



# **LOG MINING USING GENERALIZED ASSOCIATION RULES**

A project submitted to the Faculty of Information Technology in partial  
fulfillment of the requirements for the degree  
Master of Science (Intelligent Knowledge Based System)  
Universiti Utara Malaysia

by  
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## **ABSTRACT (ENGLISH)**

Explosive growth in size and usage of the World Wide Web has made it necessary for Web site administrators to track and analyze the navigation patterns of Web site visitors. To achieve this goal, the use of web mining tool is necessary. Web mining can be defined as the use of data mining techniques to automatically discover and extract information from web documents. Since Data Mining is primarily concerned with the discovery of knowledge and aims to provide answers to questions that people do not know how to ask, it is not an automatic process. Rather one has to exhaustively explores very large volumes of data to determine otherwise hidden relationships. The process extracts high quality information that can be used to draw conclusions based on relationships or patterns within the data. However, data mining techniques are not easily applicable to Web data due to problems both related with the technology underlying the Web and the lack of standards in the design and implementation of Web pages. Information collected by the Web servers are kept in the server log is the main source of data for analyzing user navigation patterns. Once logs have been pre-processed and sessions have been obtained, there are several kinds of access pattern mining that can be performed depending on the needs of the analyst. Since the method use in this study relied on relatively simple techniques therefore the information gathered is adequate for real user profile data due to the noise in the data has to be first tackled. In this study, Data Mining techniques known as generalized association rules was used in order to get some insights into website usage pattern. For the purpose of this study, server logs from tutor.com portal were retrieved, pre-processed and analyzed. An important finding from this study is that Mathematics subject generally popular from UPSR, PMR and UPSR levels. On the contrary, arts subjects are not popular to Tutor.com users. The system administrator may consider evaluating the content and the link for such subjects, so that the real problem can be identified.

## ABSTRACT (BAHASA MELAYU)

Perkembangan yang pesat di dalam penggunaan *World Wide Web* (www) menyebabkan perlunya pentadbir laman web menjejaki dan menganalisis corak pelayaran pengunjung laman web. Untuk mencapai matlamat ini, penggunaan alat bantu pengguna web amat diperlukan oleh pentadbir laman web. Perlombongan web didefinisikan sebagai penggunaan teknik perlombongan data untuk memenuhi dan memperolehi maklumat daripada dokumen web. Perlombongan Data adalah tertumpu kepada penemuan pengetahuan dan juga bertujuan untuk menyediakan jawapan kepada soalan pengguna, teknik ini tidak dapat melakukan pemprosesan secara automatik. Sebaliknya, pelayan web perlu meneroka data yang banyak untuk menentukan perkaitan antara data. Proses ini mengekstrak maklumat berkualiti yang boleh digunakan untuk membuat sesuatu kesimpulan berdasarkan hubungan atau paten yang terdapat didalam data berkenaan. Walaubagaimanapun, teknik perlombongan data tidak mudah diaplikasikan kepada data web disebabkan masalah yang berkaitan dengan teknologi web dan kekurangan keseragaman dalam rekabentuk dan implementasi laman web. Maklumat yang terkumpul oleh pelayan web akan disimpan didalam log pelayan yang mana merupakan sumber utama data bagi menganalisis corak pelayaran pengguna. Setelah log pelayan di pra-proses dan sesi pengguna diperolehi, perlombongan paten capaian boleh dilaksanakan dengan beberapa kaedah. Ini bergantung kepada matlamat penganalisis log pelayan. Kaedah yang digunakan dalam kajian ini adalah berdasarkan kepada teknik yang lazim digunakan, maka maklumat yang dikumpulkan tidak mencukupi untuk menjadikan data profil pengguna kerana “noise” yang terdapat dalam data perlu di pra-proses terlebih dahulu. Teknik perlombongan data yang dikenali sebagai *generalized association rules* digunakan untuk mendapatkan paten penggunaan laman web. Untuk kajian ini, log pelayan dari portal Pendidikan Utusan telah diperolehi, diproses dan telah dianalisis menggunakan alat bantu perlombongan data. Dapatan kajian menunjukkan, bahawa Matematik merupakan subjek yang popular untuk peringkat UPSR, PMR dan peringkat UPSR.. Sebaliknya, subjek sastera tidak begitu popular kepada pengguna Portal Pendidikan. Oleh sebab itu, penyelenggara Portal Pendidikan Utusan perlu mempertimbangkan kandungan serta pautan kepada setiap subjek di dalam Portal Pendidikan supaya masalah yang sebenarnya dapat diatasi.

## **ACKNOWLEDGEMENT**

Heartfelt thanks are due first to my main supervisor, Associate Professor Fadzilah Siraj for patiently navigating and generously sharing her rich source of knowledge with me. She is indeed a teacher of “*open hand, open mind, and open heart*”.

Equally thankful to my second supervisor, Miss Nooraini Yusoff for zealously giving a hand to her utmost. I also sincerely acknowledge the cooperation and consideration given by Mr. Hassani Hassan from Bahagian Pendidikan Utusan Melayu (Malaysia) Sdn. Bhd.

I am most indebted to my parents for all the love and support in giving me the best gift; “*Education*”- a lifelong priceless present that can never be destroyed by calamities. Last but not least, let me express my deep appreciation to all who lend a hand in materializing this project.

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**2004**

## TABLE OF CONTENTS

Permission to use .....	i
Abstract .....	ii
Abstract (Bahasa Melayu) .....	iii
Acknowledgement .....	iv
Table of Contents .....	v
List of Figures .....	viii
List of Tables .....	x

### CHAPTER 1: INTRODUCTION

1.1 Context of the study .....	1
1.1.1 Web Mining .....	2
1.1.2 Association Rules .....	5
1.1.3 Web Server Log .....	5
1.1.4 How Server Log is created .....	6
1.2 Problem Statement .....	7
1.3 Objective of the Study .....	7
1.4 Scope of Project .....	7
1.5 Significance of the Study .....	7
1.6 Thesis Organization .....	8

### CHAPTER 2: LITERATURE REVIEW

2.1 Previous Issues and Challenges .....	9
2.2 Web Mining Definition and Research Area .....	10
2.3 Web Mining in Education .....	11
2.4 Web Usage Mining .....	11
2.5 Web Usage Mining Techniques .....	12
2.6 Application Areas .....	16

## CHAPTER 3: WEB SERVER LOG

3.1 Web Server Log.....	19
3.2 Background.....	20
3.3 Information in Server Logs.....	20
3.3.1 Access Log.....	21
3.3.2 Agent Log.....	25
3.3.3 Error Log.....	26
3.3.4 Referer Log.....	27
3.4 Log File Format.....	28
3.4.1 W3C Log File Format.....	28
3.4.2 IIS Log File Format.....	29
3.4.3 NCSA Log File Format.....	30

## CHAPTER 4: METHODOLOGY

4.1 Introduction.....	31
4.2 Raw Log File.....	32
4.3 Preprocessing.....	33
4.4 Pattern Mining.....	34
4.5 Generalized Association Rules .....	35
4.6 Result .....	36

## CHAPTER 5: IMPLEMENTATION

5.1 Active Server Pages .....	38
5.2 Read Server Log.....	39
5.3 Transfer Server Log to Database.....	41
5.4 Pattern Mining Algorithm .....	42
5.5 Generalized Association Rules Algorithm .....	47
5.5.1 Counting Occurrence Algorithm.....	49
5.5.2 Algorithm for Support.....	50

5.5.3 Algorithm for Confidence.....	51
-------------------------------------	----

## **CHAPTER 6: RESULT AND DISCUSSION**

6.1 General Summary.....	53
6.2 Most Requested Pages .....	54
6.3 Most Downloaded Files.....	54
6.4 Most Active Countries.....	55
6.5 Most Active Search Engines.....	56
6.6 Phrases.....	56
6.7 Keyword .....	57
6.8 Support and Confidence for Structure Level 1.....	58
6.9 Support and Confidence for Structure Level 2.....	59
6.10 Support and Confidence for Structure Level 3.....	60

## **CHAPTER 7: CONCLUSION AND RECOMMENDATIONS**

Conclusion and Recommendation.....	63
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## **REFERENCES**

References.....	65
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## **APPENDIXES**

Appendix A: Table of Country Code Based on IP Address

Appendix B: List of Error Code

Appendix C: List of Error from Server Log Tutor.com

Appendix D: List of Popular Pages

Appendix E: List of Downloaded Files

Appendix F: List of Active Countries Access Tutor.com

Appendix G: List of Top Search Engines

Appendix H: Top Search Keyword



**Appendix I: Top Search Phrases**

**Appendix J: Support and Confidence for Level 1, Level 2 and Level 3**

## LIST OF FIGURES

Figure 1.1	Web Mining Taxonomy	2
Figure 1.2	Web Structure Mining of Utusan Education Portal	4
Figure 1.3	Process how the Server Logs is created	6
Figure 3.1	Single Entry of Log Files from Portal Pendidikan	21
Figure 3.2	Agent Log Entry	25
Figure 3.3	Error Log File Entry	26
Figure 3.4	Referer Log Entry	27
Figure 3.5	W3C Log File Format	29
Figure 3.6	IIS Log File Format	30
Figure 3.7	NCSA Log File Format	30
Figure 4.1	Methodology of the study	31
Figure 4.2	Single Entry of Raw Log File	33
Figure 4.3	Hierarchy Structure of Portal Pendidikan Utusan	35
Figure 5.1	Method and Properties of MCSW.IISLog Class	39
Figure 5.2	Algorithm for Reading Server Logs	40
Figure 5.3	Table after data has been transferred to database	41
Figure 5.4	Algorithm transfer to database	41
Figure 5.5	Algorithm Calculating Total Hits	42
Figure 5.6	Algorithm to calculate number of page view	42
Figure 5.7	Algorithm to calculate number of download files	43
Figure 5.8	IP address conversion formula	44
Figure 5.9	IP address conversion calculation	44
Figure 5.10	META Tags	45
Figure 5.11	Referer attributes	45
Figure 5.12	Algorithm to determine the search engines, keyword and phrases	46
Figure 5.13	Algorithm to perform HTTP error analysis	47
Figure 5.14	Algorithm for data cleaning	48
Figure 5.15	Starter Prompt for Log File Simulator	48
Figure 5.16	Rule produced by the simulator	49

Figure 5.17	Counting Occurrences Algorithm	49
Figure 5.18	Implementation of Counting Occurrences	50
Figure 5.19	Support Calculation Formula	50
Figure 5.20	Implementation of Support Counting	51
Figure 5.21	Confidence Calculation Formula	51
Figure 5.22	Implementation of Confidence Counting	52
Figure 6.1	Top requested pages	54
Figure 6.2	Top downloaded files	55
Figure 6.3	Top country access to Tutor.com	55
Figure 6.4	Search engines used	56
Figure 6.5	Search phrases used in search engines	57
Figure 6.6	Search keyword used in search engines	58
Figure 6.7	Support and Confidence for level 1 for Portal Tutor.com	59
Figure 6.8	Support and Confidence for Question Banks	60
Figure 6.9	Support and Confidence for UPSR	60
Figure 6.10	Support and Confidence for PMR	61
Figure 6.11	Support and Confidence for SPM	62
Figure 6.12	Support and Confidence for STPM	62

## LIST OF TABLES

Table 4.1	Preprocessed Log File	34
Table 6.1	General Summary of Server Logs	54

# CHAPTER 1

## INTRODUCTION

### 1.1 Context of the study

With the explosive growth of data available on the World Wide Web (WWW), discovery and analysis of useful information from the World Wide Web becomes a practical necessity. Data Mining is primarily concerned with the discovery of knowledge and aims to provide answers to questions that people do not know how to ask. It is not an automatic process but one that exhaustively explores very large volumes of data to determine otherwise hidden relationships. The process extracts high quality information that can be used to draw conclusions based on relationships or patterns within the data.

Using the techniques used in Data Mining, Web Mining applies the techniques to the Internet by analyzing server logs and other personalized data collected from customers to provide meaningful information and knowledge. Web access pattern, which is the sequence of accesses pursued by users frequently, is a kind of interesting and useful knowledge in practice (Pei, 2000). Today web browsers provide easy access to myriad sources of text and multimedia data. More than 1 000 000 000 pages are indexed by search engines, and finding the desired information is not an easy task (Pal *et al.*, 2002). Web Mining is now a popular term of techniques to analyze the data from World Wide Web (Pramudiono, 2004). A widely accepted definition of the web mining is the application of data mining techniques to web data. With regard to the type of web data, web mining can be classified into three types: Web Content Mining, Web Structure Mining and Web Usage Mining.

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the thesis is for  
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only

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