal, L. Polkowski, and A. Skowron, editors. *Rough-Neuro Computing: Techniques for Computing with Words*. Springer, Heidelberg, 2003.
- [208] S. K. Pal and S. C. K. Shiu. *Foundations of Soft Case Based Reasoning*. John Wiley, New York, 2004.
- [209] S. K. Pal and A. Skowron, editors. *Rough-Fuzzy Hybridization: New Trends in Decision Making*. Springer Verlag, Singapore, 1999.
- [210] S. K. Pal, V. Talwar, and P. Mitra. Web mining in soft computing framework: Relevance, state of the art and future directions. *IEEE Trans. Neural Networks*, 13(5):1163–1177, 2002.
- [211] S. K. Pal and P. P. Wang, editors. *Genetic Algorithms for Pattern Recognition*. CRC Press, Boca Raton, 1996.
- [212] D. Pavlov, J. Mao, and B. Dom. Scaling-up support vector machines using boosting algorithm. In *Proc. 15th Intl. Conf. Pattern Recognition*, pages 219–222, Barcelona, Spain, 2000.
- [213] Z. Pawlak. Rough sets. *International Journal on Computer and Information Sciences*, 11:341–356, 1982.

- [214] Z. Pawlak. *Rough Sets, Theoretical Aspects of Reasoning About Data*. Kluwer Academic, Dordrecht, 1991.
- [215] Z. Pawlak. Rough sets and decision algorithms. In *Proc. Intl. Conf. Rough Sets and Current Trends in Computing (RSTC'2000)*, pages 1–16, Banff, Canada, 2000.
- [216] W. Pedrycz. Conditional fuzzy c-means. *Pattern Recognition Letters*, 17:625–632, 1996.
- [217] W. Pedrycz. Fuzzy set technology in knowledge discovery. *Fuzzy Sets and Systems*, 98:279–290, 1998.
- [218] W. Pedrycz. Shadowed sets: Representing and processing fuzzy sets. *IEEE Trans. Systems, Man and Cybernetics B*, 28:103–109, 1998.
- [219] W. Pedrycz. Granular computing in data mining. In M. Last and A. Kandel, editors, *Data Mining and Computational Intelligence*. Springer Verlag, Singapore, 2001.
- [220] W. Pedrycz and A. Bargiela. Granular clustering: A granular signature of data. *IEEE Trans. Systems, Man and Cybernetics*, 32(2):212–224, 2002.
- [221] W. Pedrycz and Z. A. Sosnowski. Designing decision trees with the use of fuzzy granulation. *IEEE Trans. Systems, Man, and Cybernetics*, 30(2):151–159, 2000.
- [222] W. Pedrycz and G. Vukovich. Abstraction and specialization of information granules. *IEEE Trans. Systems, Man and Cybernetics*, 31(1):106–111, 2001.
- [223] J. F. Peters, A. Skowron, L. Han, and S. Ramanna. Towards rough neural computing based on rough neural networks. In *Proc. Intl. Conf. Rough Sets and Current Trends in Computing (RSTC'2000)*, pages 572–579, Banff, Canada, 2000. Springer Verlag, Berlin.
- [224] P. Piatetsky-Shapiro and W. J. Frawley, editors. *Knowledge Discovery in Databases*. AAAI/MIT Press, Menlo Park, CA, 1991.
- [225] J. C. Platt. Fast training of support vector machines using sequential minimal optimisation. In B. Scholkopf, C. J. C. Burges, and A. J. Smola, editors, *Advances in Kernel Methods – Support Vector Learning*, pages 185–208. MIT Press, Cambridge, MA, 1998.
- [226] M. Plutowski and H. White. Selecting concise training sets from clean data. *IEEE Trans. Neural Networks*, 4(2)(2):305–318, 1993.
- [227] L. Polkowski and A. Skowron, editors. *Rough Sets in Knowledge Discovery 1 and 2*. Physica-Verlag, Heidelberg, 1998.

- [228] L. Polkowski, A. Skowron, and J. Komorowski. Approximate case-based reasoning: A rough mereological approach. In H.D. Burkhard and M. Lenz, editors, *Proc. 4th German Workshop on Case-Based Reasoning, System Development and Evaluation*, pages 144–151, Humboldt University, Berlin, 1996.
- [229] K. L. Priddy, S. K. Rogers, D. W. Ruck, G. L. Tarr, and M. Kabrisky. Bayesian selection of important features for feedforward neural networks. *Neurocomputing*, 5:91–103, 1993.
- [230] F. Provost and V. Kolluri. A survey of methods for scaling up inductive algorithms. *Data Mining and Knowledge Discovery*, 2:131–169, 1999.
- [231] P. Pudil, J. Novovicova, and J. Kittler. Floating search methods in feature selection. *Pattern Recognition Letters*, 15:1119–1125, 1994.
- [232] J. R. Quinlan. *C4.5, Programs for Machine Learning*. Morgan Kaufmann, San Mateo, CA, 1993.
- [233] J. R. Quinlan and R. M. Cameron-Jones. Induction of logic programs: FOIL and related systems. *New Generation Computing*, 13:287–312, 1995.
- [234] N. Ramakrishnan and A. Y. Grama. Data mining: From serendipity to science. *IEEE Computer*, 34(8):34–37, 1999.
- [235] V. Ramamurti and J. Ghosh. Structurally adaptive modular networks for non-stationary environments. *IEEE Trans. Neural Networks*, 10(1):152–160, 1999.
- [236] C. R. Rao. *Linear Statistical Inference and its Applications*. John Wiley, New York, 1973.
- [237] M. L. Raymer, W. F. Punch, E. D. Goodman, and L. A. Kuhn. Genetic programming for improved data mining: An application to the biochemistry of protein interactions. In *Genetic Programming 1996: Proc. First Annual Conf.*, pages 375–380, Stanford University, CA, 1996. MIT Press, Cambridge, MA.
- [238] M. L. Raymer, W. F. Punch, E. D. Goodman, L. A. Kuhn, and A. K. Jain. Dimensionality reduction using genetic algorithm. *IEEE Trans. Evolutionary Computation*, 4:164–172, 2000.
- [239] F. Ricci and P. Avesani. Data compression and local metrics for nearest neighbor classification. *IEEE Trans. Pattern Analysis and Machine Intelligence*, 21:380–384, 1999.
- [240] G. H. Rosenfeld and K. Fitzpatrick-Lins. Coefficient of agreement as a measure of thematic classification accuracy. *Photogrammetric Engineering and Remote Sensing*, 52:223–227, 1986.

- [241] N. Roy and A. McCallum. Towards optimal active learning through sampling estimation of error reduction. In *Proc. 18th Intl. Conf. Machine Learning (ICML-2001)*, pages 441–448, Williams College, MA, 2001. Morgan Kaufmann, San Mateo, CA.
- [242] J. Rubner and P. Tavan. A self-organizing network for principal component analysis. *Europhysics Letters*, 10:693–698, 1989.
- [243] D. W. Ruck, S. K. Rogers, and M. Kabrisky. Feature selection using a multilayer perceptron. *Neural Network Computing*, 20:40–48, 1990.
- [244] S. Russell and W. Lodwick. Fuzzy clustering in data mining for telco database marketing campaigns. In *Proc. NAFIPS 99*, pages 720–726, New York, 1999. IEEE Press, Piscataway, NJ.
- [245] T. Ryu and C. F. Eick. MASSON: Discovering commonalities in collection of objects using genetic programming. In *Genetic Programming 1996: Proc. First Annual Conf.*, pages 200–208, Stanford University, CA, 1996. MIT Press, Cambridge, MA.
- [246] R. Sasisekharan, V. Seshadri, and Sholom M. Weiss. Data mining and forecasting in large-scale telecommunication networks. *IEEE Intelligent Systems*, 11(1):37–43, 1996.
- [247] E. Saund. Dimensionality-reduction using connectionist networks. *IEEE Trans. Pattern Analysis and Machine Intelligence*, 11:304–314, 1989.
- [248] A. Savasere, E. Omiecinski, and S. B. Navathe. An efficient algorithm for mining association rules in large databases. In *Proc. 21st Intl. Conf. Very Large Database*, pages 432–444, Zurich, Switzerland, 1995. Morgan Kaufmann, San Mateo, CA.
- [249] N. A. Sayeed, H. Liu, and K. K. Sung. A study of support vectors on model independent example selection. In *Proc. 1st Intl. Conf. Knowledge Discovery and Data Mining*, pages 272–276, San Diego, CA, 1999. AAAI Press, CA.
- [250] R. Schapire, Y. Freund, P. Bartlett, and W. S. Lee. Boosting the margin: A new explanation for the effectiveness of voting methods. *Annals of Statistics*, 26(5):1651–1686, 1998.
- [251] W. A. C. Schmidt and J. P. Davis. Pattern recognition properties of various feature spaces for higher order neural networks. *IEEE Trans. Pattern Analysis and Machine Intelligence*, 15:795–801, 1993.
- [252] G. Schohn and D. Cohn. Less is more: Active learning with support vector machines. In *Proc. 17th Intl. Conf. Machine Learning*, pages 839–846, Stanford, CA, 2000. Morgan Kaufmann, CA.
- [253] B. Scholkopf, S. Mika, C.J.C. Burges, P. Knirsch, K.-R. Müller, G. Ratsch, and A.J. Smola. Input space versus feature space in kernel-based methods. *IEEE Trans. Neural Networks*, 10(5):1000–1017, 1999.

- [254] J. Shafer, R. Agrawal, and M. Mehta. SPRINT: A scalable parallel classifier for data mining. In *Proc. 22nd Intl. Conf. Very Large Databases*, pages 544–555, San Francisco, 1996. Morgan Kaufmann, San Mateo, CA.
- [255] D. Shalvi and N. De Claris. Unsupervised neural network approach to medical data mining techniques. In *Proc. IEEE Intl. Joint Conf. Neural Networks*, pages 171–176, Alaska, 1998.
- [256] N. Shan and W. Ziarko. Data-based acquisition and incremental modification of classification rules. *Computational Intelligence*, 11:357–370, 1995.
- [257] A. Silberschatz and A. Tuzhilin. What makes patterns interesting in knowledge discovery systems. *IEEE Trans. Knowledge and Data Engineering*, 8:970–974, 1996.
- [258] D. Skalak. Prototype and feature selection by sampling and random mutation hill climbing algorithms. In *Proc. 11th Intl. Conf. Machine Learning*, pages 293–301, New Brunswick, NJ, 1994. Morgan Kaufmann, San Mateo, CA.
- [259] A. Skowron. Extracting laws from decision tables – A rough set approach. *Computational Intelligence*, 11:371–388, 1995.
- [260] A. Skowron and C. Rauszer. The discernibility matrices and functions in information systems. In R. Slowiński, editor, *Intelligent Decision Support, Handbook of Applications and Advances of the Rough Sets Theory*, pages 331–362. Kluwer Academic, Dordrecht, 1992.
- [261] A. Skowron and R. Swiniarski. Rough sets in pattern recognition. In S. K. Pal and A. Pal, editors, *Pattern Recognition: From Classical to Modern Approaches*, pages 385–428. World Scientific, Singapore, 2001.
- [262] Spl. issue on soft case based reasoning. T. Dillon, S. K. Pal, and S.C.K. Shiu, editors, *Applied Intelligence*, volume 24(3). 2004.
- [263] Spl. issue on soft data mining. S. K. Pal and A. Ghosh, editors, *Information Sciences*. 2004 (to appear).
- [264] Spl. issue on rough-neuro computing. S. K. Pal, W. Pedrycz, A. Skowron, and R. Swiniarski, editors, *Neurocomputing*, volume 36(1–4). 2001.
- [265] Spl. issue on rough sets, pattern recognition and data mining. S. K. Pal and A. Skowron, editors, *Pattern Recognition Letters*, volume 24(6). 2003.
- [266] Spl. issue on neural networks for data mining and knowledge discovery. Y. Bengio, J. M. Buhmann, M. Embrechts, and J. M. Zurada, editors, *IEEE Trans. Neural Networks*, volume 11(3). 2000.

- [267] R. Srikant, Q. Vu, and R. Agrawal. Mining association rules with item constraints. In *Proc. 3rd Intl. Conf. Knowledge Discovery and Data Mining, KDD*, pages 67–73. AAAI Press, Menlo Park, CA, 14–17 1997.
- [268] I. A. Taha and J. Ghosh. Symbolic interpretation of artificial neural networks. *IEEE Trans. Knowledge and Data Engineering*, 11(3):448–463, 1999.
- [269] A. Teller and M. Veloso. Program evolution for data mining. *The International Journal of Expert Systems*, 8:216–236, 1995.
- [270] A. B. Tickle, R. Andrews, M. Golea, and J. Diederich. The truth will come to light: Directions and challenges in extracting the knowledge embedded within trained artificial neural networks. *IEEE Trans. Neural Networks*, 9:1057–1068, 1998.
- [271] H. Toivonen. Sampling large databases for association rules. In *Proc. 1996 Int. Conf. Very Large Data Bases*, pages 134–145. Morgan Kaufman, San Mateo, CA, 1996.
- [272] S. Tong and D. Koller. Support vector machine active learning with application to text classification. *Journal of Machine Learning Research*, 2:45–66, 2001.
- [273] G. G. Towell and J. W. Shavlik. Extracting refined rules from knowledge-based neural networks. *Machine Learning*, 13:71–101, 1993.
- [274] I. B. Turksen. Fuzzy data mining and expert system development. In *Proc. IEEE Intl. Conf. Systems, Man, and Cybernetics*, pages 2057–2061, San Diego, CA, 1998.
- [275] V. Vapnik. *Statistical Learning Theory*. Wiley, New York, 1998.
- [276] J. Vesanto and E. Alhoniemi. Clustering of the self-organizing map. *IEEE Transactions on Neural Networks*, 11:586–600, 2000.
- [277] W. Wang, J. Yang, and R. R. Muntz. STING: A statistical information grid approach to spatial data mining. In *Intl. Conf. Very Large Data Bases*, pages 186–195, Athens, Greece, 1997. Morgan Kaufmann, San Mateo, CA.
- [278] Q. Wei and G. Chen. Mining generalized association rules with fuzzy taxonomic structures. In *Proc. NAFIPS 99*, pages 477–481, New York, 1999.
- [279] D. R. Wilson and T. R. Martinez. Reduction techniques for instance-based learning algorithms. *Machine Learning*, 38(3):257–286, 2000.
- [280] J. Wroblewski. Genetic algorithms in decomposition and classification. In *Rough Sets in Knowledge Discovery 1 and 2*. Physica-Verlag, Heidelberg, 1998.

- [281] K. Xu, Z. Wang, and K. S. Leung. Using a new type of nonlinear integral for multi-regression: An application of evolutionary algorithms in data mining. In *Proc. IEEE Intl. Conf. Systems, Man, and Cybernetics*, pages 2326–2331, San Diego, CA, 1998.
- [282] R. R. Yager. On linguistic summaries of data. In W. Frawley and G. Piatetsky-Shapiro, editors, *Knowledge Discovery in Databases*, pages 347–363. AAAI/MIT Press, Menlo Park, CA, 1991.
- [283] R. R. Yager. Database discovery using fuzzy sets. *International Journal of Intelligent Systems*, 11:691–712, 1996.
- [284] Y. Y. Yao. Granular computing: Basic issues and possible solutions. In *Proc. 5th Joint Conf. Information Sciences*, pages 186–189, Atlantic City, NJ, 2000. Association for Intelligent Machinery.
- [285] L. A. Zadeh. Fuzzy sets. *Information and Control*, 8:338–353, 1965.
- [286] L. A. Zadeh. Outline of a new approach to the analysis of complex systems and decision processes. *IEEE Trans. Systems, Man, and Cybernetics*, 3:28–44, 1973.
- [287] L. A. Zadeh. Fuzzy logic, neural networks, and soft computing. *Comm. ACM*, 37:77–84, 1994.
- [288] L. A. Zadeh. Toward a theory of fuzzy information granulation and its centrality in human reasoning and fuzzy logic. *Fuzzy Sets and Systems*, 90:111–127, 1997.
- [289] L. A. Zadeh. A new direction in AI: Toward a computational theory of perceptions. *AI Magazine*, 22:73–84, 2001.
- [290] C. T. Zahn. Graph-theoretical methods for detecting and describing Gestalt clusters. *IEEE Trans. on Computer*, 20:68–86, 1971.
- [291] T. Zhang, R. Ramakrishnan, and M. Livny. BIRCH: An efficient data clustering method for large databases. In *Proc. ACM SIGMOD Intl. Conf. Management of Data*, pages 103–114, New York, 1996. ACM Press, NY.
- [292] Y. Q. Zhang, M. D. Fraser, R. A. Gagliano, and A. Kandel. Granular neural networks for numerical-linguistic data fusion and knowledge discovery. *IEEE Trans. Neural Networks*, 11:658–667, 2000.
- [293] Q. Zhao. A Co-Evolutionary Algorithm for Neural Network Learning. In *Proc. IEEE Intl. Conf. Neural Networks*, pages 432–437, Houston, TX, 1997. IEEE Press, NJ.
- [294] N. Zhong, Y. Y. Yao, and S. Oshuga. Peculiarity oriented multi-database mining. In *Proc. PKDD'99*, pages 136–146, Prague, Czech Republic, 1999. Springer Verlag, Berlin.