

Fakulti Sains Komputer Dan Matematik

TECHNICAL REPORT
FINAL YEAR PROJECT
CS249

OCTOBER 2021 - FEBRUARY 2022

TRAVELLING SALESMAN PROBLEM USING
GENETIC ALGORITHM

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ZON D

• Teknologi Maklumat
& Sains Komputasi
• Pengajaran
• Hasil Pengajaran

ACKNOWLEDGEMENTS

In the name of Allah the Most Merciful and the Most Knowing. Alhamdulillah, praise be to Allah S.W.T the as this project can be done in a given period of time. We would like to express my deepest appreciation to all those who have made our final year project a success. First of all, I would like to express sincere gratitude to our supervisor, Madam Wan Nurfaizul Ifwah Wan Alias for her consistent support, guidance, time, and advice throughout the process of completing this project. In addition, a big thank you goes to University of Technology MARA for equipping the students with a good environment and facilities. Furthermore, I would like to thank Faculty of Computer and Mathematical Sciences of UiTM for giving me the golden opportunity by offering this subject which allows me to learn about the Genetic Algorithm process. Next, we would like to thank Dr Nazhatul Sahima and mister Mohd Faiez Suhaimin, our panels for spending their time having a Question and Answers session for the proposal of the final year project and giving comments and teaching about this research. We are very grateful that they give opinions and ideas as well as answer all our questions. Lastly, special thanks to our family and friends for providing their ideas and thoughts for this project.

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ABSTRACT

Travelling Salesmen Problem is a well-known algorithm problem in the fields of computer science and operation research. This paper evaluates the Travelling Salesmen Problem based on dataset used from (Ohlmann & Thomas, 2007) and this research 30 towns that mentioned from (Ohlmann & Thomas, 2007). Travelling salesmen must travel to every towns and ends at the same town when it started. Nowadays, the demand for salesmen deliver increase so frequency salesmen travel a lot and need to finds ways to make fast deliveries. Thus, the aim of the study is to help the delivering sector in overcoming the problems of delivering goods to customers while minimizing distance travelled. The method that use in this research is Genetic Algorithm. The first round this research use two Genetic Algorithms' operator which are crossover and inversion operator. The second round this research use three operator which are crossover, inversion and mutation operator. The parents that used in every section are same. After each operation, the total distance was determine and the least total distance will be chosen. This research stop after 10 iteration which in both round. In each iteration, the selection step compare and select the minimum distance for each chromosome. The result shows using Genetic Algorithm operator can help Travelling Salesmen to minimize the distance effectively and to make it more effective Travelling Salesmen need to use three Genetic Algorithms' operator. In conclusion, companies deliver sector can apply this research in their companies to decrease their logistic costs.

Keywords : Genetic Algorithm, Travelling Salesmen problem, Distance, Route

1 INTRODUCTION

Travelling salesman problem (TSP) is a well-known algorithmic problem in the fields of computer science and operations research. TSP involves a salesman and a collection of towns. The salesman must travel to each of the towns, starting from a hometown and return to the same town (Sorma et al., 2020). TSP is frequently used to determine the most efficient route for data to travel between nodes. In this study, the problem will be solved by using genetic algorithm.

The objective of the TSP is to determine the shortest distance travelled by the salesman and to reduce the total logistic cost. As everyone knows, due to the pandemic, the usage of delivery services are increasing every day. Hence, the number of cities that the salesman need to travel are also increasing. TSP is very easy to solve when there are fewer cities, but as the number of cities increases, it becomes very difficult to solve due to the large amount of computation time required.

TSP may be utilized efficiently in a variety of domains, including military and transportation. Because of its resilience and flexibility, genetic algorithms may also be used to solve TSP. Therefore, in this research, we will determine the shortest distance travelled by the salesman so that the total of logistic cost can be reduced. In addition, the other objective of this study is to solve TSP using Genetic Algorithm. Genetic Algorithm will be explained more in the methodology.

Nowadays, there are many job opportunities, and every job exists whenever there are other people's problems. Every job is to solve problems or facilitate the affairs of others. As traveling salesmen, they make it easier for people to not take home purchased items. The scope of work of the traveling salesmen is to deliver the goods from one place to another. But working as a traveling salesman requires a high level of patience because there is a lot of pleasure. Examples of that pleasure are first the superiors push to deliver quickly. So, workers must work overtime to make sure goods arrive on time. Next, logistic costs exceeding the prescribed limit happen