

# 應用緣集合論於延遲性診斷關鍵屬性之研究

沈智敏、陳郁文

E-mail: 9900320@mail.dyu.edu.tw

## 摘要

根據美國醫學研究機構(Institute of Medicine, 簡稱IOM)所發表之報告指出, 每年因可避免的醫療錯誤, 至少造成四萬四千人死亡, 且高居全美十大死因第八位。此報告突顯出關於醫療錯誤的嚴重性, 消費者應該了解醫療錯誤的發生機率比我們原先所想的要高出許多, 所謂的醫療錯誤在本研究中之定義為延遲性診斷, 表示當病人的病徵在急診室未被發現, 但被加護病房的醫師發現, 即稱為延遲性診斷。本研究應用緣集合論的概念進行資料探勘的步驟, 再利用拓樸學的方法分析資料之間的關連性, 進而探討哪些屬性易造成延遲性診斷, 以期降低延遲性診斷的機率, 增進醫療品質。研究結果發現, 病人於血壓與脈搏不正常之緊急狀態下, 易造成醫師延遲性診斷, 其機率高達六成。而其原因乃因醫師在緊急的情況下, 沒有多餘的時間對病患作詳盡的診斷; 而且醫師易以第一印象來判斷病人之病況, 因此當病人處於意識清醒且呼吸正常時, 易導致醫師延遲性診斷。此外; 根據結果顯示, 超時工作容易造成醫師工作失焦, 但是醫師的年齡大小及專科證照的多寡並不會影響延遲性診斷的機率。本研究亦透過粗略集合之應用軟體ROSETTA產生規則與緣集合比較, 發現前者的規則庫龐大且雜亂, 無法清楚地解釋資料之間的關連性, 且判中率最高的規則只有四成。

關鍵詞: 延遲性診斷; 緣集合; 資料探勘; 拓樸學

## 目錄

封面內頁	簽名頁	博碩士論文暨電子檔案上網授權書	iii	Abstract	iv	中文摘要	v	誌謝	vi	Contents	vii	Figure List	x	Table List	xi																																																								
Chapter 1	Introduction	1	1.1	Background and Motivation	1	1.2	Research Objectives	3	1.3	Assumptions and Limitations	3	1.4	Research Procedure	4																																																									
Chapter 2	Literature Review	5	2.1	Data Mining	5	2.1.1	The process of Knowledge Discovery in Database	5	2.1.2	The Techniques of Data Mining	6	2.1.3	Related Studies in Medical Data Mining	7	2.2	Set Review	8	2.2.1	Fuzzy Set	8	2.2.2	Rough Set	10	2.2.3	The Concept of Affinity Set	11	2.2.4	The Definition of Affinity	12	2.2.5	Comparison with Fuzzy Sets and Rough Sets	17	2.3	Summary	18																																				
Chapter 3	Model Construction and Resolution	19	3.1	Research Procedure	19	3.2	Processing the Data	20	3.3	Generate the Rules	21	3.4	Computing Hit Rate	21	3.5	Find out the Rule Base	23																																																						
Chapter 4	Case Study	25	4.1	Data Collection	25	4.2	Data Coordination	25	4.3	Conclusions and Discussions	27	4.3.1	The Discussion of one Attribute	28	4.3.2	The Discussion of the Combination with two Attributes	29	4.3.3	The Discussion of the Combination with three Attributes	30	4.3.4	The Discussion of the Combination with four Attributes	31	4.3.5	The Discussion of the Combination with five Attributes	33	4.3.6	The Discussion of the Combination with six Attributes	34	4.3.7	The Discussion of the Combination with seven Attributes	35	4.3.8	The Discussion of the Combination with eight Attributes	36	4.3.9	The Discussion of the Combination with nine Attributes	37	4.3.10	Summary	37	4.4	The Conclusions while Patient's Consciousness is clear	40	4.4.1	The Discussion of the Combination with two Attributes	40	4.4.2	The Discussion of the Combination with three Attributes	41	4.4.3	The Discussion of the Combination with four Attributes	42	4.4.4	Summary	43	4.5	The conclusions while patient is clear and breath is normal	45	4.5.1	The Discussion of the Combination with two Attributes	46	4.5.2	The Discussion of the Combination with three Attributes	47	4.5.3	Summary	48	4.6	Compare the results of Affinity with ROSETTA	50
Chapter 5	Conclusions and Recommendations	52	5.1	Conclusions	52	5.2	Recommendations	53																																																															
References		55	Appendix		58																																																																		

## 參考文獻

- [1]Bellman, R. E. and Zadeh, L. A., " Decision making in a fuzzy environment, " Management Science 17B, 141-164, 1970.
- [2]Dubois, D. and Prade, H., Fuzzy Sets and Systems, Theory and Applications, Academic Press, New York, 1980.
- [3]Ham, J. W. and Kamber, M., Data mining: concept and techniques, QA76.9.D343 H36, 2001.
- [4]Klir, G. J. and Yuan, B., Fuzzy Sets and Fuzzy Logic: Theory and Applications, 3rd, Taiwan, 2003.
- [5]Kohn, L. T., Corrigan, J. M. and Donaldson, M. S. Editors, To Err is Human: Building a Safer Health System, Washington D. C., 1999.
- [6]Leape, L. L., Brennan, T. A., Laird, N., Lawthers, A. G., Localio, A. R., Barnes, B. A., Hebert, L., Newhouse, J. P., Weiler, P. C. and Hiatt, H., " Incidence of adverse events and negligence in hospitalized patients. Results of the Harvard Medical Practice Study I, " THE NEW ENGLAND JOURNAL of MEDICINE, vol. 324, 370-376, 1991.
- [7]Moussa, L. and Chen, Y. W., A fuzzy Set Based Framework for the Concept of Affinity.

- [8]Moussa, L. and Chen, Y. W., Developing the Affinity Set (or Guanxi Set) Theory and Its Applications.
- [9]Pawlak, Z., " Rough Set, " International Journal of Computer and Information Science, Vol. 11, pp. 341-356, 1982.
- [10]Pawlak, Z., Rough Sets. Theoretical Aspects of Reasoning about Data, Kluwer Academic Publishers, 1991.
- [11]Viveros, M. S., Nearhos, J. P. and Rothman, M. J., " Applying Data Mining Techniques to a Health Insurance Information System, " Very Large Data Bases Conference, 22nd, 1996.
- [12]Wilson, R. McL., Runciman, W. B., Gibberd, R. W., Harrison, B. T., Newby, L. and Hamilton, J. D., " The Quality in Australian Health Care Study, " THE MEDICAL JOURNAL OF AUSTRALIA, vol. 163, 458-471, 1995.
- [13]Zadeh, L. A., Fuzzy sets, Information and Control, 8, 338-353, 1965.
- [14]Department of Health, Executive Yuan, R.O.C.(Taiwan): [http://www.doh.gov.tw/CHT2006/index\\_populace.aspx](http://www.doh.gov.tw/CHT2006/index_populace.aspx).
- [15]IBM: <http://www.ibm.com/us/> [16]Medicare Australia: <http://www.hic.gov.au/> [17]Patient Safety Net: <http://www.patientsafety.tw/big5/default.asp>.
- [18]ROSETTA software: <http://www.idi.ntnu.no/~aleks/thesis/> [19]World Health Organization: <http://www.who.int/patientsafety/en/>.
- [20]古裕彥, 統計資料採礦, 東海大學統計學系研究所碩士論文, 2002。
- [21]周建河, 急診醫師人力調整前後之醫療品質相關性探討-以南部三家醫院為例, 國立中山大學人力資源管理研究所碩士論文, 2003。
- [22]郭萃華, 醫療錯誤相關因素探討-以外科醫療為例, 國立台灣大學醫療機構管理研究所碩士論文, 2005。
- [23]陳麗琴, 中文版五級急診檢傷分類電腦化系統之建構與臨床應用評估, 台北醫學大學護理學研究所碩士論文, 2005。
- [24]楊哲彥, 楊秀儀, 台灣地區中醫與西醫醫療糾紛的差異, 長庚大學醫務管理學系及研究所碩士論文, J Chin Med, 15(1), 1-15, 2004。
- [25]雷賀君, 前十字韌帶傷害快速診斷系統-以粗略集合、基因演算法與倒傳遞網路為工具, 大葉大學工業工程學系研究所碩士論文, 2004。
- [26]趙文敏, 拓樸學導論, 九章出版社, 台北, 1992。
- [27]蘇步青, 拓樸學初步, 亞東書局, 台北, 1992。