

應用知識本體與代理人技術於知識分享服務之研究:以音樂知識推薦系統為例

柯得翔、楊豐兆

E-mail: 9607619@mail.dyu.edu.tw

摘要

現今音樂推薦服務是透過網路找尋使用者喜好的音樂資訊。透過音樂推薦服務，能了解各種音樂風格資訊中有哪些歌手或歌曲。以往的音樂推薦服務是使用者輸入檢索詞利用字串的比對來獲得推薦結果，但是此一方式所產生出來的結果並不精確，使用者經常無法得到真正想要的結果。本研究在介面代理人的輔助下以本體論為基礎，針對音樂領域的知識，透過TOVE (Toronto Virtual Enterprise)知識本體工程方法建立音樂知識本體，分析音樂領域的知識與定義音樂中的每一個類別，以明確的規格化並且定義類別、屬性之間的關聯，同時也建立推論規則，應用推論引擎對知識本體進行推論。本研究以音樂領域建立知識本體，建構音樂知識推薦系統，使用者可以透過此系統介面進行語意檢索，找出與檢索詞語意相關的資訊，讓使用者過濾不必要的音樂資訊得到更適合的結果，並且達成知識分享與知識再利用的目的。

關鍵詞：知識本體；知識分享；音樂；知識本體工程法；語意

目錄

中文摘要	iii	英文摘要	iii
. . . iv 誌謝辭 . . . . .		. . . v 內容目錄	
. vi 表目錄 . . . . .		. . . . . viii 圖目錄	
. ix 第一章 緒論	1	. . . . . 第一節 研究背景	1
. 1 第二節 研究動機	2	. . . . . 第三節 研究目的	2
. 3 第四節 研究範圍與限制	3	. . . . . 5 第五節 研究	5
流程 6 第六節 論文架構	6	. . . . . 8 第二章 文	8
獻探討 9 第一節 知識本體(ontology)	9	. . . . . 9 第二	9
節 本體論語言 12 第三節 知識本體工程法	12	. . . . . 16	16
. 20 第五節 軟體代理人	20	. . . . .
. 21 第六節 知識分享	21	. . . . . 第七節 Protege知識本體編輯器	21
. 22 第三章 系統需求分析	22	. . . . . 第一節 系統架構	23
. 23 第二節 使用者需求分析	23	. . . . . 25 第三節 系統特色	25
. 33 第四章 系統核心設計	33	. . . . . 35 第一節 知識	35
本體設計 35 第二節 知識本體分析	35	. . . . . 35 第三節	35
. 36 第五章 系統實作與效能評估	36	. . . . . 47	47
. 47 第一節 系統開發工具與環境	47	. . . . . 第二節 系統介面與功能	47
. 47 第三節 系統評估	47	. . . . . 55 第六章 結論與未來展望	55
. 60 第一節 研究成果	60	. . . . . 60 第二節 未來研究方向	60
. 61 參考文獻	61	. . . . . 63	63

參考文獻

一、中文部份 林建宏(2006)，正規化概念分析建構電腦病毒特徵之知識本體，國立雲林科技大學資訊管理學系碩士班未出版之碩士論文。胡訓誠(2003)，應用本體論設計ISO文件管理資訊系統，國立高雄第一科技大學資訊管理學系未出版之碩士論文。戚玉樑(2005)，以本體知識為基礎的知識庫建制程式及其應用，資訊科技與社會，5(2)，1-18。戚玉樑，林建良(2004)，使用OWL-QL開發領域本體知識庫之知識提取，電子商務與數位生活研討會。鍾正男(2004)，以知識本體為基礎的語意查詢系統之研究-以圖書館為例，大葉大學資訊管理系未出版之碩士論文。二、英文部份 Bechhofer, S., Horrocks, I., Goble, C., & Stevens, R. (2001, Sep). OilEd: A Reason-able ontology editor for the semantic web. In Proceedings of the German/Austrian Conference on AI (pp.396-408), Vienna, Austria. Berners-Lee, T. (1998). Semantic web road map. Internal note, World Wide Web Consortium. Celik, D., & Elci, A. (2005, Nov). Searching semantic web services: An intelligent agent approach using semantic enhancement of client input term(s) and matchmaking step; Computational Intelligence for Modelling. Control and Automation, 2005 and International Conference on Intelligent Agents, Web Technologies and Internet Commerce, International Conference 2 (pp.916-922), Washington. Chandrasekaran, B., Josephson, J., & Benjamins, V. (1999, Jan). What are ontologies, and why do we need them?.

IEEE Intelligent System, 14(1), 20-26. Corcho, O., & Gomez-Perez, A. (2002, Feb). Ontology languages for the Semantic Web. IEEE Intelligent Systems and their Applications, 17(4), 54-60. Decker, S., Melnik, S., Van Harmelen, F., Fensel, D., Klein, M., Broekstra, J., Erdmann, M., & Horrocks, I. (2000, Sep). The Semantic Web: The roles of XML and RDF. IEEE Internet Computing, 4(5), 63-74. Ding, Y. (2001), Ontology: The enabler for the Semantic Web. Journal of Information Science, 27(6), 377-384. Farquhar, A., Fikes, R. & Rice, J. (1997, Jun). The Ontolingua Server: A tool for collaborative ontology construction. International Journal of Human Computer Studies, 46(6), 707-727. Fensel, D., Horrocks, I., Van Harmelen, F., Decker, S., Erdmann, M., & Klein, M. (2000). OIL in the nutshell. In Proceedings of the European Knowledge Acquisition Conference (pp.1-16), France. Fensel, D., van Harmelen, F., Horrocks, I., McGuinness, D. L. & Patel-Schneider, P. F. (2001, May). OIL: An ontology infrastructure for the semantic web. IEEE Intelligent Systems, 16(2), 38-45. Fernandez, L. M. (1999, Aug). Overview of methodologies for building ontologies. In Proceedings of the IJCAI-99 Workshop on Ontologies and Problem-solving Methods (pp.1-13), Sweden. Fox, M. S., & Gruninger, M. (1998). Enterprise modeling. AI Magazine, 19(3), 109-121. Gillam, L., Tariq, M., & Ahmad, K. (2005, Jan). Terminology and the construction of ontology. Terminology, 11(1), 55-81. Grosso, W. E., Eriksson, H., Ferguson, R. W., Gennari, J. H., Tu, S. W., & Musen, M. A. (1999). Knowledge modeling at the millennium: the design and evolution of Protege-2000. SMI Technical Report, SMI-1999-0801. Gruber, T. R. (1993, Jun). A translation approach to portable ontology specifications. Knowledge Acquisition, 5(2), 199-220. Gruber, T. R. (1995, Nov). Towards principles for the design of ontologies used for knowledge sharing?. International Journal of Human-Computer Studies, 43, 907-928. Gruninger, M., & Fox, M. S. (1995, Apr). Methodology for the design and evaluation of ontologies. In Workshop on Basic Ontological Issues in Knowledge Sharing (pp.6.1-6.10), Toronto Canada. Guarino, N. (1997). Understanding, building and using ontologies, International journal of human and computer studies, 46(3/4), 219-310. Han, J., & Kamber, M. (2001). Data mining: Concepts and techniques. New York: Morgan Kaufmann. Hui, B., & Yu, E. (2005, Jul). Extracting conceptual relationships from specialized documents. Data & Knowledge Engineering, 54(1), 29-55. Jacob, E. K. (2003, Apr). Ontologies and the semantic web. Information Science and Technology, 29(4), 19-22. Jennings, N. R., & Wooldridge, M. (1995, Aug). Applying agent technology, Int. Journal of Applied Artificial Intelligence, 9(4), 351-369. Jones, D., Bench, C. T., & Visser, P. (1999). Methodologies for ontology development. Proceedings of the IJCAI-99 workshop on Ontologies and Problem -Solving Methods, Budapest. Kietz, J. U., Maedche, A., & Volz, R. (2000, Sep). Extracting a domain-specific ontology from a corporate intranet. In Proceedings of the Fourth Conference on Computational Natural Language Learning and of the Second Learning Language in Logic Workshop (pp.167-175), Portugal. Kim, H. M. (2002, Jan). XML-hool: a prototype application for intelligent query of XML documents using domain-specific ontologies, In Proceedings of the 35th Hawaii International Conference on Systems Science (pp. 1289- 1298), Hawaii. Kim, H. M., & Fox, M. S. (2002, Jan). Using enterprise reference models for automated ISO 9000 compliance evaluation. In Proceedings of the 35th Hawaii International Conference on Systems Science (pp.1278-1287), Hawaii. Kupfer, A., Eckstein, S., Neumann, K., & Mathiak, B. (2006). A coevolution approach for database schemas and related Ontologies. presented at 19th IEEE Symposium on Computer-Based. Medical Systems (pp. 605-610), Salt Lake City, Utah. Lopez, de Vergara, J. E., Villagra, V. A., & Berrocal, J. (2004, Jul). Applying the web ontology language to management information definitions. IEEE Communication magazine, 42(7), 68-74. Lopez, M. F., Perez, A. G., Sierra, J. P., & Sierra A. P. (1999, Jan). Building a chemical ontology using methontology and the ontology design environment. IEEE Intelligent Systems, 37-46. McGuinness, D. L., & Harmelen, F. V. (2004, Feb). OWL Web Ontology Language Overview W3C Recommendation [Online]. Available: <http://www.w3.org/TR/2004/REC-owl-features-20040210> [2007 January 18]. Mizoguchi, R. (2004). Ontology engineering environment. In Steffen Staab & Rudi Studer Handbook on ontologies, 275-296. Neches, R., Fikes R. E., Finin T., Gruber T. R., Senator, T., & Swartout, W. R. (1991). Enabling technology for knowledge sharing. AI Magazine, 12(3), 36-56. Noy, N. F., Sintek, M., Decker, S., Crubezy, M., Ferguson, R. W., & Musen, M. A. (2001, Mar). Creating semantic web contents with Protege-2000. IEEE Intelligent Systems, 16(2), 60-71. Omelayenko, B. (2002, Jul). RDFT: A mapping meta-ontology for business integration. In Proceedings of the Workshop on Knowledge Transformation for the Semantic for the Semantic Web at the 15th European Conference on Artificial Intelligence (pp.77-84), Lyon France. Open Biomedical Ontologies. (2006). Gene ontology [Online]. Available: <http://www.geneontology.org/> [2006 November 28]. Pokraev, S., Zlatev, Z., Brussee, R., & Eck, P. V. (2004, Apr). Semantic support for automated negotiation with alliances. In Proceedings of the ICEIS 2004: 6th International conference on enterprise information systems (pp.244-249), Portugal. Ram, S., & Park, J. (2004, Feb). Semantic conflict resolution ontology(SCROL): An ontology for detecting and resolving data- and schema-level semantic conflict. IEEE Transactions on Knowledge and Data Engineering, 16(2), 189-202. Roberto, G. G. (2005). Methodology [Online]. Available: <http://rhizomik.net/~roberto/thesis/html/Methodology.html> [2006 August 20]. Senge, P. (1997). Sharing knowledge. Executive Excellence, 4(11), 17-18. Schreiber, A. T., Dubbeldam, B., Wielemaker, J., & Wielinga, B. (2001, May). Ontology-based photo annotation. IEEE Intelligent Systems, 16(3), 66-74. Stephens, L. M., & Huhns, M. N. (2001, Sep). Consensus ontologies reconciling the semantics of web pages and agents, IEEE Internet Computing, 15(5), 92-95. Tamma, V., Wooldridge, M., & Dickinson, I. (2002, Jul). An ontology for automated negotiation. In Proceedings of the Workshop on Ontologies in Agent Systems (pp.93-98), Italy. The Open Music Project (2006). MusicMoz [Online] Available: <http://www.musicmoz.org/> [2006 December 10]. Uschold, M., & Grueninger, M. (1996, Jun). Ontologies: Principles, methods and applications. International Journal of Knowledge Engineering Review, 11(2), 93-155. Van der Vet, P. E., & Mars, N. J. (1998, Jul). Bottom-up construction of ontologies. IEEE Transaction on Knowledge and Data Engineering, 10(4), 513-526. Van Kralingen, R. W., Visser, P. R. S., Bench-Capon, T. J. M., & Jaap Van Den Herik, H. (1999, Dec). A principled approach to developing legal knowledge systems. International Journal of Human-Computer Studies, 51(6), 127-1154. Nguyen, X. & Kowalczyk, R. (2005, Sep). Enabling agent-based management of web services with WS2JADE. In Quality Software, 2005. (QSIC 2005). Fifth International Conference (pp. 407- 412), Australia. Shi, Z., Huang, H., Luo, J., Lin,

Fen., & Zhang H. (2006, Jul). Agent-based grid computing. *Applied Mathematical Modelling* , 30(7), 629-640.