# A Recommender System Based on Ontology and Intelligent Agent—A Case Study of Conference Announcement


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**ABSTRACT**

As information becomes abundant and lacks of proper evaluation and management mechanism, the reuse of domain knowledge does not increase as we expected. With the development of software agents and ontology technology, users are able to obtain proper services and promote competitive advantages through the platform. The recommendation architecture of a recommender on system based knowledge ontology and intelligent agent contains user interface, database and core kernel modules. To enable agents to the process of developing a more flexible and complete, this study is used MASE regardless doing analysis, Design and Implementation. Content of the message service is planning to follow the use of OWL-S norms. The contributions of this paper are (1) apply ontology-based search mechanism: users can obtain services precisely at a lower cost; (2) using MASE methodology: the agent-based system can be implemented completely; (3) integration of several tools and standards: the system integrates and applies various tools and standards to implement this system. Finally, the system not only promotes the sharing of knowledge but also enforces the code reuse and reduces the cost of developing similar systems. As knowledge services will be more and more common in the future, this architecture that we propose has long vision and necessary to apply in the different domains.



Keywords : Knowledge ontology ; MASE ; Message service ; Recommendation system ; Intelligent agents


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**REFERENCES**


一、中文部份 林育群(2003)，智慧型代理人應用於營建採購協商之研究，交通大學土木工程系，碩士論文，民92。 吳仁和，林信

惠(2000)，系統分析與設計-理論與實務運用，智勝文化事業有限公司出版，台北，第232-240頁。 二、英文部份 A.J. Duineveld, R. Stoter, M. R. Weiden, B. Kenepa, & V. R.Benjamins(2000), Wonder Tools? a comparative study of ontological engineering tools, International Journal of Human-Computer Studies, Vol. 52, No. 6, pp.1111-1133. A leksander B. Demko & Nicolino J. Pizzi(2003), The utility of graph theoretic software metrics: a case study, Electrical & Computer Engineering, Vol. 2, pp.1309-1312, May. A. Zisman; A. Kozlenkov(2001), Knowledge base approach to consistency management of UML specifications, Automated Software Engineering,. (ASE 2001). Proceedings. 16th Annual International Conference on , 26-29 Nov. 2001, Page(s): 359 -363 A. Perini, P. Bresciani, F. Giunchiglia, P. Giorgini, & J. Mylopoulos(2001). A knowledge level software engineering methodology for agent oriented programming. In Proc. of the 5th Int. Conference on Autonomous Agents, Montreal CA, May . ACM. B. Chandrasekaran,J. R. Josephson, & V. R. Benjamins(1999), What Are Ontologies & Why Do We Need Them? IEEE Intelligent Systems, Vol. 14, Issue 1, pp.20-26,. Available at http://dlib.computer.org/ex/books/ex1999/pdf/x1020.pdf. C. C. Hayes(1999), Agent in a Nutshell – A Very Brief Introduction, IEEE Trans. on Knowledge & Data Engineering, Vol. 11, No.1, Jan/Feb. C.A. Iglesias; M. Garijo; & J.C. Gonzalez, (1999) A Survey of agent-Oriented Methodologies. Proceedings of the Fifth International Workshop on agent Theories, Architectures. DARPA, DARPA Agent Markup Language (DAML)(2004), Defense Advanced Research Projects gency, http://www.daml.org. David Tennenhouse, Proactive Computing(2000)., Communicationsof the ACM, Vol. 43, No. 5, pp. 42-50, May. David W. McDonald(2003), Ubiquitous Recommendation Systems, Computer, Vol. 36, No. 10, pp. 111-112, Oct. Davies, D. Fensel & F. V. Harmelen.(2003)., Towards The Semantic Web: ontology-driven knowledge management, England : Wiley, Aug. E. K. Mugisa(2003), A reuse triplet view of UML, SoutheastCon, in Proceedings IEEE, pp. 126 – 133, Apr. FIPA ACL Message Structure Specification Technical Report, SC00061G(2002), Foundation for Intelligent Physical Agent, Dec. Guttman, R. H., Moukas, A.G.& Maes, P, (1998), Agents as Mediators inElectronic Commerce, Electronic Markets, 8(1), pp. 22-27. Gheorghe Tecuci(1998). Building Intelligent Agents: An Apprenticeship Multi strategy Learning Theory, Methodology, Tool & Case Studies. ACADEMIC PRESS. Giunchiglia F., Mylopoulos j. (2001), Perini A., The Tropos software development methodology: processes, models & diagrams, November1. H.Suguri(1999), A standardization effort for agent technologies: The Foundation for Intelligent Physical Agents & its activities, in Proceedings of the 32nd Annual Hawaii International Conference, pp. 10. H. M. Kim, (2002), XMLhoo!: A Prototype Application for Intelligent Query of XML Documents using Domain-Specific Ontologies, Proceedings of the 35th Hawaii International Conference on Systems Science (HICSS-35 ‘ 02), USA. J. Odell, H. V. D. Parunak, & B. Bauer, (2000) Extending UML for agents. In Proceedings of the agent -Oriented Information Systems Workshop at the 17th National conference M. Uschold & M. King, (1995), Towards a Methodology for Building Ontologies, Workshop on Basic Ontological Issues in Knowledge Sharing,International Joint Conference on AI (IJCAI-95), Canada. M. L. Fernandez, Aug(1999), Overview of Methodologies For Building Ontologies, Proceedings of the Workshop on Ontologies & Problem-Solving Methods, International Joint Conference on AI (IJCAI-99), Sweden. Maes, P., Guttman, R.H. & Moukas, A.G, (1999), Agents that Buy & Sell: Transforming Commerce as We Know It, Communications of the ACM, Vol.42,No. 3, pp.81-91. Mark Stang & Stephen Whinston(2001)., Enterprise Computing with Jini Technology, IT Professional, Vol. 3, No. 1, pp. 33 -38, Jan/Feb. M. Bjerkander & C. Kobryn(2003), Architecting systems with UML2.0 Software, IEEE, Vol. 20, No. 4, pp. 57-61. Jul/Aug. M. Luck, R. Ashri & M. D ’ inverno(2004)., Agent-based Software Development, USA: Artech House, Feb. Mark F. Wood Scott A. DeLoach(2000), An Overview of the Multiagent Systems Engineering Methodology, In AOSE-Proc. of the First International Workshop on AOSE, 10 th June . Limerick, Ireland Ciancarini, P., Wooldridge, M.: (ed.) Lecture Notes in Computer Science, Vol. 1957 Springer - Verlag, Berlin. Michael Gruninger & Mark S Fox, (1995), Methodology for the Design & Evaluation of Ontologies Department of Industrial Engineering University of Toronto, Canada, M S A. Mark F. Wood Scott A. DeLoach(2000), An Overview of the Multiagent Systems Engineering Methodology, In AOSE – Proc. of the First International Workshop on AOSE, 10 th June 2000, Limerick, Ireland Ciancarini, P., Wooldridge, M.: (ed.) Lecture Notes in Computer Science, Vol. 1957 Springer-Verlag, Berlin. Nwana, H. S. (1996), Software Agents:An Overview, Knowledge Engineering Review, Nol.11, No.3, pp. 205-244. N. Guarino(1998), Formal Ontology & Information System, In Proceedings of FOIS'98, Trento, Italy, pp. 3-15, Amsterdam, IOS Press, June. Available at ftp://ftp.ksl.stanford.edu/pub/KSL_Reports/KSL-92-71.ps. Object Services & Consulting, Inc, (1999) Agents for the Masses, http://www.objs.com/agility/tech-reports/9902-agents-for-the-masses.doc. OWL-S: Semantic Markup for Web Services, (2004). http://www.daml.org/services/owl-s/1.0/owl-s.html Paul Resnick & Hal R. Varian(1997), Recommendation systems Communication of ACM, Vol. 40, No. 3, pp. 56-58. P. A. Huhns et al., Inside an agent(2001) Internet Computing, IEEE,Vol. 5, NO. 1, pp. 82-86, Jan/Feb. Park, Chang-Sup; Kim, Myoung Ho; Lee, Yoon-Joon. (2002), Finding an efficient rewriting of OLAP queries using materialized views in data warehouses, Decision Support Systems Volume: 32, Issue: 4, March, pp. 379-399. Padgham, L. & Winikoff, M. (2002), Prometheus: A Methodology for Developing Intelligent Agents, Proceedings of the Third International Workshop on Agent Oriented Software Engineering, at AAMAS 2002. July, 2002, Bologna, Italy. January 2003. R.Larry Dooley,C.Hopkins, & C.L. Yieh(1988) ,Artificial intelligence-Bayesian analysis system for cardiac catheterization laboratory, in Proceedings of the Annual International Conference of the IEEE, Nov., pp. 1337. R. B. France et al(2004)., A UML-based pattern specification technique, Software Engineering, IEEE Transactions on, Vol.30, No. 3, pp. 193-206, Mar. R. Larry Dooley, C. Hopkins, & C.L. Yieh(1998), Artificial intelligence-Bayesian analysis system for cardiac catheterization laboratory, in Proceedings of the Annual International Conference of the IEEE, Nov., pp. 1337. S.Cranefield, M. Nowostawski, & M. Purvis(2001). Implementing agent communication languages directly from UML specifications. Department of Information Science, University of Otago, PO Box 56. T. R. Gruber(1993), A Translation Approach to Portable Ontology Specifications, Journal of Knowledge Acquisition, Vol. 5, pp. 199-220. Wooldridge, M., Jennings, N., Kinny, D. (2000), The Gaia Methodology for Agent-Oriented Analysis & Design. Autonomous Agents & Multi-Agent Systems.

Wooldridge M. J., Jenning N. R. & Kinny D(1999). A methodology for agent-oriented analysis & design. In Proc. of the third international conference on Autonomous agents, pages 69-76. Wood, M. F. (2000), Multiagent Systems Engineering: A Methodology for Analysis & Design of Multiagent Systems. MS thesis, AFIT/GCS/ENG/00M-26. School of Engineering, Air Force Institute of Technology (AU), Wright-Patterson AFB Ohio, USA . Web Services Activity, 2004. http://www.w3.org/2002/ws. Zacharis Z. Nick, & Panayiotopoulos Themis(2001), Web search using a genetic algorithm, Internet Computing IEEE, Vol.5 , No. 2 , pp. 18-26, Mar./Apr. Zarnekow,Brenner W., R., & Wittig, H. (1998), Intelligent Software Agents, Springer.