

**WEB BASED SUPERVISOR SUPERVISEE PROJECT  
MATCHING SYSTEM**

**BENOTMANE MESSAOUD**

**UNIVERSITI UTARA MALAYSIA**

**2010**

# **WEB BASED SUPERVISOR SUPERVISEE PROJECT MATCHING SYSTEM**

**A thesis submitted to the Postgraduate Studies College of Arts and Sciences**

**in partial fulfillment of the requirements for the degree**

**Master of Information Technology**

**Universiti Utara Malaysia**

**By**

**BENOTMANE MESSAOUD**

**(801195)**



**KOLEJ SASTERA DAN SAINS**  
**(College of Arts and Sciences)**  
**Universiti Utara Malaysia**

**PERAKUAN KERJA KERTAS PROJEK**  
**(Certificate of Project Paper)**

Saya, yang bertandatangan, memperakukan bahawa  
*(I, the undersigned, certify that)*

**BENOTMANE MESSAOUD**  
**(801195)**

calon untuk Ijazah  
*(candidate for the degree of)* **MSc. (Information Technology)**

telah mengemukakan kertas projek yang bertajuk  
*(has presented his/ her project paper of the following title)*

**WEB BASED SUPERVISEE SUPERVISOR MATCHING SYSTEM**

seperti yang tercatat di muka surat tajuk dan kulit kertas projek  
*(as it appears on the title page and front cover of project paper)*

bahawa kertas projek tersebut boleh diterima dari segi bentuk serta kandungan dan meliputi bidang ilmu dengan memuaskan.  
*(that the project paper acceptable in form and content, and that a satisfactory knowledge of the field is covered by the project paper).*

Nama Penyelia Utama  
*(Name of Main Supervisor :* **PROF. DR. KU RUHANA KU MAHAMUD**

Tandatangan  
*(Signature)* :  Tarikh (Date) : 10 May 2010

Nama Penyelia Kedua  
*(Name of 2<sup>nd</sup> Supervisor):* **DR. FAUDZIAH AHMAD**

Tandatangan  
*(Signature)* :  Tarikh (Date) : 10 May 2010

## **PERMISSION TO USE**

In presenting this thesis in partial fulfillment of the requirements for a postgraduate degree from Universiti Utara Malaysia, I agree that the University Library may make it freely available for inspection. I further agree that permission for copying of this thesis in any manner, in whole or in part, for scholarly purpose may be granted by my supervisor(s) or, in their absence by the Dean of the Graduate School.

It is understood that any copying or publication or use of this thesis or parts thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to Universiti Utara Malaysia for any scholarly use which may be made of any material from my thesis. Requests for permission to copy or to make other use of materials in this thesis, in whole or in part, should be addressed to

**Dean of Postgraduate**

**College of Arts and Sciences (UUM-CAS)**

**Universiti Utara Malaysia**

**06010 UUM Sintok**

**Kedah Darul Aman.**

## **ABSTRACT**

This study aims to develop a web-based supervisor-supervisee matching system to automatically match relevant research area topics and lecturers with students' knowledge and skills. The web-based supervisor-supervisee matching system is often used in educational organizations due to its effectiveness in facilitating and enhancing the monitoring of the supervision of project papers. To develop such system, there has been a combination of both the general methodology on one hand, and Nunamaker's system research process approach to develop the system, on the other hand. The data used in this study was drawn from time tables and students' achievement records provided by the UUM IT faculty. Finally, data analysis was done following the development of the system which was based on the matching algorithm suggested in this paper. The algorithm was found to be good as it proved to have an accuracy of 81.39%, suggesting the efficiency and feasibility of the system.

## **Acknowledgement**

**IN THE NAME OF ALLAH, THE MOST GRACIOUS AND MOST MERCIFUL**

First and foremost, all praise to Allah for providing me with the strength, perseverance, and wisdom to have this work done on time.

I would like to thank and extend my deep gratitude to my supervisor Professor Ku Ruhana Ku Mahmud. I was extremely fortunate to have her as my primary source of knowledge, guidance, and support throughout the process of my project, and I would certainly be even more fortunate to benefit for her wide experience in my future academic undertakings. In short, this work could not have been accomplished without her enlightenment. Thank you very much.

Further, I would like to thank Dr Faudziah Ahmad whose valuable and wise direction played a crucial role in this project.

Finally, special thank to those who supported me with their prayers particularly my grandmother (Fatima), father (Rabah ), mother (Djamila), uncle (Ahmed), and siblings (Iyamine , Mustapha , Nawel , Khaoula ). I would like also to thank my friends in Malaysia, namely Aissa, Lokman, Anis, Abakda, Khaled, Hisham, the two Omars, and Taleb, Finally, I will never forget my friends in my home town Beni Fouda, Algeria, namely Abdelghani, Jamal Nawi, Bilal Tashghila, Fycel Baatiss, Redha.

Messaoud Benotmane

April 18<sup>th</sup>, 2010

## TABLES OF CONTENT

PERMISSION TO USE.....	ii
ABSTACT.....	iii
ACKNOWLEDGEMENT.....	iv
TABLE OF CONTENTS.....	v
LIST OF TABLES.....	viii
LIST OF FIGURES.....	ix

### CHAPTER 01

#### INTRODUCTION

1.1 PROBLEM STATEMENT .....	02
1.2 RESEARCH OBJECTIVE.....	03
1.4 SCOPE AND LIMITATIONS OF THE RESEARCH .....	04
1.5 SIGNIFICANCE OF THE RESEARCH.....	04
1.6 ORGANIZATION OF THE REPORT .....	05

### CHAPTER 02

#### LITERATURE REVIEW

2.1 INTRODUCTION.....	06
2.2 MATCHING SYSTEM.....	06
2.3 MATCHING TECHNIQUES .....	09
2.3.1 Matching technique in health.....	11
2.3.2 Matching in accounting.....	13
2.3.3 Matching in finance .....	14
2.3.4 Matching in statistic.....	15

2.3.5 Matching in search method.....	15
2.4 DISCUSSION.....	16
2.5 THE ADMINISTRATION PROCESS OF SUPERVISION .....	16
2.6 SUMMARY .....	19

## **CHAPTER 03**

### **RESEARCH METHODOLOGY**

3.1 INTRODUCTION.....	20
3.2 RESEARCH STEPS .....	21
3.2.1 AWARENESS OF PROBLEM.....	21
3.2.2 SUGGESTION.....	22
3.2.3 DEVELOPMENT METHODOLOGY.....	23
3.2.3.1 DATA PREPROCESSING .....	23
3.2.3.2 SYSTEM DEVELOPMEN STEPS.....	25
3.2.4 TESTING AND EVALUATION.....	26
3.4 SUMMARY.....	28

## **CHAPTER 04**

### **SYSTEM ANALYSIS AND DESIGN**

4.1 INTRODUCTION.....	29
4.2 SYSTEM REQUIREMENT.....	30
4.2.1 FUNCTIONAL REQUIREMENT.....	30
4.2.2 NON-FUNCTIONAL REQUIREMENTS.....	31



4.3 MODELING AND SYSTEM DESIGN.....	32
4.3.1 USE CASE DIAGRAM.....	32
4.3.2 USE CASE SPECIFICATION.....	33
4.3.3 SEQUENCE DIAGRAMS.....	38
4.3.4 CLASS DIAGRAM .....	41
4.4 PROTOTYPE DESIGN.....	42
4.5 EXPERIMENT DESIGN.....	44
4.5.1 DATA DESCRIPTION.....	44
4.5.2 ATTRIBUTE INFORMATION.....	44
4.5.3 STEP OF USED ROSETTA.....	45
4.6 SUMMARY.....	53

## **CHAPTER 05**

### **FINDINGS**

5.1 INTRODUCTION.....	54
5.2 THE ACCURACY TEST RESULTS.....	56
5.3 SUMMARY.....	59

## **CHAPTER 06**

### **CONCLUSION AND RECOMMENDATION**

6.1 RESEARCH CONTRIBUTION.....	60
6.2 RECOMMENDATION AND FUTURE WORK.....	61
<b>REFERENCES</b>	<b>62</b>

## LIST OF TABLES

Table 4.1	Functional requirements	30
Table 4.2	Non-functional requirements	31
Table 5.1	Comparisons of using different split factors, reduction algorithms and classifiers, Discretized, Boolean	56
Table 5.1	Comparisons of using different split factors, reduction algorithms and classifiers, Discretized , Equal frequency	57

## LIST OF FIGURES

Figure 3.1: Research steps.	21
Figure3.2: Sample data of students' achievement records.	23
Figure3.3: Sample data of lecturers and there area.	24
Figure 3.4: System Development steps.	25
Figure 3.5: Rosetta software interface.	27
Figure 4.1: Design steps.	29
Figure 4.2: Use case diagram.	32
Figure 4.3: Use case specification login.	33
Figure 4.4: Use case specification logout	34
Figure 4.5: Use case specification view schedule.	35
Figure 4.6: Use case specification match.	36
Figure 4.7: Use case specification manage course.	37
Figure 4.8: Log-in Sequence Diagram.	38
Figure 4.9: View schedule sequence diagram.	39
Figure 4.10: Manage course sequence diagram.	39
Figure 4.11: Match sequence diagram.	40
Figure 4.12: Class diagram.	41
Figure 4.13: Snapshot of manage student subject.	42
Figure 4.14: Snapshot of report management.	43
Figure 4.15: Snapshot of student management.	43
Figure 4.16: Simple of data.	44

Figure 4.17: Load Data step 01.	45
Figure 4.18: Load data step 02.	46
Figure 4.19: Load data step 03.	46
Figure 4.20: Discretize Data.	47
Figure.4.21: Split data step 01.	48
Figure.4.22: Split data step 02.	48
Figure. 4.23: Split data step 03.	49
Figure.4.24: Reduction step 01.	50
Figure.4.25: Reduction step 02.	50
Figure 4.26: Classification step01.	51
Figure 4.27: Classification step 02.	52
Figure 4.28: Accuracy Result 02.	52
Figure 4.29: Accuracy Result 01.	53

# CHAPTER 01

## INTRODUCTION

Matching has, increasingly, become a successful method applied in many fields including medicine, statistics, accounting, political science, sociology, law, and health (Sekhon, 2008). The matching is a way combines between two groups of data set for reach some of target. Matching systems were introduced by Carbone and Mafeis (2004). They are protocols ensuring that a client matches effectively with a server only in the case where both parties (client and server) comprise the same sequence (series) of names.

In any academic institution, it is usually mandatory for all students to prepare a specific project paper as a partial requirement for graduation. Project paper is considered to be a major source for students to establish and support their knowledge in whatever field they specialize in. Students, in doing so, encounter multiple problems related to the selection of a topic for the project such a finding the most suitable supervisor and other issues related to project paper schedule.

It is well known that the monitoring project paper systems are more relevant in educational organizations (Corchado, 1997). According to Phillips & Pugh (1994), supervision has been identified as an important factor of research. Moreover, supervision represents the most important variable in a successful research process (Economic and Social Research Council (1991). In this context, causal of the insurance of the rapid distribution and treatment of information between users and their various platforms web-

The contents of  
the thesis is for  
internal user  
only

## REFERENCES

- Abadie A, Imbens G (2006). Large Sample Properties of Matching Estimators for Average Treatment Effects. *Econometrica*, 74, 235–267.
- Ackerman, M.S., & McDonald, D.W. (1996). Answer garden 2: Merging organizational memory with collaborative help. In M. Ackerman (Ed.), *Proceedings of the ACM Conference on Computer Supported Cooperative Work (CSCW)* (pp. 97–105). New York: ACM Press.
- Barclay, K., & Savage, J. (2004). *Object-Oriented Design with UML and Java*.
- Bennet, s., McRobb, S.&Farmer,R.(2002). *Oriented-object system analysis and design using UML* (2<sup>nd</sup> ed.) London:McGraw-hil.
- Bowers J, Hansen B (2005). *Attributing Effects to A Cluster Randomized Get-Out-The-Vote Campaign*. Technical Report #448, Statistics Department, University of Michigan.<http://www-personal.umich.edu/~jwbowers/PAPERS/bowershansen2006-10TechReport.pdf>.
- Brady H, Hui I (2006). *Is it Worth Going the Extra Mile to Improve Causal Inference*. Paper presented at the 23rd Annual Summer Meeting of the Society of Political Methodology.
- Budzik, J., Bradshaw, S., Fu, X., & Hammond, K.J. (2002). Clustering for opportunistic communication. In D. Lassner (Ed.), *Proceedings of the International Conference on World Wide Web, Honolulu, HI* (pp. 726–735), New York: ACM Press.

- Carbone, M. and S. Maeis, (2003). the expressive power of polybasic synchronization in  $\pi$ -calculus, *Nordic Journal of Computing* 10, 70-98.
- Christakis NA, Iwashyna TI (2003). The Health Impact of Health Care on Families: A matched cohort study of hospice use by decedents and mortality outcomes in surviving widowed spouses. *Social Science & Medicine*, 57(3), 465–475.
- Dehejia RH, Wahba S (2002). Propensity Score Matching Methods for Nonexperimental Causal Studies. *Review of Economics and Statistics*, 84(1), 151–161.
- Delamont, S., Atkinson, P. & Parry, O. (2004) *Supervising the doctorate: a guide to success* (2<sup>nd</sup> edn).
- Diamond A, Sekhon JS (2005). Genetic Matching for Estimating Causal Effects: A General Multivariate Matching Method for Achieving Balance in Observational Studies. Working Paper.
- Diprete TA, Engelhardt H (2004). Estimating Causal Effects With Matching Methods in the Presence and Absence of Bias Cancellation. *Sociological Methods & Research*, 32(4), 501–528.
- Ellis-Christensen, T. (2010). [what-is-price-matching.htm](http://www.wisegeek.com/what-is-price-matching.htm). Retrieved from wisegeek: <http://www.wisegeek.com/what-is-price-matching.htm>.
- Economic and Social Research Council (ESRC) (1991) *Postgraduate training guidelines* (Swindon, ESRC).



EPFL, 2009 .Master Thesis Project SIN & SSC regulations, Ecole polytechnique federale de LAUSANE

Galiani S, Gertler P, Schargrodsky E (2005). Water for Life: The Impact of the Privatization of Water Services on Child Mortality. *Journal of Political Economy*, 113(1), 83–120.

Gilligan MJ, Sergenti EJ (2006). Evaluating UN Peacekeeping with Matching to Improve Causal Inference. [http://sekhon.berkeley.edu/causalinf/papers/gilligan\\_sergenti\\_06.pdf](http://sekhon.berkeley.edu/causalinf/papers/gilligan_sergenti_06.pdf).

Gordon S, Huber G (2007). The Effect of Electoral Competitiveness on Incumbent Behavior. *Quarterly Journal of Political Science*, 2(2), 107–138.

Harris, M. (1996). Review of postgraduate education (2 vols). Bristol: Higher Education Funding Council for England.

Herron MC, Wand J (forthcoming). Assessing Partisan Bias in Voting Technology: The Case of the 2004 New Hampshire Recount. *Electoral Studies*.

Hoffer, J. A., George, J., & Valacich, J. (2002). *Modern Systems Analysis and Design*. New Jersey: Prentice Hall.

HUC, 2009, Regulations or study from URL [www.holar.is](http://www.holar.is)

IEEE Std 830. (1998) . IEEE Recommended practice for Software Requirements Specifications.

J. M. Corchado, B. L. (1997). project monitoring intelligent agent system. *iee* .

Johan, 2004 information system analysis and design retrieved: October 2005, available from: <http://www.cs.toronto.edu/~jm/3405/slides2/sequence D.pdf>.

K. & Brown, M. (2001). Factors associated with completion of research higher degrees. Report No. 37, Higher Education Series. Canberra, ACT: Department of Employment, Education, Training and Youth Affairs.

Kautz, H., Selman, B., & Shan, M. (1997). ReferralWeb: Combining social networks and collaborative filtering. *Communication of the ACM*, 30(3).

Kum, H., & Masterson, T. (2008). Statistical Matching Using Propensity Scores. *Journal of Statistical Software*.

Lenz GS, Ladd JM (2006). Exploiting a Rare Shift in Communication Flows: Media Effects in the 1997 British Election. <http://sekhon.berkeley.edu/causalinf/papers/LaddLenzBritish.pdf>.

Li, Q., & Wu, B. (2008). People Search: Searching People Sharing Similar Interests From the Web. *InterScience*.

McDonald, D.W., & Ackerman, M.S. (2000). Expertise recommender: A flexible recommendation architecture. In W. Kellogg and S. Whittaker (Eds.), *Proceedings of the ACM Conference on Computer-Supported Cooperative Work (CSCW)* (pp. 231–240). New York: ACM Press.

McDonald, D.W. (2001). Evaluating expertise recommendations. In C. Ellis and I. Zigurs (Eds.), *Proceedings of the International Conference on Supporting Group Work (GROUP'01)* (pp. 214–223). New York: ACM Press.

- Morgan SL, Harding DJ (2006). Matching Estimators of Causal Effects: Prospects and Pitfalls in Theory and Practice. *Sociological Methods & Research*, 35(1), 3–60.
- Nunamaker, J., Chen, M., & Purdin, T. (1991). System Development in Information Systems Research. *Journal of Management Information Systems*, 7(3), 89–106.
- Park JH (2006). Causal Effect of Information on Voting Behavior from a Natural Experiment: An Analysis of Candidate Blacklisting Campaign in 2000 South Korean National Assembly Election. Working paper.
- Pearson, M. & Brew, A. (2002). Research training and supervision development. *Studies in Higher Education*, 27, 135–150.
- Pearson, M. & Cryer, P. (2001). Training the trainers: Current initiatives in enhancing research supervision in Australia and the UK. *Higher Education Research and Development Society of Australasia News*, 23, 16–18.
- Phillips, E. M. & Pugh, D. S. (1994) *How to get a PhD* (Buckingham, Open University Press).
- Raessler S, Rubin DB (2005). Complications when using nonrandomized job training data to draw causal inferences. *Proceedings of the International Statistical Institute*.
- Rosenbaum PR (2002). *Observational Studies*. Springer-Verlag, New York, 2nd edition.
- Rubin DB (1997). Estimating Causal Effects from Large Data Sets Using Propensity Scores. *Annals of Internal Medicine*, 127(8S), 757–763.
- Rubin DB (2006). *Matched Sampling for Causal Effects*. Cambridge University Press, New York.

Sastry, T. (2004) Postgraduate education in the United Kingdom (Oxford, Higher Education Policy Institute).

Sekhon JS (2004). The Varying Role of Voter Information Across Democratic Societies. Working Paper, URL  
<http://sekhon.berkeley.edu/papers/SekhonInformation.pdf>.

Smith HL (1997). Matching with Multiple Controls to Estimate Treatment Effects in Observational Studies. *Sociological Methodology*, 27, 305–353.

Terveen, L., & McDonald, D.W. (2005). Social matching: A framework and research agenda. *ACM transaction on Computer-Human Interaction*, 12(3), 401–434.

Turban, E. (1995). *Decision Support System and Expert System*, 4th ed., Prentice Hall, pp.442- 634.

Vaishnavi, V. and Kuechler, W. (2007). *Design Research in Information Systems*  
January 20, 2004, last updated June 29, 2007. URL:  
<http://www.isworld.org/Researchdesign/drisISworld.htm>.

University of Houston-Clear Lake, 2009. MASTER'S OPTION GENERAL  
GUIDELINES.

UMT, 2002, *Guide to Graduate Studies*, from graduate school universiti malaysia  
Terengganu.

Vitez, O. (2010). what-is-the-matching-principle.htm. Retrieved from wisegeek:  
<http://www.wisegeek.com/what-is-the-matching-principle.htm>

Wieggers, Karl E. (2003). Software Requirements 2: Practical techniques for gathering and managing requirements throughout the product development cycle (2nd ed.). Redmond: Microsoft Press. ISBN 978-0735618794.

Winship C, Morgan S (1999). The estimation of causal effects from observational data. Annual Review of Sociology, 25, 659–707.