

# 網站使用者的資訊偏好變動推測之研究

朱志浩、陳振東

E-mail: 9222314@mail.dyu.edu.tw

## 摘要

由於網際網路的普及，越來越多企業利用網際網路一對一的傳播特性，提供各式各樣的資訊與服務給客戶，並作為一個企業與顧客間重要的互動管道。在強調個別化行銷的年代中，以低成本的方式提供消費者量身定作的個人化服務，將是未來企業必須重視的課題。然而，網際網路的蓬勃發展，使得企業能提供更多的服務及產品的資訊給消費者。但若是使用者不斷迷失於網站的大量資料中，不但佔去了網站的資源，降低了消費者的滿意度，更讓企業失去服務另一位使用者的機會與資源。因此，企業莫不希望利用資訊科技了解、預測消費者的興趣偏好，進而快速且準確的提供使用者所需的資訊、產品或服務。為此，本研究藉由資料採礦與模糊集合的技術，提出一個使用者的偏好分析模式，以偵測使用者偏好的改變。同時，經由建置網站以進行使用者瀏覽資料的收集，與本研究提出之分析模式的評估測試，最後結果顯示使用者對於分析的結果有相當大的認同度。所以，本研究提出之分析模式將能協助企業針對消費者偏好特性設計出獨特的行銷方案，以及客製化的網站環境與個人化的服務，進而提昇企業顧客關係管理與競爭力。

關鍵詞：網際網路、資料採礦、使用者偏好分析、個人化服務

## 目錄

第一章 緒論.....1	第一節 研究背景..... 1	第二節 研究動機.....2	第三節 研究目的.....3	第四節 研究流程.....4
第二章 文獻探討.....6	第一節 顧客關係管理與個人化服務..... 6	第二節 資料採礦與資料庫知識探索..... 9	第三節 網頁探勘的定義與種類..... 23	
第三章 使用者偏好變動的推測模式..... 26	第一節 模糊集合論..... 26	第二節 最大瀏覽序列..... 28	第三節 使用者偏好的分析流程.....29	
第四章 測試網站設計與實證分析..... 39	第一節 系統開發環境與工具.....39	第二節 網站架構說明..... 39	第三節 測試流程與結果.....44	
第四章 問題探討..... 57	第五章 結論.....59	第一節 結論.....59	第二節 後續研究與建議..... 60	
參考文獻.....62				

## 參考文獻

- [1]Apte, C. and S. Weiss, "Data Mining with Decision Trees and Decision rules," Future Generation Computer System, Vol.13, 1997, pp.197-210.
- [2]Allen, C., D. Kania and B. Yaeckel, Internet World Guide to One- To-One Web Marketing, Camada : John Wiley & Sons, 1998.
- [3]Agrawal R. and R. Srikant, "Fast Algorithms for Mining Associati- on Rules in Large Databases", Proceedings of the 20th International Conference on Very Large Data Based. September 1994, pp. 478-499.
- [4]Bose, I. and R. K. Mahapatra, "Business data Mining-a machine learning perspective," Information & Management, Vol.39, 2001, pp.221-225.
- [5]Borges, J. and M. Levene, "Data Mining of user navigation patte- rns," In Proceedings of the WEBKDD99 Workshop on Web Usage Analysis and User Profiling, August 15, 1999, San Diego, CA, USA, 1999, pp.31-36.
- [6]Buckley, J. J. and Y. Hayashi, "Fuzzy genetic algorithm and appli- cations," Fuzzy Set and System, Vol.61, 1994, pp.129-136.
- [7]Chakrabarti, S., B. Dom, D. Gibson, J. Kleinberg, S.Kumar, P. Raghavan, S. Rajagopalan, and A. Tomkins. "Mining the Link Structure of the world wide web," IEEE Computer, Vol.32, 1999, pp.60-67.
- [8]Chen, M. S., J. Ha and P. S. Yu, "Data mining:an overview from a database perspective," Knowledge and Data Engineering, IEEE Transactions, Vol.86, 1996, pp.866-883.
- [9]Chen, M. S., S. P. Jong and P. S. Yu, "Efficient Data mining for path traversal patterns," Knowledge and Data Engineering, IEEE Transaction, Vol.102, 1998, pp.209-221.
- [10]Cooley, R., B. Mobasher and J. Srivastava, "Web mining: inform- ation and pattern discovery on the World Wide Web," Ninth IEEE International Conference, Taipei, 1997, pp.558-567.
- [11]Chakrabarti, S., "Data mining for hypertext : A tutorial surve- y."ACM SIGKDD Explorations, Vol.1, 2000, pp.1-11.
- [12]Craven, M. W. and J. W. Shavlik, "Using Neural Networks for Data Mining," Future Generation Computer Systems, Vol.13, 1997, pp.211-229.
- [13]Dubin, F. and D. Bycina., Academic reading and the ESL/EFL teacher. In Teaching English as a second or foreign language (2nd ed.) ed. M. Celce-Murcia. Boston: Heinle and Heinle.

- [14]Etzioni, O., "The world wide web : Quagmire or gold mine", Communications of the ACM, Vol.39, 1996, pp.65-68.
- [15]Fayyad, U., G. P. Shapiro and P. Smyth , "From data mining to knowledge discovery in database", AI magazine, Vol.17,1996, pp.37-54.
- [16]Fayyad, U., G. P. Shapiro and P. Smyth , "From data mining to knowledge discovery in database", AI magazine, Vol.17, 1996, pp.37-54.
- [17]Fayyad, U., G. P. Shapiro, P. Smyth, and R. Uthurusamy, "Adv- ances in knowledge Discovery and Data Mining," Menlo Park, CA: AAAI/MIT Press,1996.
- [18]Fayyad, U., and R. Uthurusamy, "Special Issue on Data Mining" , Communications ACM, 1996, pp.1-11.
- [19]Frawley, W. J., S. G. Paitetsky and C. J. Matheus, "Knowledge Discovery in Databases : An Overview," Communications of the ACM, Vol.39, 1996, pp.1-34.
- [20]Fu, Y., "Data mining," IEEE Potentials, Vol.16, 1997, pp.18-20.
- [21]Grzymala, J. W. and W. Ziarko, "Data Mining and Rough Set Theory," Communications of ACM, Vol.43, 2000, pp.108-109.
- [22]Goebel, M. and L. Gruenwald, "A Survey of Data Mining and Knowledge Discovery Software Tools," ACM SIGKDD Explorations, Vol.1, May 1999, pp.1-20.
- [23]George, J. K. and B. Yuan, Fuzzy Sets and Fuzzy Logic theory and Application, publish by Prentice-Hall International, Inc., 1995.
- [24]Greenfeld, N., "Data Mining," UNIX Review, Vol.14, 1996, pp.9-14.
- [25]Harvard Business School Press, "Harvard Business Review on Cu- stomer Relationship Management" , 2001.
- [26]Hall, L. O., "Rule chaining in fuzzy expert systems," Fuzzy Systems, IEEE Transactions, Vol:9, Dec. 2001, pp.822-828.
- [27]Han, J. and M. Kamber, Data Mining - Concepts and Techniq- ues , Morgan Kaufmann Publishers, 2001.
- [28]Inmon, W. H., Build the Data Warehouse, John Wiley & Sons, 1990.
- [29]Jain, A. K., M. N. Murty, and P. J. Flynn,"Data Clustering : A Review," ACM Computing Survey, Vol.31, 1999, pp.264-324.
- [30]Kaoru, H. and P. Witold, "Fuzzy Computing for Data Mining", Pr- oceeding of the IEEE, Vol.87, 1999, pp.1575-1600.
- [31]Kusiak, A., "Rough Set Theory: a Data Mining Tool for Semico- nductor Manufacturing," IEEE Transactions on Electronics Packaging Manufacturing, Vol.24, 2001, pp.44-50.
- [32]Kosala, R. and H. Blockeel, "Web Mining Research : A Survey." ACM SIGKDD, Vol.2, 2000, pp.1-15.
- [33]Kolodner, J., "Case-Base Reasoning," Morgan Kaufmann, San Mateo, CA, 1993.
- [34]Langley, P., "User modeling in adaptive interfaces" In Processdin- gs of the Seventh International Conference on User Modeling, 1997, pp.729- 737.
- [35]Matthew, Neil and Richard Stones, Beginning Databases with MySQL, Wrox, Inc, 2002.
- [36]Michael, J. A. B. and S. L. Gordon, Data Mining Techniques : for marketing, sales, and customer support, Wiley Publishing Company, 1997.
- [37]Mobasher, B., R Cooley and J. Srivastava, "Automatic personalize- ation based on Web usage mining," Commucations of the ACM, Vol.43, 2000, pp.142-152.
- [38]Maes, P., "Agents that reduce work and information overload" Communications of the ACM, Vol.37, 1994, pp.30-40.
- [39]Mulvenna, M. D., S. S. An and, G. B. Alex, "Personalization on the Net using Web Mining," Commucations of the ACM, Vol.43, 2000, pp.123-126.
- [40]Mitra, S., S. K. Pal and P. Mitra, "Data mining in soft computing" framework: A survey", IEEE Transactions on Neural Networks, Vol.13, 2002, pp. 3-14.
- [41]Michio, S., Industrial Application of Fuzzy Control, Elsevier Science Publishing Company, 1985.
- [42]Madria, S. K. and S. S. Bhowmick, W. K. Ng, and E. P. Li- m ."Research issues in web data mining," In Rroceedings of Data Warehousing and Knowledge discovery, First International Conference, 1999, pp.303-312.
- [43]Newell, F., The New Rules of Marketing: how to use One-To-One Relationship Marketing to be the leader in your industry, New York: McGraw-Hill, Inc,1997.
- [44]Nakajima, H., "Fuzzy logic and data mining", Fuzzy System Symposium, Soft Computing in Intelligent Systems and Information Processing., Proceedings of the 1996 Asian, 1996, pp.133-138.
- [45]Peppers, D. and Rogers, Martha, et al, "Is Your Company Ready for One-to-one Marketing?," Harvard Bussiness Review, Vol.77, 1999, pp.151.
- [46]Park, J. S., M. S. Chen and S. Y. Philip, "An Effective Hash Based Algorithm for Mining Association Rules", Proc. Of ACM SIGMOD, May 1995, pp. 175-186.
- [47]Pepper, D. and M. Rogers, Enterprise One to One: tools for competing in the Interactive Age, New York: Doubleday,1997.
- [48]Salton, G., "Another Look At Automatic Text-Retrieval System," Communications of the ACM, Vol.29, 1986, pp.648-656.
- [49]Setiono, R., J. Y. L. Thong and C. S. Yap, "Symbolic Rule Extraction from Neural Networks," Information and Management, Vol.34, 1998, pp.33-40.
- [50]Thomas, Deepak, Choi, Wankyu, et al,Professional PHP4, Wrox, Inc,2002.
- [51]Yager, R. R., "Database Discovery using Fuzzy Sets," Intern- ational Journal of Intelligent Systems, Vol.11, 1996, pp.619-712.
- [52]Zadeh, L. A., "Outline of a new approach to the analysis of complex systems and decision processes," IEEE Transactions on Systems, Man and

Cybernetics, SMC-3, no.1, 1973, pp.28-44.

[53]Zadeh, L. A., "Fuzzy Sets," Information and Contro, Vol.8, 1965, pp.338-353.