

## REFERENCES

- [1] H. V. Pipberger, R. J. Arms, F. W. Stallman, "Automatic screening of normal and abnormal ECG by mean of an digital electronic computer", *Proc Soc Exp Biol Med*, 106, (1961), pp130-132.
- [2] Mitsuharu Okajima, "Current Status of Computerized ECG Processing in Japan", Research Institute of Environmental Medicine, Nagoya University, Furo-cho, Chikusa-ku, Nagoya, Japan. (edited by Chr. Zywiets and B. Schneider in "Computer Application on ECG and VCG Analysis", North-Holland Publishing Company, 1973.)
- [3] N. Bianchi, P. Botteni, M. Cigada, A. De Giuli, P. Mussio, F. Sessa, "Interpretation Strategies in a Cardiologist-controllable Automatic Assistant for ECG Description.", *Computers in Cardiology 1991, Proceedings.*, 23-26 Sept., (1991), pp673-676.
- [4] Emil Jovanov, Pedro Gelabert, Reza Adhami, Bryan Wheelock, Robert Adams "Real Time Holter Monitoring of Biomedical Signals.", *DSP Technology and Education Conference DSPS'99, Houston, Texas, 4-6 Aug.*, (1999), pp1-7.
- [5] R. H. Clayton, A. Murray, R. W. F. Campbell, "Frequency Analysis of Self-Terminating Ventricular Fibrillation.", *Computers in Cardiology 1994*, 25-28 Sept., (1994), pp705-708.
- [6] R. H. Clayton, A. Murray, R. W. F. Campbell, "Time-Frequency Analysis of Ventricular Arrhythmias.", *Time-Frequency Analysis of Biomedical Signals, IEE Colloquium on*, 29 Jan., (1997), pp1-4.
- [7] C. Gamo, P. Gaydecki, A. Zaidi, A. Fitzpatrick, "An Implementation of the Wavelet Transform for ECG Analysis.", *Advances in Medical Signal and Information Processing 2000*, 4-6 Sept., (2000), pp32-40.

- [8] C. Brohet, C. Derwael, R. Fesler, “ Automated ECG Diagnosis of Atrial Flutter by Means of Wavelet Transform.”, *Computers in Cardiology 1994*, 25-28 Sept., (1994), pp773-776.
- [9] Cuiwei Li, Chongxun Zheng, Changfeng Tai, “ Detection of ECG Characteristic Points using Wavelet Transforms.”, *IEEE Trans. on Biomedical Engineering*, Vol. 42, Issue: 1, Jan., (1995), pp21-28.
- [10] A. E. Cetin, A. H. Tewfik, Y. Yardimci, “ Coding of ECG Signals by Wavelet Transform Extrema.”, *Time-Frequency and Time-Scale Analysis, 1994, Proceedings of the IEEE-SP International Symposium on*, 25-28 Oct., (1994), pp544-547.
- [11] M. Borahan Tumer, Lee A. Belfore, Kristina M. Ropella, “A Diagnosis Methodology for Continuous Time Measurements using Hierarchical Signal Representations”, *IEEE International Conference on Systems, Man and Cybernetics*, Vol. 3, Oct., (1998), pp3038-3043.
- [12] C. A. Ramirez-Rodriguez, T. Vladimirova, “ A hybrid neuro-fuzzy system for the classification of normal, fusion and PVC cardiac beats in the MIT-BIH database. ”, *Artificial Intelligent Methods for Biomedical Data Processing, IEE Colloquium on*, 26 April, (1996), pp2/1-2/6.
- [13] Goldberger AL, Amaral LAN, Glass L, Hausdorff JM, Ivanov PCh, Mark RG, Mietus JE, Moody GB, Peng CK, Stanley HE. PhysioBank, Physio Toolkit, and Physionet: Components of a new Research Resource for Complex Physiologic Signals. *Circulation* 101 (23) : e215-e220  
 [CirculationElectronicPages;<http://circ.ahajournals.org/cgi/content/full/101/23/e215>];  
 2000 (June 13).

- [14] Jodie Usher, Duncan Campbell, Jitu Vohra, Jim Cameron, "Fuzzy Classification of Intra-Cardiac Arrhythmias", Proceedings of the 18<sup>th</sup> Annual International Conference IEEE, Vol. 3, (1996), pp997-998.
- [15] Tran Hoai Linh, Stanislaw Osowski, Maciej Stodolski, "On-line Heart Beat Recognition Using Hermite Polynomials and Neuro-Fuzzy Network", Proceedings of the 19<sup>th</sup> Annual International Conference IEEE, Vol. 1, May, (2002), pp165-170.
- [16] M. Lagerholm, C. Peterson, G. Braccini, L. Edenbrandt, L. Sornmo, "Clustering ECG complexes using Hermite Functions and Self-Organizing Map", IEEE Trans. Biomedical Engineering, (2000), pp838-847.
- [17] J. L. Willems, C. Abreu-Lima, P. Arnaud, L. H. Van Bommel, C. Brohet, R. Degani, B. Denis, "The diagnostic performance of computer programs for the interpretation of electrocardiograms", The new England Journal of Medicine, Vol. 325, Dec. 19, (1991), pp1767-1773.
- [18] J. P. Marques de Sa, A.P. Goncalves, F. O. Ferreira, C. Abreu-Lima, "Comparison of Artificial Neural Network Based ECG Classifiers Using Different Features Types", Computers in Cardiology 1994, IEEE, (1994), pp545-547.
- [19] A. E. Smith, A. K. Mason, "Cost Estimation Predictive Modeling: Regression versus Neural Network", *Engineering Economist*, Vol. 42, No. 2, Feb., (1997), pp. 137-160.
- [20] Y. Danon, M. J. Embrechts, "Least Squares Fitting Using Artificial Neural Networks", in *Intelligent Engineering Systems Through Artificial Neural Networks*, Vol. 2, NY: ASME Press, (1992).

- [21] B. Heden, M. Ohlsson, H. Holst, M. Mjoman, R. Rittner, O. Pahlm, C. Peterson, L. Edenbrandt, "Detection of frequently overlooked electrographic lead reversals using artificial neural networks", *Am J Cardiol*, 78, (1996), 600-604.
- [22] Noboru Babaguchi, Koji Yamada, Koichi Kise, Yoshikazu Tezuka, "Connectionist Model Binarization", *Proceedings of the 10<sup>th</sup> International Conference on Pattern Recognition*, (1990).
- [23] E. A. Patrick, F. P. Fischer, "A generalization of the k-nearest neighbor rule", *Inf. Control* 16, (1970), pp128-152.
- [24] G. S. Sebestyen, "Decision Making Processes in Pattern Recognition", Macmillan, New York, (1962).
- [25] R. P. Lippmann, "An introduction to computing with neural nets", *IEEE ASSP Mag.* April, (1987), pp4-22.
- [26] R. P. Lippman, "Pattern Classification using neural networks", *IEEE Commun. Mag.* Nov., (1989), pp47-64.
- [27] R. L. Streit, "A neural network for optimum Neyman-Pearson classification", *Proc. Int. Conf. Neural Networks*, San Diego, CA, Vol. 1, Jun, (1990), pp685-690.
- [28] G. Vrckovnik et al., "Radial Basis Functions Classification of Impulse Radar Waveforms", *Proc. Int. Joint Conf. Neural Networks*, Vol. 1, (1990), pp45-50.
- [29] D. F. Specht, "Probabilistic neural networks", *Neural Networks* 3 ,(1990), pp109-118.

- [30] I. K. Sethi and M. Otten, "Comparison between entropy net and decision tree classifiers", Proc. Int. Conf. Neural Networks, Washington, D. C., Vol. 3, Jun, (1989), pp63-68.
- [31] C. H. Chen, "On The Relationships Between Statistical Pattern Recognition and Artificial Neural Networks", special issue of International Journal of Pattern Recognition and Artificial Intelligence, Vol. 5, No. 4, October, (1991).
- [32] Cornelius T. Leondes , " Image Processing and Pattern Recognition", Academic Press, (1998).
- [33] J. P. Marques de Sa, "Pattern Recognition: Concepts, Methods and Applications", Springer-Verlag Berlin Heidelberg, (2001), pp15.
- [34] N. Rescher, "Many-Valued Logic", Mcgraw-Hill, New York, (1969).
- [35] M. Black, "Vagueness: An Exercise in Logical Analysis", Philosophy of Science, vol. 4, (1937), pp427-455.
- [36] B. Kosko, "Neural Networks and Fuzzy Systems: A Dynamical Systems Approach to Machine Intelligence", Prentice Hall, Inc., (1992).
- [37] Li-Xin Wang, "Adaptive Fuzzy Systems and Control", Prentice Hall Inc., (1994), pp65-82.
- [38] P. Bozzola, G. Bortolan, C. Combi, F. Pinciroli, C. Brohet, " A Hybrid Neuro-Fuzzy System for ECG Classification of Myocardial Infarction", Computers in Cardiology 1996, IEEE, (1996), pp241-244.

- [39] S. Osowski, T. H. Linh, "Fuzzy Clustering Neural Network for Classification of ECG Beats", Proceedings of the IEEE-INNS-ENNS International Joint Conference on Neural Networks (IJCNN'00), vol. 5, (2000), pp5026-5032.
- [40] V. Pilla, Jr., H. S. Lopes, "Evolutionary Training of a Neurofuzzy Network for Detection of P wave of the ECG", Proceedings of the Third International Conference on Computational Intelligence and Multimedia Applications, (1999), pp102-106.
- [41] M. Umamo, S. Fukunaka, I. Hatono, H. Tamura, "Acquisition of fuzzy rules using fuzzy neural networks with forgetting," Proc. of 1997 IEEE International Conference on Neural Networks, (1997), pp2369-2373.
- [42] G. Bortolan, C. Brohet, S. Fusaro, "Possibilities of using neural networks for ECG classification", J.Electrocardiol.29,(1996),pp10-16.
- [43] V. E. Neagoe, I. F. Iatan, S. Grunwald, "A Neuro-fuzzy Approach to Classification of ECG Signals for Ischemic Heart Disease Diagnosis", Proc AMIA Symp., (2003), pp494-498.
- [44] Y. H. Hu, W. J. Tompkins, J. L. Urrusti and V. X. Alfonso, "Application of artificial neural networks for ECG signal detection and classification," J.Electrocardiol., (1994).
- [45] R. Silipo, M. Gori, C. Marchesi, "Autoassociator structured neural network for rhythm classification of long-term electrocardiogram," Comput Cardiol 349, (1993).
- [46] E. L. Drazen and E. F. Garneau, "Use of computer-assisted ECG interpretation in the United States," in Proc. Computers in Cardiology, (1979).
- [47] S. Singal and L. Wu, "Training feed-forward networks with the extended kalman algorithm", IEEE Int. Conf. Acoustic, Speech, and Signal Processing, (1989), pp1187.

- [48] M. C. Nechyba and Y. Xu, "Learning and transfer of human real-time control strategies," *J. Adv. Computational Intell.* 1(2), (1997), pp137-154.
- [49] C. A. Ramirez-Rodriguez, "QRS detection in ECG using fuzzy neural networks. In: Dagli C et al, *Intelligent Engineering Systems through Artificial Neural Networks*. USA: ASME Press, (2000), pp375-380.
- [50] A. Spaargaren and M. J. English, "Analysis of the Signal Averaged ECG in the Time-Frequency Domain", *Computers in Cardiology*, (1999), pp571-574.
- [51] Metin Akay, "Time-frequency and Wavelets in Biomedical Signal Processing", IEEE Press, (1997), pp101-115.
- [52] M. E. Nygard and J. Hulting, "An automated system for ECG monitoring," *Comput. Biomed. Res.*, vol. 12, (1979), pp181-202.
- [53] C. N. Mead, K. W. Clark, G. C. Oliver, and L. J. Thomas, Jr., "Progress towards fully automated processing of ambulatory ECGs," *Proc. Comput. Cardiol.*, (1976), pp183-188.
- [54] O. Pahlm, B. Jonson, O. Werner, K. Johansson, and K. Pettersson, "Computer-aided visual analysis of long-term ECG recordings," *Europ. Heart J.*, vol. 2, (1981), pp487-498.
- [55] M. Okada, "A digital filter for the QRS complex detection," *IEEE Trans. Biomed. Eng.*, vol. BME-26, (1979), pp700-703.
- [56] P. Kinias and H. A. Fozzard, "Rapid ECG analysis and arrhythmia detection," *Computer Techniques in Cardiology*. New York: Marcel Dekker, (1979), pp98-122.
- [57] F. M. Nolle, et al., "Evaluation of a frequency-domain algorithm to detect ventricular fibrillation in the surface ECG," in *Proc. Computers in Cardiology*, (1988), pp337-360.

- [58] H. V. Pipberger, "The ECG computer analysis system developed in the US Veterans Administration," in Trends in Computer-Processed Electrocardiograms, J. H. Van Bommel and J. L. Willems, Eds. Amsterdam, the Netherlands: North-Holland, (1977), pp42-48.
- [59] Jiapu Pan and Willis J. Tompkins, "A Real-Time QRS Detection Algorithm", IEEE Transactions On Biomedical Engineering, Vol. BME-32, No. 3, (1985), pp230-236.
- [60] C. M. Bishop, "Neural Networks for Pattern Recognition", New York: Oxford University Press Inc., (1996).
- [61] (Communication & Personal Interaction with Dr. Razali Omar) Dr. Razali Omar, Consultant Cardiologist & Electrophysiologist, Institute Jantung Negara (National Heart Institute) at 145, Jalan Tun Razak, 50400 Kuala Lumpur, Malaysia.
- [62] Per Ola Borjesson, Olle Pahlm, Leif Sornmo and Mats-Erik Nygard, "Adaptive QRS Detection Based On Maximum A Posteriori Estimation", IEEE Transactions On Biomedical Engineering, Vol. BME-29, No. 5, (1982), pp341-351.
- [63] Y. Sun, K. L. Chan, S. M. Krishnan, "A new approach for electrocardiogram analysis using wavelet-based nonlinear dynamic", Medical and Biological Engineering Computing 37, Supplement 2, (1999), pp390-391.
- [64] C. Papaloukas, D. I. Fotiadis, A. Likas, L. K. Michalis, "A rule based technique for the automated detection of ischemic episodes from long duration ECGs", Medical and Biological Engineering Computing 37, Supplement 2, (1999), pp728-729.
- [65] F. Jager, R. G. Mark, G. B. Moody, S. Divjak, "Analysis of transient ST segment changes during ambulatory monitoring using the Karhunen-Loeve transform", IEEE Computing Cardiology, (1992), pp691-694.



- [66] F. Azuaje *et. al*, “Knowledge discovery in electrocardiography data based on neural clustering algorithms”, in: Proceedings Medicon '98 of the International Federation of Medical & Biological Engineering, (1998).
- [67] U. Olli *et. al*, “Analysis of T wave morphology for discrimination of life threatening arrhythmias”, preliminary study, in: Proceeding Medicon 2001 of the International Federation of Medical & Biological Engineering, (2001).
- [68] T. K. Chang, “Process Fault-tolerant control based on neural networks”, Ph.D. Thesis, Liverpool John Moores University, (2003), pp70-90.
- [69] T. K. Chang, “Fault-Tolerant Control Based On Adaptive Neural Network”, IFAC Conference on Control Applications in Marine Systems, Glasgow, UK, 17-20<sup>th</sup> July, (2001).
- [70] P. Werbos, “Beyond Regression: New Tools for Prediction and Analysis in the Behavioral Sciences.” Ph.D. Thesis, Harvard University, Cambridge, Mass, (1974).
- [71] D. E. Rumelhart, G. E. Hinuton, R. J. Williams, “ Learning internal representations by error propagation.” In D. E. Rumelhart, J. L. McClelland (eds), *Parallel Distributed Processing*, vol. 2: Foundations., Cambridge, Mass, MIT Press, (1986).
- [72] H. Demuth, M. Beale, “Neural Network *TOOLBOX* user’s guide. For use with *Matlab*. The MathWorks Inc., 1998.
- [73] Andrew P. Paplinski, Bin Qiu, “CSE5301: Neural Networks”, Monash University Online Lecture Notes obtained at:  
<http://www.csse.monash.edu.au/~app/CSE5301/index.html>.
- [74] YongLiu, Xin Yao, Tetsuya Higuchi, “Designing Neural Network Ensembles by Minimising Mutual Information”, *Computational Intelligence in Control* (Edited by Mohammadian, Masoud), Hershey, PA, USA: Idea Group Inc., (2002), pp1-20.

- [75] Simon Haykin, "Neural Networks: A comprehensive foundation", Second Edition, Prentice-Hall, Inc., (1999), pp191-192.
- [76] G. Bortolan, R. Degani and J. L. Willems, "ECG classification with neural networks and cluster analysis," in Proc. Computers in Cardiology, (1991), pp177-180.
- [77] J. C. Chang, "Applying artificial neural network for ECG QRS detection," Master Thesis, Univ. of Wisconsin, Madison, (1993).
- [78] Y. H. Hu, W. J. Tompkins and Q. Xue, "Artificial neural network for ECG arrhythmia monitoring," in Neural Networks for Signal Processing II, S. Y. Kung, F. Fallside, J. A. Sorenson and C. A. Kamm, Eds. Piscataway, NJ: IEEE Press, (1992), pp350-359.
- [79] Michael Negnevitsky, "Artificial Intelligence", 1<sup>st</sup> edition, Pearson Education Limited, (2002), pp87-115.
- [80] George F. Luger, "Artificial Intelligence", 4<sup>th</sup> edition, Addison Wesley, (2002), pp323-328.
- [81] Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, "Neuro-Fuzzy and Soft Computing", Prentice-Hall, Inc., (1997), pp335-353.
- [82] R. O. Duda and P. E. Hart, "Pattern Classification and Scene Analysis", John Wiley & Sons, New York, (1973).
- [83] D. E. Rumelhart, J. L. McClelland and the PDP Research Group, "Parallel Distributed Processing", MIT Press, Cambridge, (1986).
- [84] S. M. Weiss and C. A. Kulikowski, "Computer Systems That Learn", Morgan Kaufmann Publishers, San Mateo, (1991).
- [85] J. R. Quinlan, "C4.5: Programs for Machine Learning", Morgan Kaufmann Publishers, San Mateo, California, 1993.

- [86] M. Sugeno, "An Introductory Survey of Fuzzy Control", *Information Sciences*, vol.36, no. 1/2, (1985), pp59-83.
- [87] C. C. Lee, "Fuzzy Logic in Control Systems: Fuzzy Logic Controller Part I and II," *IEEE Trans. on Systems, Man and Cybernetics*, vol. 20, no. 2, (1990), pp404-435.
- [88] T. Takagi and M. Sugeno, "Fuzzy identification of systems and its applications to modeling and control," *IEEE Trans. on Systems, Man and Cybernetics*, vol. 15, no. 1, (1985), pp116-132.
- [89] L. X. Wang and J. M. Mendel, "Generating fuzzy rules by learning from examples," *IEEE Trans. on Systems, Man and Cybernetics*, vol. 22, no. 6, (1992), pp1414-1427.
- [90] M. Sugeno and T. Yasukawa, "A fuzzy-logic-based approach to qualitative modeling," *IEEE Trans. on Fuzzy Systems*, vol. 1, no. 1, (1993), pp7-31.
- [91] S. Mitra, "Fuzzy MLP based expert system for medical diagnosis," *Fuzzy Sets and Systems*, vol. 65, No. 2/3, (1994), pp285-296.
- [92] S. Abe and M. S. Lan, "A method for fuzzy rules extraction directly from numerical data and its application to pattern classification," *IEEE Trans. on Fuzzy Systems*, vol. 3, no. 1, (1995), pp18-28.
- [93] Y. Yuan and H. Zhuang, "A genetic algorithm for generating fuzzy classification rules," *Fuzzy Sets and Systems*, vol. 84, no. 1, (1996), pp1-19.
- [94] O. Cordon and F. Herrera, "A three-state evolutionary process for learning descriptive and approximate fuzzy-logic-controller knowledge bases from examples," *International Journal of Approximate Reasoning*, vol. 17, no. 4, (1997), pp369-407.
- [95] D. Nauck and R. Kruse, "A neuro-fuzzy method to learn fuzzy classification rules from data," *Fuzzy Sets and Systems*, vol. 89, (1997), pp277-288.

- [96] R. Andrews, J. Diederich and A. B. Tickele, "Survey and critique of techniques for extracting rules from trained artificial neural networks," *Knowledge-Based Systems*, vol. 8, no. 6, (1995), pp373-389.
- [97] L. Fu, "Rule generation from neural networks," *IEEE Trans. on Systems, Man and Cybernetics*, vol. 24, no. 8, pp1114-1124, 1994.
- [98] S. Sestito and T. Dillon, "Knowledge acquisition of conjunctive rules using multilayered neural networks," *International Journal of Intelligent Systems*, vol. 8, (1993), pp779-805.
- [99] G. Towell and J. W. Shavlik, "Interpretation of artificial neural networks: mapping knowledge-based neural networks into rules," *Advances in Neural Information Processing System 4* (Edited by J. E. Moody, S. J. Hanson and R. P. Lippmann), San Mateo, Morgan Kaufmann, (1992), pp977-984.
- [100] G. Towell and J. W. Shavlik, "Extracting refined rules from knowledge-based neural networks," *Machine Learning*, vol. 13, (1993), pp71-101.
- [101] Y. Hayashi, "A neural expert system with automated extraction of fuzzy if-then rules and its application to medical diagnosis," *Advances in Neural Information Processing System 3* (Edited by R. P. Lippmann, J. E. Moody and D. S. Touretzky), San Mateo, Morgan Kaufmann, (1991), pp578-584.
- [102] C. Matthews and I. Jagielska, "Fuzzy rule extraction from a trained multi-layered neural network," *Proc. of 1995 IEEE International Conference on Neural Networks*, (1995), pp744-748.
- [103] T. Furuhashi, S. Matsushita, H. Tsutsui, Y. Uchikawa, "Knowledge extraction from hierarchical fuzzy model obtained by fuzzy neural networks and genetic algorithms," *Proc. of 1997 IEEE International Conference on Neural Networks*, (1997), pp2374-2379.

- [104] N. K. Kasabov, "Fuzzy rule extraction, reasoning and rule adaptation in fuzzy neural networks." Proc. of 1997 IEEE International Conference on Neural Networks, (1997), pp2380-2383.
- [105] Bunke O. and Droge B. , " Model selection and variable transformations in nonlinear regression." CORE Discussion Paper No. 9327, C.O.R.E., UCL, Belgium.
- [106] Penrose R., "The Emperor's New Mind: concerning computers, minds and the laws of physics", Oxford University Press, (1989).
- [107] Subhash C. Kak, "On Quantum Neural Computing", Information Sciences, Vol. 83, March, (1995), pp1-21.
- [108] Tad Hogg, Subhash C. Kak, Dan Ventura, "Quantum Computing and AI.", IEEE Intelligent Systems, (1999), pp9-11.
- [109] Alexander A. Ezhov, Gennady P. Berman, " Introduction to Quantum Neural Technologies", Rinton Press, Inc., (2003), pp101-125.
- [110] Howard Anton, Irl Bivens, Stephen Davis, "Calculus", John Wiley & Sons, Inc., (2002), pp1075-1090.
- [111] Jacek M. Zurada, "Introduction to Artificial Neural Systems", West Publishing Company, (1999), pp229-230.