Abstract

Case Based Reasoning (CBR) is an intelligent way of thinking based on experience and capitalization of already solved cases (source cases) to find a solution to a new problem (target case). Retrieval phase consists on identifying source cases that are similar to the target case. This phase may lead to erroneous results if the existing knowledge imperfections are not taken into account. This work presents a novel solution based on Fuzzy logic techniques and adaptation measures which aggregate weighted similarities to improve the retrieval results. To confirm the efficiency of our solution, we have applied it to the industrial diagnosis domain. The obtained results are more efficient results than those obtained by applying typical measures.

References

- Y. Peng and J.A. Reggia, “Abductive inference models for diagnostic problem solving.” Symbolic Computation, Springer-Verlag New York, Inc, 1990.
- A. Aamodt and E. Plaza, "Case-Based Reasoning: Foundational Issues, Methodological
A Logic and Adaptive Approach for Efficient Diagnosis Systems using CBR

- I. Watson and S. Abdullah, "Developing case-based reasoning systems: A case study in diagnosing building defects", IEEE Colloquium on Case-Based Reasoning: Prospects for Applications, N° 1994/057, Digest. March 1994.
- G. Zwingelstein "Diagnostic des défaillances : Théorie et pratique pour les systèmes industriels", Hermès, 1995.
- P.W. Grant, P.M. Harris and L.G. Moseley, "Fault Diagnosis for Industrial Printers Using Case-Based Reasoning". Engineering Applications of Artificial Intelligence. 9(2), 163-173, 1996.
- Mille, A., Fuchs, B. et Herbeaux, O. “A unifying framework for adaptation in case-based reasoning", Workshop on Adaptation in Case-Based reasoning, European Conference on Artificial Intelligence, ECAI-96, Budapest, Hungary. (1996)
- D. Leake, and D. Wilson, "Categorizing case-base maintenance: Dimensions and directions", Lecture Notes in Computer Science, vol.1488, Springer-Verlag, Berlin. 1998.
- A. Varma "ICARUS: Design and Deployment of a Case-Based Reasoning System for Locomotive Diagnostics. " In 3rd international conference on case-based reasoning (ICCBR-99), vol. 1650, pp. 581-595.1999
- L.J. Candia, "Gestion des connaissances imparfaites dans les organisations industrielles : cas d’une industrie manufacturière en Amérique Latine", Thèse de doctorat, Institut National Polytechnique de Toulouse, 2001.
- I. Grosclaude " Diagnostic abductif temporel - scénarios de pannes", modèles causaux et traitement de l’information. Thèse de Doctorat. Université de Rennes I. 2001.
- Afnor. Maintenance terminology. European standard, NF EN 13306, 2001.
- R. Bergmann, K.D. Althoff, S. Breen, M. Göker, M. Manago and S. Wess. "Developing Industrial Case Based Reasoning Applications: The INRECA Methodology", Lecture Notes in Artificial Intelligence, LNAI 1612, Springer Verlag, Berlin, 2003.
- B. Bouchon-Meunier and M. Christophe, "Logique floue, principes, aide à la décision". Traité IC2, Série informatique et systèmes d'information, Lavoisier, 2003.
- Cheetham, W., Tenth Anniversary of Plastics Color Matching, Artificial Intelligence Magazine, Volume 26, No. 3, (2005). pp 51 – 61.
- A. Cordier, and B. Fuchs, "Apprendre à mieux adapter en raisonnement à partir de cas", 2006.
- A. Mille, "Tutoriel: raisonner à partir de cas: principe, théorisation et ingénierie de la connaissance associée", 14e Atelier du Raisonnement à Partir de Cas, Besançon, France, March 2006.
- K. Haouchine, B. Chebel-Morello and N. Zerhouni, "Conception d’un Système de Diagnostic Industriel par Raisonnement à Partir de Cas", 17ème séminaire de raisonnement à partir des cas, 115-128, Paris, June 2009.
- K. Haouchine, PhD thesis :"Remémoration guide par l’adaptation et maintenance de systèmes de diagnostic industriel par l’approche du raisonnement à partir de cas", 2010.
- I. El Bitar, Master Thesis: "CBR: design, implementation and improvement of similarity measures applied to the field of industrial diagnosis", Lebanese University, Doctoral School of Sciences and Technology, 2010, unpublished.
- I. El Bitar, B. Hussein, F.Z. Belouadha, O. Roudies: "Solutions aux imperfections de connaissances dans le RàPC", 3ème édition des Journées Doctorales en Technologies de l'Information et de la Communication, 2011.
Keywords
CBR    Retrieve    Fuzzy logic    Adaptation    knowledge imperfections

Index Terms
Computer Science    Artificial Intelligence