

UNIVERSITAT POLITÈCNICA DE CATALUNYA

Departament d'Enginyeria de Sistemes, Automàtica i Informàtica Industrial

**A MIXED QUALITATIVE
QUANTITATIVE SELF-LEARNING
CLASSIFICATION TECHNIQUE
APPLIED TO SITUATION ASSESSMENT
IN INDUSTRIAL PROCESS CONTROL**

Autor: J. Carlos Aguado Chao
Director: Josep Aguilar Martín

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Bibliografia

Aczél, J. (1969). *Lectures on Functional Equations and Their Applications*. Academic Press, New York.

Alsina, C. (1983). A primer of t-norms. *Proc. FISAL-83*. Univ. Palma de Mallorca, 27-36.

Alsina, C. (1984). Between Min and Max. *Proc. FISAL-84*. Univ. de les Illes Balears, 37-39.

Alsina, C. (1985). On a family of connectives for fuzzy sets. *Fuzzy Sets and Systems*, 16: 231-235.

Alsina, C., Castro, J.L., Trillas, E. (1995), On the characterization of S and R Implications. *Proc. IFSA '95*. Sao Paulo, 317-319.

Alsina, C., Grané, J., Sales, T., Trillas, E. (1984) Algunes consideracions sobre el Modus Ponens: Funcions de Modus Ponens. Actes del III Congrés Català de Lògica Matemàtica. Barcelona 55-77.

Alsina, C., Trillas, E., Valverde, L. (1983). On Some Logical Connectives for Fuzzy Sets Theory. *J. Math. Anal. and Appl.* 93, 15-26.

Baldwin, J.F. (1979). A New Approach to Approximate Reasoning using Fuzzy Logic. *Fuzzy Sets and Systems* 2, 309-325.

Bezdek, J.C. (1981). *Patter Recognition with Fuzzy objective Function Algorithms*. Plenum, New York.

Bezdek, J.C., Harris, J.O. (1978). Fuzzy partitions and relations. An

- axiomatic basis for clustering. *Fuzzy Sets and Systems*, 1. 112-127.
- Birkhoff, G. (1973). *Lattice Theory*. Amer. Math. Soc. Colloquium Pubs. 25, 3a. ed. Am. Math. Soc. New York.
- Blumenthal, L., Menger, K. (1970). *Studies in Geometry*. W.H. Freeman & Co. San Francisco.
- Boixader, D., Jacas, J. (1994), Generators and Dual Similarities, *Proc. of IPMU94* Paris, 1994.
- Boixader, D., Jacas, J. (1995), Generators and Dual T-indistinguishabilities, in *Fuzzy Logic and Soft Computing*, Bouchon-Meunier, Yager & Zadeh Eds. World Scientific. Singapore, 283-291.
- Boixader, D. Jacas, J. (1996). CRI as Approximate Reasoning tool: an analysis via T-indistinguishability operators, *Proc. of Fuzzy IEEE 96 Conference*, New Orleans.
- Boixader, D., Jacas, J. (1996), Indistinguishability Operators and Approximate Reasoning via CRI, Pròxima aparició en *Fuzzy Sets, Logics and Knowledge Based Reasoning*, Dubois, Prade & Klement, Eds., Kluwer, Publ.
- Boixader, D., Jacas, J. (1997), Extensionality Based Approximate Reasoning, Pròxima aparició en *Int. Journal of Approximate Reasoning*.
- Boixader, D., Jacas, J., Recasens, J. (1997). Searching for meaning in defuzzification, *Enviat al 7è Congrés IFSA*, Praga.
- Boixader, D., Jacas, J., Recasens, J. (1997). Upper and lower approximation of fuzzy sets. *Enviat al Congrés FUZZ'IEEE-97*, Barcelona.
- Bouchon-Meunier, B., Rifqi, M. and Bothorel, S. General Measures of Comparison of Objects, Apareixerà a *Fuzzy Sets and System*.
- Bouchon-Meunier, Valverde, L. *Analogical Reasoning and Fuzzy Resemblance. Uncertainty in Intelligent Systems*, Bouchon-Meunier et al. (Eds.), Elsevier Science, Pub.
- Castellet, M., Llerena, I. Àlgebra lineal i geometria. Manuals de la UAB. 1988.

Di Nola, A., Sessa, S., Pedrycz, W., Sanchez, E. (1989). *Fuzzy relation equations and their applications to knowledge engineering*. Kluwer Academic Publishers.

Dubois, D., Esteva, F., Garcia, P., Godo, Ll., Prade, H. A logical Approach to Interpolation Based On Similarity Relations. Apareixerà a *Int. Jour. of Approximate Reasoning*.

Dubois, D., Lang, J., Prade, H. (1989) Automated Reasoning Using Possibilistic Logic: Semantics, Belief Revision and Variable Certainty Weights. Proceedings of the *fifth workshop on Uncertainty in Artificial Intelligence*, Windsor, Ontario, Canada, 81-87.

Dubois, D., Prade, H. (1991). Fuzzy Sets in Approximate Reasoning, Part 1: Inference with possibility distributions, *Fuzzy Sets and Systems*, 143-202.

Dubois, D., Prade, H. (1994), Similarity-Based Approximate Reasoning, en: *Computational Intelligence Imitating Life*. Zurada, J.M., Marles, R.J., Robinson, C.J. eds. IEEE Press, New York, 69-80.

Dubois, D., Prade, H., What are fuzzy rules and how to use them, Apareixerà a *Fuzzy Sets and Systems, Special Issue in memory of Prof. A. Kaufmann*.

Erceg, M.A. (1980). Functions, equivalence relations, quotient spaces and subsets in fuzzy set theory. *Fuzzy Sets and Systems*, 3. 75-92.

Esteva, F. (1981). Negaciones en la teoría de conjuntos difusos, *Stochastica*, V-1, 33-44.

Esteva, F., Domingo, X. (1980). Sobre funciones de negación en $[0,1]$. *Stochastica*, IV-2, 141-165.

Esteva, F., Garcia, P., Godo, L. (1994). Relating and extending semantical approaches to possibilistic reasoning *Int. J. of Approximate Reasoning* 10, 311-344.

Esteva, F., Trillas, E., Domingo, X. (1981). Weak and strong negations for Fuzzy Set Theory. *Proc. XI ISMVL*. Oklahoma. 23-26.

Fodor, J.C., Roubens, M., *Structure of transitive valued binary relations*, Prépublication n. 94.001, Institut de Mathématique. Université de Liège.

Fraïssé, R. (1986). Theory of Relations. *Studies in Logic* 118. Elsevier Publisher, Amsterdam.

Fréchet, M. (1928). *Les espaces abstraits*. Gauthier-Villars.

García, P., Valverde, L. (1986). Isomorphisms between De Morgan Triplets. *Fuzzy Sets and Systems*, 30, 1, 27-36.

Genesereth, M.R., Nilsson, H.J. (1987) *Logical Foundations of Artificial Intelligence*, Morgan Kaufmann Pub.

Godo, L., *Contribució a l'estudi de models d'inferència en els sistemes possibilístics*. Tesi Doctoral. UPC. 1990.

Godo, L., et al. *Handbook of Fuzzy Sets and Systems*. Vol. 3 (Dubois & Prade Eds. of Part 1). Kluwer Academic (Próxima aparició).

Godo, L., Hájek, P. (1996). On Deduction in Zadeh's Fuzzy Logic *Proceedings IPMU'96*, Vol. II, 991-996

Godo, L., Hájek, P. Fuzzy Inference as Deduction. *Apareixerà a Journal of Non-Classical Applied Logics*

Godo, L., Jacas, J., Valverde, L. (1991). Fuzzy Values in Fuzzy Logic *Int. Journal of Intelligent Systems*, vol. 6.

Grätzer, G. (1978). *General Lattice Theory*, Birkhäuser Verlag, Stuttgart.

Höhle, U. (1988). Quotients with respect to similarity relations. *Fuzzy Sets and Systems* 27. 31-44.

Hume, D. (1996). *Enquiries concerning human understanding and concerning the principles of morals*. Edició de L.A. Selby-Bigge. Revisat per P.H. Nidditch. Oxford University Press.

Jacas, J. (1987). *Contribució a l'estudi de les relacions d'indistingibilitat i a les seves aplicacions als processos de classificació*. Tesi Doctoral. Univ. Politècnica de Catalunya.

Jacas, J. (1988). On the generators of T-indistinguishability operator. *Stochastica* XII-1. 49-63.

Jacas, J. (1990). Similarity Relations - The Calculation of Minimal Generating Families. *Fuzzy Sets and Systems*. 35 151-162.

Jacas, J. (1993). Fuzzy Topologies Induced by S-metrics, *The Journal of Fuzzy Mathematics*, 1, 1.

Jacas, J., Monreal, A., Recasens, J. (1996). A model for CAGD using Fuzzy Logic. Accepted in *International Journal of Approximation Reasoning*.

Jacas, J., Recasens, J. (1990). A topological approach to some cluster methods. *Proceedings 3rd IPMU Congress*. Paris. 298-300.

Jacas, J., Recasens, J. (1991a). A topological approach to some cluster methods. En B. Bouchon-Meunier, R.R. Yager, L.A. Zadeh Eds. *Uncertainty in Knowledge Bases. Lecture Notes in Computer Science 521*. Springer Verlag.

Jacas, J., Recasens, J. (1991b). A topological approach to some cluster methods, en B. Bouchon-Meunier, R.R. Yager, L.A. Zadeh Eds. *Uncertainty in Knowledge Bases. Lecture Notes in Computer Science 521*. Springer Verlag, 479-487.

Jacas, J., Recasens, J. (1991c). Morphisms of cluster methods, *Proceedings del 4rt. congrés IFSA*, Bruselas, 95-98.

Jacas, J., Recasens, J. (1992). Eigenvectors and generators of fuzzy relations. *Proceedings del FUZZ'IEEE-92*, San Diego, 687-694.

Jacas, J., Recasens, J. (1993a). Fuzzy numbers and equality relations. *Proceedings del FUZZ'IEEE-93*, San Francisco.

Jacas, J., Recasens, J. (1993b). On some kinds of probabilistic relations, en B. Bouchon-Meunier, R.R. Yager, L.A. Zadeh Eds. *Int. Systems with Uncertainty*, Elsevier, 171-178.

Jacas, J., Recasens, J. (1994) Fixed points and generators of fuzzy relations. *J. Math. Anal. Appl.* 186 21-29.

Jacas, J., Recasens, J. (1995a). Fuzzy Betweenness Relations *Fuzzy Logics and Soft Computing*. Bouchon-Meunier, Yager & Zadeh Eds. World Scientific, 283-290.

Jacas, J., Recasens, J. (1995b) Fuzzy T-transitive relations: eigenvectors and generators. *Fuzzy Sets & Systems* 72 147-154.

Jacas, J., Recasens, J. (1995c). Decomposable indistinguishability operators, *Proceedings del 6è. Congress IFSA*, Sao Paulo.

Jacas, J., Recasens, J. (1996). One-dimensional indistinguishability operators. *Proceedings del 6è Congrès IPMU*, Granada.

Jacas, J., Recasens, J., Decomposable relations and indistinguishability operators, *Enviat a Fuzzy Sets and Systems*

Jacas, J., Trillas, E, Valverde, L. (1986). On m-fuzzy cluster coverages. *International Conference on IPMU*. Paris. Ext. Abs. 311-315.

Jacas, J., Valverde, L. (1985). On the generating families of F-indistinguishability operators. *First IFSA Congress. Palma de Mallorca*. Ext. Abs. Vol. II.

Jacas, J., Valverde, L. (1987). A Metric Characterization of T-transitive Relations. *Proceedings of FISAL-86*. Palma de Mallorca, 81-89.

Jacas, J., Valverde, L. (1990). On Fuzzy Relations, Metrics and Cluster Analysis. En J.L. Verdegay & M. Delgado Eds. *Approximate Reasoning. Tools for Artificial Intelligence* (Verlag TÜV, Rheinland) I5R, 96.

Jardine, N., Sibson, R. (1977). *Mathematical Taxonomy*. John Wiley & Sons Ltd. London.

Kant, I. (1989). *Crítica de la razón pura*. Traducció i edició de Pedro Ribas, Alfaguara, Madrid.

Katz, M. (1980). Inexact Geometry. *Notre Dame J. of Formal Logic* 21. 521-535.

Klawonn, F., Kruse, R. (1993). Equality relations as a basis for fuzzy control, *Fuzzy Sets and Systems*, 54,147-156.

Klawoon, F., Castro, J.L. (1995) Similarity in Fuzzy Reasoning, *Mathware & Soft Computing* 2, 197-228.

Kóczy, L.T., Hirota, K. (1993a). Ordering, Distance and Closeness of Fuzzy

- Sets. *Fuzzy Sets and Systems*, 60, 281-293.
- Kóczy, L.T., Hirota, K. (1993b). Approximate Reasoning by linear rule interpolation and general approximation. *Int. J. Approximate Reasoning*, 9, 197-225.
- Kruse, R., Gebhardt, J., Klawonn, F. (1994). *Foundations of Fuzzy Systems*, John Wiley & Sons, Stuttgart.
- Lang, S. *Álgebra*. Ed. Aguilar, 1971.
- López de Mántaras, R. (1990) *Approximate Reasoning Models*. Ellis Horwood Ltd., London.
- Magrez, P., Smets, R. (1989). Fuzzy Modus Ponens: A New Model Suitable for Applications in Knowledge-Based Systems. *Int. Journal of Intelligent Systems*, Vol. 4, 181-200.
- Mamdani, E.H. (1977). Application of fuzzy logic to approximate reasoning using linguistic systems, *IEEE Trans. Comput.* 26, 1182-1191.
- Menger, K. (1951). Probabilistic theory of relations. *Proc. Nat. Acad. Sci. USA*. 37. 178-180.
- Menger, K. (1979). Geometry and Positivism. A probabilistic Microgeometry. Selected papers in *Logic and Foundation, Didactics, Economics*, Vienna Circle Collection, 10. D. Reidel Pub. Co., Dordrecht.
- Niiniluoto, I. (1987). Truthlikeness, *Synthese Library*, Vol. 185. Reidel, Holland.
- Ovchinnikov, S.V. (1981). Structure of fuzzy binary relations. *Fuzzy Sets and Systems* 6. 169-185.
- Ovchinnikov, S.V. (1984). Representations of transitive fuzzy relations. En H.J. Skala et al. Eds. *Aspects of Vagueness* (Reidel, Dordrecht). 105-118.
- Ovchinnikov, S.V., Riera, T. (1982). On fuzzy classifications. En R.R. Yager Ed. *Fuzzy Set and Possibility Theory: Recent Developments*. Pergamon Press. New York. 120-132.
- Pawlak, Z. (1982). Rough Sets. *International Journal of Computer and*

Information Science, 11, 341-356.

Prade, H. (1983). Approximate and Plausible Reasoning *Fuzzy Information, Knowledge Representation and Decision Analysis*. IFAC Symp., Marseille, France, Sanchez & Gupta, Etds. Pergamon Press.

Pultr, A. (1984). Fuzziness and fuzzy equality *Aspects of Vagueness*, 119-135 Skala, Termini and Trillas (eds). Reidel Pub. Co.

Rasiowa, H. (1974). *An algebraic Approach to Non-classical Logics*. North Holland, Amsterdam.

Recasens, J. (1995). *Sobre la representació i generació de relacions d'indistingibilitat*. Tesis doctoral. Edicions UPC.

Recasens, J. On a geometric combinatorial problem. En procés de revisió en *Discrete Mathematics*

Recasens, J., Isometric embeddings of metric spaces, Enviat a *Archiv der Mathematik*.

Rescher, N. (1969). *Many-valued Logic*. McGraw-Hill.

Ruspini, E. (1969). A new approach to clustering. *Inform. and Control*, 16. 22-31.

Ruspini, E. (1977). *A theory of Mathematical Classification*. Ph.D. Dissertation. Depart. of System Science. School of Engineering. Univ. of California. Los Angeles.

Ruspini, E. (1982). Recent developments in fuzzy clustering. En R.R. Yager. Ed. *Fuzzy Set and Possibility Theory: Recent Developments*. Pergamon Press. New York. 133-147.

Ruspini, E.H. (1986). The Logical Foundations of Evidential Reasoning. *Technical Note 408*, Artificial Intelligence Center, SRI International, Menlo Park.

Ruspini, E.H. (1989). On the Semantics of Fuzzy Logic. *Technical Note 475*, Artificial Intelligence Center, SRI International, Menlo Park.

Schoenberg, I.J. (1938). Metric spaces and positive definite functions.

- Trans. Amer. Math. Soc.* 44. 522-536.
- Schweizer, B. Sklar, A. (1983). *Probabilistic Metric Spaces*. North-Holland. Amsterdam.
- Shafer, G. (1976). *A Mathematical Theory of Evidence*. Princeton University Press.
- Shafer, G. (1985). Belief Functions and Possibility Measures. In J.C. Bezdek (Ed.): *Analysis of Fuzzy Information*. C.R.C. Press, 51-84.
- Skala, H.J., Termini, S., Trillas, E. (Eds). (1984). *Aspects of Vagueness*, Reidel Pub. Co.
- Soula, G. (1981). *Aide à la Décision en Logique Floue. Application a Médecine*. Ph.D. Thesis.
- Tarski, A. (1944). The Semantic Conception of Truth and the Foundations of Semantics. *Philosophy and Phenomenological Research* 4, 341-376.
- Tarski, A. (1955). A Lattice-Theoretical Fixpoint Theorem and its applications. *Pacific J. Math.* 5, 285-309.
- Trillas, E. (1979). Sobre funciones de negación en la teoría de conjuntos difusos. *Stochastica*, III-1. 47-60.
- Trillas, E. (1982). Assaig sobre les relacions d'indistingibilitat. *Actes del Primer Congrés Català de Lògica Matemàtica*. Barcelona. 51-59.
- Trillas, E., Alsina, C. (1978). Introducción a los Espacios Métricos Generalizados. *Fund. J. March. Serie Universitaria*, 49. Madrid.
- Trillas, E., Alsina, C., Valverde, L. (1981). Do we need Max, Min and 1-j in Fuzzy Sets Theory? En R.R. Yager Ed., *Fuzzy Sets and Possibility Theory: Recent Developments*. Pergamon Press. New York. 275-297.
- Trillas, E., Valverde, L. (1984a). An inquiry on indistinguishability operators. En H. Skala et al. Eds. *Aspects of vagueness* (Reidel, Dordrecht). 231-256.
- Trillas, E., Valverde, L. (1984b). On implication and indistinguishability in the setting of fuzzy logic. en J. Kacprzyk and R.R. Yager, Eds. *Management*

Decision Support System Using Fuzzy Sets and Possibility Theory. Verlag TUV. Rheinland, 198-212.

Trillas, E., Valverde, L. (1985a) On Mode and Implication in Approximate Reasoning. In M.M. Gupta et al. (eds.): *Approximate Reasoning in Expert Systems*. North Holland, Amsterdam, 157-166.

Trillas, E., Valverde, L. (1985b). On Modus Ponens in Fuzzy Logic. *Proc. del 15th. I.S.M.V.L.* Kingston (Ontario), 294-301.

Trillas, E., Valverde, L. (1987) On Inference in Fuzzy Logic. *Proc. of Second IFSA Congress*, Tokyo, 294-297.

Tuersky, A. (1977). Features of Similarity, *Psychological Review*, 84 (4).

Turksen, I.B., Zhong, Z. (1990). An Approximate Analytical Reasoning Schema Based on Similarity Measures and Interval-Valued Fuzzy Sets, *Fuzzy Sets and Systems* 34.

Valverde, L. (1982). *Contribució a l'estudi dels models matemàtics per a lògiques multivalents*. Tesi Doctoral. Univ. Politècnica de Catalunya.

Valverde, L. (1985). On the Structure of F-indistinguishability operators. *Fuzzy Sets and Systems* 17. 313-328.

Valverde, L. (1986). Representation of fuzzy symmetric relations. *J. Math. Anal. Appl.*

Valverde, L. (1990). Functional Models for Approximate Reasoning Representation *4th Int. Symp. on Knowledge Engineering*, Barcelona.

Vila, M.A., Delgado, M. (1983). Problem of classifications in a fuzzy environment. *Fuzzy Sets and Systems* 9. 229-239.

Yager, R.R. (1989). Aspects of possibilistic uncertainty *Int. Journal of Man-Machine Studies*, vol. 12.

Zadeh, L.A. (1965). Fuzzy Sets. *Inf. & Control*, 8. 338-353.

Zadeh, L.A. (1971). Similarity relations and fuzzy orderings. *Inform. Sci.*, 3. 177-200.

- Zadeh, L.A. (1973). Outline of a new approach to the analysis of complex systems and decision processes. *IEEE Trans. Sys. Man. Cybern.* 1, 28-44.
- Zadeh, L.A. (1975). Fuzzy Logic and Approximate Reasoning. *Synthese*, 30, 407-428.
- Zadeh, L.A. (1977). Fuzzy Sets and Their Applications to Pattern Classification and Cluster Analysis, en J. Van Ryzin, Ed. *Classificacion and Clustering*. Academic Press. New York. 251-299.
- Zadeh, L.A. (1979). A theory of Approximate Reasoning. *Machine Intelligence*, 9. 149-194.
- Zwick, R., Carlstein, E. and Budescu, D.V. (1987). Measures of similarity between fuzzy concepts: A comparative analysis. *Int. J. Approximate Reasoning* 1.



BIBLIOTECA RECTOR GABRIEL FERRATÉ
Campus Nord