Utilization of Timetable Management System to IT Faculty at University of Moratuwa

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Declaration

I declare that this thesis is my 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 Information derived from the published or unpublished work of others has been acknowledged in the text and a list of references is given.

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Name of Student

Signature of Student

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Mr Saminda Premarathna

Date: 28/04/2016

Dedication

This dissertation is dedicated to my beloved mother, father and husband who gave me endless courage and support to achieve my tasks whenever I was discouraged.

Acknowledgement

My heartiest thanks should be goes to my Supervisor Mr Saminda Premarathna the guidance, assistance, encouragement and providing this opportunity of research given to me.

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Abstract

University timetable construction is a laborious and complicated task when there are large number of course arrays and limited resources. Often, the timetable administrator, solve these problems of scheduling. However, the results may not always fully optimal. Every academic year, faculty of IT faces the rigorous task of preparing timetables. Although the current manually operated, timetable system is efficient enough to carry out the courses without clashes, it is very time consuming and resource optimization problems occur due to insufficient lab resources and hall facilities.

The endeavor of this work is to find out a proper near optimal solution for this highly constrained combinational timetabling problem. The efficient utilization of the resources is the main objective. After a better literature survey, it could found, by evolutionary techniques based on Darwin's theories can exploit to construct an automated timetable management system to the Information Technology faculty at University of Moratuwa. The theory named Genetic Algorithm and selected it to develop the main logic of the timetable management system. Probabilistic operators such as selection, crossover and mutation in GA, are used to plan proper timetable. Each individual is called chromosome and its validity must be evaluated using a fitness function in the implementation process. Chromosomes with higher fitness value considered as optimal solution or timetable schedules. Those optimal solutions will be further refined by manually in a lesser time.

The main stakeholders of this process will be admin of the timetable system, lecturers and the students. Interviews and observation were the main methods of data collection. PHP and Yii framework, MySQL database management system and some other software used to design and develop this timetable management system. The system was tested by using black box testing, white box testing and efficiency test. Moreover, it was evaluated using number of evaluation techniques such as interviews, observation and questionnaires. To conclude, this timetable management system automatically generates good quality timetables while optimizing the resources to the IT faculty at university of Moratuwa.

Keywords: optimize, utilize, Timetable Management System, Genetic Algorithm, fitness function

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Abbreviations

TMSFIT – Timetable Management System of Faculty of IT

GA – Genetic Algorithm