

**OPTIMISING TRAFFIC LIGHT SYSTEMS USING  
PARTICLE SWARM OPTIMISATION**

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**Thesis Submitted in Fulfilment of the Requirement for  
Bachelor of Science (Hons.) Mathematical Modelling and Analytics  
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**February 2024**

## **ABSTRACT**

Particle Swarm Optimisation (PSO) is a commonly used method to solve optimisation problems. These problems typically aim to maximise or minimise a subject. The PSO method was proposed by Kennedy and Eberhart, inspired by the movement of animals in swarms. This method assumes that every swarm particle is able to update its position until an optimum point is achieved. A real-life problem that could employ the particle swarm optimisation technique is the everyday challenge of traffic congestions. One solution to reduce traffic congestions is to implement proper traffic light cycles that could potentially increase road capacity and decrease journey time. This project aims to produce optimised green light durations of traffic lights using the particle swarm optimisation method with varying number of iterations. The durations that were produced with the implementation of PSO in MATLAB were incorporated into the traffic lights of a road network in a traffic simulator, SUMO. These cycles were compared using the outcomes of these simulations based on road capacity, total journey time, and total stop and wait time. By the end of the research, it was found that 6 of the 10 produced cycles were able to optimise the traffic conditions of the traffic simulation.

## ACKNOWLEDGEMENT

I would like to express my sincere and heartfelt gratitude toward every individual who have supported me directly or indirectly throughout the period of completing this case study. I thank them all for helping me in their own special ways.

First and foremost, I extend my greatest appreciation to my supervisor, Madam Ruhana binti Jaafar, for her guidance and support throughout the completion of my final year project. She has provided both insights and encouragement to fuel my motivation whilst conducting this research. This project could not have been accomplished without her help.

Additionally, I would like to give a special thanks to Madam Norulhidayah binti Isa for offering advice and suggestions to improve the research. Not to forget, thanks to Dr Mohd Rivaie bin Mohd Ali for his teachings as the Coordinator of Final Year Project.

Finally, I wish to say my greatest thanks and praise to Allah S.W.T for giving me the strength to fight through the obstacles while finishing this project. There were certainly times when things were difficult, but I was able overcome the hardships by depending on Him, and I will continue to do so in the future.

## TABLE OF CONTENTS

DECLARATION BY THE SUPERVISOR	i
DECLARATION BY THE CANDIDATE	ii
ABSTRACT	iii
ACKNOWLEDGEMENT	iv
TABLE OF CONTENTS	v
LIST OF TABLES	viii
LIST OF FIGURES	ix
1.0 INTRODUCTION OF PROJECT	1
1.1 Introduction	1
1.2 Background of Study	1
1.3 Problem Statement	5
1.4 Objectives	6
1.5 Significance of Project	6
1.6 Scope of Project	7
1.7 Project Benefit	7
1.8 Definition of Terms and Concepts	8
1.9 Organisation of Project	9
2.0 LITERATURE REVIEW	11
2.1 Introduction	11
2.2 Literature Review	11
2.3 Conclusion	14
3.0 METHODOLOGY	15
3.1 Introduction	15

3.2	Research Steps	15
3.3	Particle Swarm Optimisation (PSO) Components	18
3.3.1	Equations	18
3.3.2	Parameters	19
3.4	Flow of PSO	22
3.5	Conclusion	25
4.0	IMPLEMENTATION	26
4.1	Introduction	26
4.2	Define Fitness Function	26
4.3	Simulation Set Up	28
4.4	Editing the Network	30
4.5	Problem Definition	34
4.6	Initialisation of Parameters	35
4.7	First Swarm	36
4.8	Main PSO Loop	39
4.9	Comparing Traffic Light Cycles	40
4.10	Conclusion	42
5.0	RESULTS AND DISCUSSION	43
5.1	Introduction	43
5.2	Result of the First Simulation	43
5.3	Results of PSO Implementation	44
5.4	Comparing the Produced Cycles	46
5.5	Conclusion	48
6.0	CONCLUSION AND RECOMMENDATION	49
6.1	Introduction	49