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## Fuzzy-Neuro Model for Intelligent Credit Risk Management

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### Author(s)

Elmer P. Dadios, James Solis

### ABSTRACT

This paper presents hybrid fuzzy logic and neural network algorithm to solve credit risk management problem. Credit risk is the risk of loss due to a debtor's non-payment of a loan or other line of credit. A method of evaluating the credit worthiness of a customer is complex and non-linear due to the diverse combinations of risk involve. To address this problem a credit scoring method is proposed in this paper using hybrid fuzzy logic-neural network (HFNN) model. The model will be implemented, tested, and validated for individual auto loans using real life bank data. The neural network is used as the learner and the fuzzy logic is used as the implementer. The neural network will fine tune the fuzzy sets, remove redundant input variables, and extract fuzzy rules. The extracted fuzzy rules are evaluated to retain the best k number of rules that will give final and intelligent decisions. The experiment results show that the performance of the proposed HFNN model is very accurate, robust, and reliable. Comparison of these results to other previous published works is also presented in this paper.

### KEYWORDS

Fuzzy Logic; Neural Networks; Fuzzy-Neuro Model; Credit Risk Management

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### References

- [1] M. Bonilla, I. Olmeda and R. Puertas-An, " Application of Genetic Algorithms in Credit Scoring," WASL Journal, 2000.
- [2] L. P. Wallis, " Credit Scoring," Business Credit Magazine, March, 2001.
- [3] A. Fensterstock, " Credit Scoring Basics," Business Credit, March, 2003.
- [4] A. Jost, " Neural Networks," Credit world, Vol. 81, No. 4, 1993, p. 26.
- [5] A. Fensterstock, " The Application of Neural Networks to Credit Scoring," Business Credit, March, 2001.
- [6] G. Vasconcelos, P. Adeodato and D. S. M. P. Monterio, " A Neural Network Based Solution for the Credit Risk Assessment Problem," Proceedings of the IV Brazilian Conference on Neural Networks, Washington, 20-22 July 1999, pp. 269-274.
- [7] S. A. DeLurgio and F. Hays, " Understanding the Financial Interests in Neural Networks," WASL Journal, 2001.
- [8] BrainMaker, " Credit Scoring with Brainmaker Neural Network Software," 2003. <http://www.calsi.com/CreditScoring.html>
- [9] J. Whitehouse, " Human Capabilities + Computer Automation = Knowledge," IT Briefing, Pacific Lutheran University, Parkland, 2000.
- [10] E. P. Dadios and D. J. Willaims, " A Fuzzy-Genetic Controller for the Flexible Pole-Cart Balancing

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Problem," Proceedings of 1996 IEEE International Conference on Evolutionary Computation, Nagoya, 20-22 May 1996, pp. 223-228.

- [11] L. A. Zadeh, " A Theory of Approximate Reasoning," In: Machine Intelligence, John Wiley & Sons, New York, 1979, pp. 149-194.
- [12] I. Iancu, " A Mamdani Type Fuzzy Logic Controller," In: E. P. Dadios, Ed., Fuzzy Logic: Controls, Concepts, Theories and Applications, InTech Croatia, Rijeka, 2012, pp. 55-54.
- [13] A. Achs, " From Fuzzy Datalog to Multivalued Knowledge-Base," In: E. P. Dadios, Ed., Fuzzy Logic: Algorithms, Techniques and Implementations, InTech Croatia, Rijeka, 2012, pp. 25-54.
- [14] E. P. Dadios, K. Hirota, M. Catigum, A. Gutierrez, D. Rodrigo, C. San Juan and J. Tan, " Neural Network Vision Guided Mobile Robot for Driving Range Golf Ball Retriever," Journal of Advanced Computational Intelligence and Intelligent Informatics, Vol. 10, No. 4, 2006, pp. 181185.
- [15] R. Gustilo and E. P. Dadios, " Optimal Control of Aquaculture Prawn Water Quality Index Using Artificial Neural Networks," Proceedings of the 5th IEEE International Conference on Cybernetics and Intelligent Systems and the 5th IEEE International Conference on Robotics, Automation and Mechatronics, Qingdao, 17-19 September 2011, pp. 266-271.
- [16] S. Hilado and E. P. Dadios, " Face Detection Using Neural Networks with Skin Segmentation," Proceedings of the 5th IEEE International Conference on Cybernetics and Intelligent Systems and the 5th IEEE International Conference on Robotics, Automation and Mechatronics, Qingdao, 17-19 September 2011, pp. 261-265.
- [17] N. Marcos, " Belief-Evidence Fusion through Successive Rule Refinement in a Hybrid Intelligent System" , Ph.D. Thesis, De La Salle University, Manila, 2002.
- [18] D. Nauck, " Combining Neural Networks and Fuzzy Controllers," FLAI, Linz, 28 June-2 July 1993.
- [19] D. Nauck, " Data Analysis with Neuro-Fuzzy Methods," Habilitation Thesis, University of Magdeburg, Magdeburg, 2000.
- [20] S. Haykin, " Neural Networks: A Comprehensive Foundation," Prentice Hall, Upper Saddle River, 1999.
- [21] S. Piramuthu, " Financial Credit-Risk Evaluation with Neural and Neurofuzzy Systems," European Journal of Operation Research, Vol. 112, No. 1, 1999, pp. 310-321. doi:10.1016/S0377-2217(97)00398-6