

DAFTAR PUSTAKA

- [1] E. M. Cherry and F. H. Fenton, "Heart Structure , Function and Arrhythmias Heart Anatomy and Structure."
- [2] NHLBI and NIH, "What Is the Heart?," *National Institutes of Health*, 2011. [Online]. Available: <http://www.nhlbi.nih.gov/health/health-topics/topics/hhw>. [Accessed: 20-Nov-2015].
- [3] WHO, "Cardiovascular diseases (CVDs)," *WHO*, 2015. [Online]. Available: <http://www.who.int/mediacentre/factsheets/fs317/en/>. [Accessed: 19-Nov-2015].
- [4] WHO, "Indonesia: country profiles," *World Healt Organization*, 2015. [Online]. Available: http://www.who.int/gho/countries/idn/country_profiles/en/. [Accessed: 20-Mar-2016].
- [5] NHLBI and NIH, "What Is Coronary Heart Disease?," *National Institutes of Health*, 2015. [Online]. Available: <http://www.nhlbi.nih.gov/health/health-topics/topics/cad>. [Accessed: 20-Nov-2015].
- [6] National Heart Foundation of Australia, "Coronary heart disease.," 2013.
- [7] M. M. Barry L Zaret, Lawrence S Cohen, *Yale University School of Medicine heart book*. New York: William Morrow and Co, 1992.
- [8] NHLBI and NIH, "How Is Coronary Heart Disease Diagnosed?," *National Institutes of Health*, 2015. [Online]. Available: <http://www.nhlbi.nih.gov/health/health-topics/topics/cad/diagnosis>. [Accessed: 18-Nov-2015].
- [9] G. Hendro Martono and T. B. Adji, "Penggunaan Principal Component Analysis dan Pohon Keputusan untuk Mendeteksi Penyakit Jantung Koroner," Universitas Gadjah Mada, 2012.
- [10] N. Salari, S. Shohaimi, F. Najafi, M. Nallappan, and I. Karishnarajah, "A novel hybrid classification model of genetic algorithms, modified k-nearest neighbor and developed backpropagation neural network," *A peer-reviewed open access Sci. J. (PLoS ONE)*, vol. 9, no. 11, pp. 1–50, 2014.
- [11] Wiharto, H. K usnanto, and Herianto, "Performance Analysis of Multiclass Support Vector Machine Classification for Diagnosis of Coronary Heart Diseases," *Int. J. Comput. Sci. Appl.*, vol. 5, no. 5, pp. 27–37, 2015.
- [12] W. Wiharto, H. Kusnanto, and H. Herianto, "Intelligence system for

- diagnosis level of coronary heart disease with K-star algorithm,” *Healthc. Inform. Res.*, vol. 22, no. 1, pp. 30–38, 2016.
- [13] W. Wiharto, H. Kusnanto, and H. Herianto, “Interpretation of clinical data based on C4.5 algorithm for the diagnosis of coronary heart disease,” *Healthc. Inform. Res.*, vol. 22, no. 3, pp. 186–195, 2016.
- [14] L. A. Zadeh, “Fuzzy sets,” *Inf. Control*, vol. 8, no. 3, pp. 338–353, 1965.
- [15] N. Mishra, “A Review on the Applications of Fuzzy Expert System for Disease,” *Int. J. Adv. Res. Eng. Appl. Sci.*, vol. 3, no. 12, pp. 28–43, 2014.
- [16] S. Muthukaruppan and M. J. Er, “A hybrid particle swarm optimization based fuzzy expert system for the diagnosis of coronary artery disease,” *Expert Syst. Appl.*, vol. 39, no. 14, pp. 11657–11665, 2012.
- [17] A. Adeli and M. Neshat, “A Fuzzy Expert System for Heart Disease Diagnosis,” *Proc. Int. MultiConference Engineers Comput. Sci.*, vol. I, pp. 1–6, 2010.
- [18] S. Kumar and G. Kaur, “Detection of Heart Diseases using Fuzzy Logic,” *Int. J. Eng. Trends Technol.*, vol. 4, no. 6, pp. 2694–2699, 2013.
- [19] M. Barman, “A Fuzzy Rule Base System for the Diagnosis of Heart Disease,” *Int. J. Comput. Appl.*, vol. 57, no. 7, 2012.
- [20] D. Pal, K. M. Mandana, S. Pal, D. Sarkar, and C. Chakraborty, “Fuzzy expert system approach for coronary artery disease screening using clinical parameters,” *Knowledge-Based Syst.*, vol. 36, pp. 162–174, 2012.
- [21] Y. Yuan and H. Zhuang, “A genetic algorithm for generating fuzzy classification rules,” *Fuzzy Sets Syst.*, vol. 84, no. 1, pp. 1–19, 1996.
- [22] S. Guillaume, “Designing fuzzy inference systems from data: An interpretability-oriented review,” *IEEE Trans. Fuzzy Syst.*, vol. 9, no. 3, pp. 426–443, 2001.
- [23] S. W. S. Wu, M. J. E. M. J. Er, and Y. G. Y. Gao, “A fast approach for automatic generation of fuzzy rules by generalized dynamic fuzzy neural networks,” *IEEE Trans. Fuzzy Syst.*, vol. 9, no. 4, pp. 578–594, 2001.
- [24] L. Muflikhah and Y. Wahyuningsih, “Fuzzy Rule Generation for Diagnosis of Coronary Heart Disease Risk Using Subtractive Clustering Method,” *J. Softw. Eng. Appl.*, vol. 2013, no. July, pp. 372–378, 2013.
- [25] N. A. Setiawan, P. A. Venkatachalam, and A. F. M. Hani, “Diagnosis of Coronary Artery Disease Using Artificial Intelligence Based Decision Support System,” *Proc. Int. Conf. Man-Machine Syst.*, p. 1C3 1-1C3 5, 2009.

- [26] P. Pamela, Gayathri, and Jaisankar, “A Fuzzy Optimization Technique for the Prediction of Coronary Heart Disease Using Decision Tree,” *Int. J. Eng. Technol.*, vol. 5, no. 3, pp. 2506–2514, 2013.
- [27] M. G. Tsipouras, T. P. Exarchos, D. I. Fotiadis, A. P. Kotsia, K. V Vakalis, K. K. Naka, and L. K. Michalis, “Automated diagnosis of coronary artery disease based on data mining and fuzzy modeling,” *IEEE Trans. Inf. Technol. Biomed.*, vol. 12, no. 4, pp. 447–458, 2008.
- [28] Y. N. Devi and S. Anto, “An Evolutionary-Fuzzy Expert System for the Diagnosis of Coronary Artery Disease,” *Int. J. Adv. Res. Comput. Eng. Technol.*, vol. 3, no. 4, pp. 1478–1484, 2014.
- [29] Z. Mahmoodabadi and M. S. Abadeh, “CADICA : Diagnosis of Coronary Artery Disease Using the Imperialist Competitive Algorithm,” *J. Comput. Sci. Eng.*, vol. 8, no. 2, pp. 87–93, 2014.
- [30] P. K. Anooj and A. H. Disease, “Implementing Decision Tree Fuzzy Rules in Clinical Decision Support System after Comparing with Fuzzy based and Neural Network based systems,” *Asian Trans. Comput.*, vol. 2, no. 4, pp. 1–11, 2013.
- [31] R. Kohavi, “A Study of Cross-Validation and Bootstrap for Accuracy Estimation and Model Selection,” *Int. Jt. Conf. Artif. Intell.*, vol. 14, no. 12, pp. 1137–1143, 1995.
- [32] M. Kumari and S. Godara, “Comparative Study of Data Mining Classification Methods in Cardiovascular Disease Prediction,” *Int. J. Comput. Sci. Technol.*, vol. 2, no. 2, pp. 304–308, 2011.
- [33] V. K. P. N. Tan, M. Steinbach, *Introduction to Data Mining*. 2005.
- [34] J. Han, M. Kamber, and J. Pei, *Data mining: concepts and techniques*. 2012.
- [35] B. Seerat and U. Qamar, “Rule Induction Using Enhanced RIPPER Algorithm for Clinical Decision Support,” *Int. Conf. Intell. Control Inf. Process.*, vol. 33, pp. 83–91, 2015.
- [36] M. Kumari and S. Godara, “Review of Data Mining Classification Models in Cardiovascular Disease Diagnosis,” *Int. J. Comput. Appl.*, 2011.
- [37] World Health Organization, *Global Atlas on Cardiovascular Disease Prevention and Control*, 1st ed. World Health Organization, 2012.
- [38] NHLBI and NIH, “What Are the Signs and Symptoms of Coronary Heart Disease?,” *National Institutes of Health*, 2015. [Online]. Available: <https://www.nhlbi.nih.gov/health/health-topics/topics/cad/signs>. [Accessed: 25-Dec-2016].

- [39] B. Phibbs, *The Human Heart: A Basic Guide to Heart Disease*, Second. Lippincott Williams & Wilkins, 2007.
- [40] NHLBI and NIH, “What Are the Signs and Symptoms of Heart Disease?,” 2014. [Online]. Available: <https://www.nhlbi.nih.gov/health/health-topics/topics/hdw/signs>. [Accessed: 21-Dec-2016].
- [41] Y. Singh, P. Bhatia, and O. Sangwan, “A review of studies on machine learning techniques,” *Int. J. Comput. Sci. Secur.*, vol. 1, no. 1, pp. 70–84, 2007.
- [42] M. Khajehei and F. Etemady, “Data Mining and Medical Research Studies,” *Second Int. Conf. Comput. Intell. Model. Simul.*, pp. 119–122, 2010.
- [43] M. Durairaj and S. Sivagowry, “A Pragmatic Approach of Preprocessing the Data Set for Heart Disease Prediction,” *Int. J. Innov. Res. Comput. Commun. Eng.*, vol. 2, no. 11, pp. 6457–6465, 2014.
- [44] J. Nahar, T. Imam, K. S. Tickle, and Y. P. P. Chen, “Computational intelligence for heart disease diagnosis: A medical knowledge driven approach,” *Expert Syst. Appl.*, vol. 40, no. 1, pp. 96–104, 2013.
- [45] V. Dominic, D. Gupta, and S. Khare, “An Effective Performance Analysis of Machine Learning Techniques for Cardiovascular Disease,” *Appl Med Inf.*, vol. 36, no. 1, pp. 23–32, 2015.
- [46] N. A. Setiawan, D. W. Prabowo, and H. A. Nugroho, “Benchmarking of Feature Selection Techniques for Coronary Artery Disease Diagnosis,” *Int. Conf. Inf. Technol. Electr. Eng.*, pp. 1–5, 2014.
- [47] A. K. Pandey, P. Pandey, K. L. Jaiswal, and A. K. Sen, “A Heart Disease Prediction Model using Decision Tree,” *J. Comput. Eng.*, vol. 12, no. 6, pp. 83–86, 2013.
- [48] M. C. Tu, D. Shin, and D. K. Shin, “Effective diagnosis of heart disease through bagging approach,” *Proc. 2009 2nd Int. Conf. Biomed. Eng. Informatics*, pp. 1–4, 2009.
- [49] E. Atashpaz-Gargari and C. Lucas, “Imperialist competitive algorithm: An algorithm for optimization inspired by imperialistic competition,” *2007 IEEE Congr. Evol. Comput.*, pp. 4661–4667, 2007.
- [50] Q. Bai, “Analysis of Particle Swarm Optimization Algorithm,” *Comput. Inf. Sci.*, vol. 3, no. 1, pp. 180–184, 2010.
- [51] G. E. A. P. A. Batista and M. C. Monard, “An analysis of four missing data treatment methods for supervised learning,” *Appl. Artif. Intell.*, vol. 17, no. 5–6, pp. 519–533, 2003.

- [52] V. H. Umathe and G. Chaudhary, "Imputation methods for incomplete data," *Int. Conf. Innov. Information, Embed. Commun. Syst.*, pp. 1–4, 2015.
- [53] C. F. Tsai and F. Y. Chang, "Combining instance selection for better missing value imputation," *J. Syst. Softw.*, vol. 122, pp. 63–71, 2016.
- [54] P.-N. Tan, M. Steinbach, and V. Kumar, *Introduction to Data Mining*. Harlow : Addison-Wesley, 2005.
- [55] R. J. Bolton, D. J. Hand, F. Provost, L. Breiman, R. J. Bolton, and D. J. Hand, "Statistical Fraud Detection: A Review," *Stat. Sci.*, vol. 17, no. 3, pp. 235–255, 2002.
- [56] E. Eskin, A. Arnold, M. Prerau, L. Portnoy, and S. Stolfo, "A geometric framework for unsupervised anomaly detection: Detecting intrusions in unlabeled data," *Data Min. Secur. Appl.*, vol. 3, no. 40, 2002.
- [57] T. Lane and C. E. Brodley, "Temporal sequence learning and data reduction for anomaly detection," *ACM Trans. Inf. Syst. Secur.*, vol. 2, no. 3, pp. 295–331, 1999.
- [58] E. M. Knorr, R. T. Ng, and V. Tucakov, "Distance-based outliers: algorithms and applications," *VLDB J. Int. J. Very Large Data Bases*, vol. 8, no. 3–4, pp. 237–253, 2000.
- [59] S. F. Moller, J. von Frese, and R. Bro, "Robust methods for multivariate data analysis," *J. Chemom.*, pp. 549–563, 2005.
- [60] D. Barbará and P. Chen, "Using the fractal dimension to cluster datasets," *Proc. sixth ACM SIGKDD Int. Conf. Knowl. Discov. data Min.*, pp. 260–264, 2000.
- [61] M. Daszykowski and B. Walczak, "Density-Based Clustering Methods," *Compr. Chemom.*, vol. 2, pp. 635–654, 2010.
- [62] E. M. Knorr and R. T. Ng, "Finding intensional knowledge of distance-based outliers," *Proc. 25th Int. Conf. Very Large Data Bases*, pp. 211–222, 1999.
- [63] T. Johnson, I. Kwok, and R. Ng, "Fast computation of 2-dimensional depth contours," *Am. Assoc. Artificial Intell.*, no. 604, pp. 224–228, 1998.
- [64] E. M. Knorr and R. Ng, "A Unified Notion of Outliers: Properties and Computation," *Int. Conf. Knowl. Discov. Data Min.*, pp. 219–222, 1997.
- [65] M. M. Breunig, H.-P. Kriegel, R. T. Ng, and J. Sander, "LOF: Identifying Density-Based Local Outliers," *Proc. 2000 Acm Sigmod Int. Conf. Manag. Data*, pp. 1–12, 2000.

- [66] S. Hawkins, H. He, G. Williams, and R. Baxter, "Outlier detection using replicator neural networks," *Proc. 4th Int. Conf. Data Warehous. Knowl. Discov.*, pp. 170–180, 2002.
- [67] N. Hewahi and M. Saad, "Class outliers mining: Distance-based approach," *Int. J. Intell. Technol.*, vol. 2, no. 1, pp. 55–68, 2007.
- [68] E. M. Knorr and R. T. Ng, "Algorithms for Mining Datasets Outliers in Large Datasets," *24th Int. Conf. Very Large Data Bases*, pp. 392–403, 1998.
- [69] S. Ramaswamy, R. Rastogi, and K. Shim, "Efficient algorithms for mining outliers from large data sets," *Proc. 2000 ACM SIGMOD Int. Conf. Manag. data*, pp. 427–438, 2000.
- [70] S. I. Kim, H. J. Ryu, J. O. Hwang, and M. S. H. Kim, "An expert system approach to art psychotherapy," *Arts Psychother.*, vol. 33, no. 1, pp. 59–75, 2006.
- [71] B. G. Buchanan and R. O. Duda, "Principles of Rule-Based Expert Systems," *Adv. Comput.*, vol. 22, no. C, pp. 163–216, 1983.
- [72] B. Ruiz-Mezcua, A. Garcia-Crespo, J. L. Lopez-Cuadrado, and I. Gonzalez-Carrasco, "An expert system development tool for non AI experts," *Expert Syst. Appl.*, vol. 38, no. 1, pp. 597–609, 2011.
- [73] J. H. Park, J. H. Song, T. Lee, and K. S. Lee, "Implementation of expert system on estimation of fatigue properties from monotonic mechanical properties including hardness," *Procedia Eng.*, vol. 2, no. 1, pp. 1263–1272, 2010.
- [74] Y. Qian, M. Zheng, X. Li, and L. Lin, "Implementation of knowledge maintenance modules in an expert system for fault diagnosis of chemical process operation," *Expert Syst. Appl.*, vol. 28, no. 2, pp. 249–257, 2005.
- [75] A. Sarkar, "Application of Fuzzy Logic in Transport Planning," *Int. J. Soft Comput.*, vol. 3, no. 2, pp. 1–21, 2012.
- [76] D. Teodorović, "Fuzzy logic systems for transportation engineering: The state of the art," *Transp. Res. Part A Policy Pract.*, vol. 33, no. 5, pp. 337–364, 1999.
- [77] M. Fasanghari and G. A. Montazer, "Design and implementation of fuzzy expert system for Tehran Stock Exchange portfolio recommendation," *Expert Syst. Appl.*, vol. 37, no. 9, pp. 6138–6147, 2010.
- [78] Q. Shen and A. Chouchoulas, "Combining rough sets and data-driven fuzzy learning for generation of classification rules," *Pattern Recognit.*, vol. 32, pp. 2073–2076, 1999.

- [79] O. Cordon, F. Herrera, and P. Villar, "Generating the knowledge base of a fuzzy rule-based system by the genetic learning of the data base," *IEEE Trans. Fuzzy Syst.*, vol. 9, no. 4, pp. 667–674, 2001.
- [80] M. Sugeno and T. Yasukawa, "A Fuzzy-Logic-Based Approach to Qualitative Modeling," *IEEE Trans. Fuzzy Syst.*, vol. 1, no. 1, pp. 7–31, 1993.
- [81] J. R. Quinlan, "Simplifying decision trees," *Int. J. Man. Mach. Stud.*, vol. 27, no. 3, pp. 221–234, 1987.
- [82] A. Idri, I. Kadi, and H. Benjelloun, "Heart Disease Diagnosis Using C4.5 Algorithms - A Case Study," *Proc. Int. Conf. Heal. Informatics*, pp. 397–404, 2015.
- [83] R. Timofeev, "Classification and Regression Trees (CART) Theory and Applications," Center of Applied Statistics and Economics Humboldt University, 2004.
- [84] A. F. A. Pinem and E. B. Setiawan, "Implementation of Classification and Regression Tree(CART) and Fuzzy Logic Algorithm for Intrusion Detection System," *J. Chem. Inf. Model.*, vol. 53, pp. 1689–1699, 2013.
- [85] W. W. Cohen, "Fast effective rule induction," *Proc. Twelfth Int. Conf. Mach. Learn.*, pp. 115–123, 1995.
- [86] I. H. Witten, E. Frank, and M. a Hall, *Data Mining: Practical Machine Learning Tools and Techniques*. 2005.
- [87] O. Castillo and P. Melin, *Type-2 Fuzzy Logic: Theory and Applications*, 1st ed. Heidelberg: Springer-Verlag Berlin Heidelberg, 2008.
- [88] A. Schwartz and H. Do, "A Fuzzy Expert System for Cost-Effective Regression Testing Strategies," *2013 IEEE Int. Conf. Softw. Maint.*, pp. 1–10, 2013.
- [89] T. M. Khoshgoftaar, "Application of fuzzy expert system in test case selection for system regression test," *IRI -2005 IEEE Int. Conf. Inf. Reuse Integr. Conf, 2005.*, pp. 120–125, 2005.
- [90] E. H. Mamdani and S. Assilian, "An experiment in linguistic synthesis with a fuzzy logic controller," *Int. J. Man. Mach. Stud.*, vol. 7, no. 1, pp. 1–13, 1975.
- [91] T. Takagi and M. Sugeno, "Fuzzy identification of systems and its applications to modeling and control," *Syst. Man Cybern. IEEE Trans.*, vol. SMC-15, no. 1, pp. 116–132, 1985.

- [92] UCI, “Heart Disease Data Set.” [Online]. Available: <https://archive.ics.uci.edu/ml/datasets/Heart+Disease>. [Accessed: 26-Oct-2015].
- [93] American Heart Association, “Angina (Chest Pain),” 2015. [Online]. Available: http://www.heart.org/HEARTORG/Conditions/HeartAttack/DiagnosingaHeartAttack/Angina-Chest-Pain_UCM_450308_Article.jsp. [Accessed: 06-Apr-2017].
- [94] American Heart Association, “Blood Pressure vs. Heart Rate (Pulse),” 2016. [Online]. Available: http://www.heart.org/HEARTORG/Conditions/HighBloodPressure/GettheFactsAboutHighBloodPressure/Blood-Pressure-vs-Heart-Rate-Pulse_UCM_301804_Article.jsp. [Accessed: 06-Apr-2017].
- [95] Flora Pro Activ, “What is serum cholesterol?” [Online]. Available: <http://www.floraproactiv.co.uk/article/detail/1227115/what-is-serum-cholesterol>. [Accessed: 06-Apr-2017].
- [96] P. Brennan, “A comprehensive survey of methods for overcoming the class imbalance problem in fraud detection,” Institute of Technology Blanchardstown Dublin, 2012.
- [97] X. Wu, V. Kumar, Q. J. Ross, J. Ghosh, Q. Yang, H. Motoda, G. J. McLachlan, A. Ng, B. Liu, P. S. Yu, Z. H. Zhou, M. Steinbach, D. J. Hand, and D. Steinberg, *Top 10 algorithms in data mining*, vol. 14, no. 1. 2008.
- [98] J. Devore, “Probability and Statistics for Engineering and the Sciences,” *Brooks/Cole*, p. 776, 2011.