

**Using Data Mining Techniques to Analyze the Best Bus
Route Available to Travel in Colombo**

M. D. Nikila Sasmitha Peiris

149221L

Faculty of Information Technology

University of Moratuwa

May 2018

**Using Data Mining Techniques to Analyze the Best Bus
Route Available to Travel in Colombo**

M. D. Nikila Sasmitha Peiris

149221L

**Dissertation submitted to the Faculty of Information Technology,
University of Moratuwa, Sri Lanka for the partial fulfillment of the
requirements of the Master of Science in
Information Technology.**

May 2018

Declaration

We declare that this thesis is our own work and has not been submitted in any form for another degree or diploma at any university or other institution of tertiary education. Information derived from the published or unpublished work of others has been acknowledged in the text and a list of references is given.

Name of Student

Signature of Student

M. D. Nikila Sasmitha Peiris

.....

Date:

Supervised by

Name of Supervisor

Signature of Supervisor

S. C. Premaratne

.....

Date:

Acknowledgements

I would like to express my gratitude to my supervisor, Mr. S. C. Premaratne, Senior Lecturer in University of Moratuwa, Sri Lanka whose expertise, understanding and patience, added considerably to my research experience. I appreciate his vast knowledge and skill in many areas, and his assistance in writing reports.

I would like to thank the other lecturers of University of Moratuwa, Sri Lanka, especially, Prof. Asoka Karunananda for the knowledge and assistance they provided at all the levels of the research project.

I would also like to thank all the batch mates of the M.Sc. in Information Technology degree program, and the office mates who gave their valuable feedbacks to improve the results of the research and my family, specially my parents for the uncountable support they provided me through my entire life and in particular. I must acknowledge my wife and best friend, Hansika, without whose love, encouragement and editing assistance, I would not have finished this thesis.

Abstract

Sri Lanka is a developing country with mainly two main public transportation systems. Train and Bus system will cover 90% of the transportation routes available across the country. Apart from these two modes other people use private vehicles for cater their travel needs. But, more than 80% of the people use trains and buses as the mode of transportation. With the limited availability of the trains, buses are being used a lot in common environment. But, the biggest disadvantage is passengers who use buses do not have a proper information system to cater their needs.

With the lack of information, we are wasting more time to our transport than our valuable time with loved ones. So, thus to make the work easy people keen to use their private vehicles instead of busses and trains. So, we are wasting our valuable time, health as well as money. So, to reduce these facts, it is crucial to develop a system and improve the efficiency of the time taken for transport in human life. This is a very serious issue that needs to be addressed.

With the development of the technology, information transmission is very easy. Day by day the usage of the mobile devices more specifically smart phone devices increasing and with the help of that the solution is to introduce a user-friendly web system which can be directly get the best possible bus route that need to take to prevent the time wasting on the roads and overcome the discomfort. There are passengers who required more comfort in traveling than the quickness of the travel. But some vise verse. So, in the proposed solution we are focusing both options. So, for the passengers who required more comfort travel can be chosen the busses with a lesser number of passenger density and for the passengers who need to travel fast to their destination can be taken the fastest bus route without thinking of the comfortability much.

Either a passenger or a non-passenger can access the designed web interface without any authentication. Then they need to select the starting and ending locations and the required level of satisfaction. Then the output will suggest the best possible bus routes which satisfy the search needs. So, this development helps consumers to plan the travel more efficiently by choosing the best route available with comfort or quickness.

Contents

	Page
Declaration	i
Acknowledgement	ii
Abstract	iii
Contents	iv
List of Figures	vii
List of Table	ix
Chapter 1 - Introduction	01
1.1 Introduction	01
1.2 Background and Motivation	02
1.3 Aim and Objectives	02
1.3.1 Aim	02
1.3.2 Objectives	02
1.4 Solution	03
1.5 Structure of Dissertation	04
Chapter 2 – Exploring Current Findings in Bus Route Analysis	05
2.1 Introduction	05
2.2 Transportation Domain and Issues	05
2.3 Summary	07
Chapter 3 - Technology Adapted in Bus Route Analysis	08
3.1 Introduction	08
3.2 How to develop the Best Bus Route	08

3.3 Summary	10
Chapter 4 - Approach and Design in Bus Route Analysis	11
4.1 Introduction	11
4.2 Best Route by Expert System	11
4.3 Summary	15
Chapter 5 - Implementation	16
5.1 Introduction	16
5.2 Implementation	16
5.3 Summary	29
Chapter 6 - Evaluation	30
6.1 Introduction	30
6.2 System Evaluation	30
6.3 Data Evaluation	31
6.4 Summary	35
Chapter 7 – Conclusion and Further Work	36
7.1 Introduction	36
7.2 Conclusion	36
7.2.1 Design and Implement a decision support system	37
7.2.2 Help to reduce the traffic congestion and time waste	37
7.2.3 Help passengers to plan the future travels in effective manner	37
7.2.4 Route delay prediction to help the customers to estimate the arrival time	37

7.2.5 Cater the user satisfaction levels	38
7.2.6 Reduce time and effort on searching buses	38
7.2.7 Getting accurate information with live traffic	38
7.3 Limitation	38
7.4 Further Work	39
7.5 Summary	39
Chapter 8 – Reference	40
Appendix A - Route Details	41

List of Figures

	Page
Figure 4.1 – System Architecture	12
Figure 4.2 - Proposed Model of System A and System B	13
Figure 5.1 - Task flow of “Route Finder”	15
Figure 5.2 - User Interface “Route Finder”	16
Figure 5.3 - Auto suggestion on the source location	16
Figure 5.4 - Requesting to allow to access your location	16
Figure 5.5 - Output of pressing “Locate Me” icon	17
Figure 5.6 - Auto suggestion on the destination location	17
Figure 5.7 - Output of the Route Finder	17
Figure 5.8 - Route Information	18
Figure 5.9 - Task flow of “Route Information”	19
Figure 5.10 - Initial setup of the CLI	21
Figure 5.11 - Source Input – System B	21
Figure 5.12 - Destination Input – System B	22
Figure 5.13 - Time of travel – System B	22
Figure 5.14 - Selection of satisfaction level – System B	23
Figure 5.15 - Selection of Type of Day – System B	23
Figure 5.16 - Output – System B	24
Figure 6.1 – Questionnaire	28
Figure 6.2 - Bambalapitiya to Panadura - Peak/ Holiday	29
Figure 6.3 - Bambalapitiya to Panadura – Off-Peak/ Holiday	29
Figure 6.4 - Bambalapitiya to Panadura - Peak/ Weekday	30

Figure 6.5 - Bambalapitiya to Panadura – Off-Peak/ Weekday	30
Figure 6.6 - Bambalapitiya to Panadura – Peak/ Weekend	30
Figure 6.7 - Bambalapitiya to Panadura – Off-Peak/ Weekend	31

List of Tables

	Page
Table 5.1: Peak and Off-Peak timing	13
Table 5.2: Route Details	14