



**PROJECT REPORT
COMPARISON OF A* AND GENETIC
IN TRAVELING SALESMAN PROBLEM**

Sie, Ricky Gunawan Setya

13.02.0003

2017

**INFORMATICS ENGINEERING DEPARTMENT
FACULTY OF COMPUTER SCIENCE
SOEGIJAPRANATA CATHOLIC UNIVERSITY**

APPROVAL AND RATIFICATION PAGE

PROJECT REPORT

Comparison of A* and Genetic in Traveling Salesman Problem

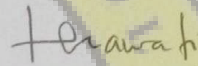
by

Sie, Ricky Gunawan Setya – 13.02.0003

This project has been approved and ratified by the Faculty of
Computer Science on January 5th, 2017

With approval,

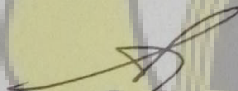
Supervisor



Rosita Herawati, ST., MT
NPP : 058.1.2004.263

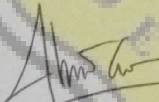
Examiners,

1)



Suyanto Edward Antonius, Jr., M.Sc
NPP : 058.1.1992.116

2)



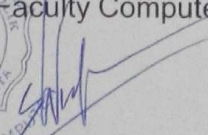
Shinta Estri Wahyuningrum, S.Si, M.Cs
NPP : 058.1.2007.272

3)



Hironimus Leong, S.Kom., M.Kom
NPP : 058.1.2007.273

Dean of Faculty Computer Science,


Erdhi Widyarto Nugroho, ST., MT
NPP : 058.1.2002.254

STATEMENT OF ORIGINALITY

I, the undersigned:

Name : Sie, Ricky Gunawan Setya

ID : 13.02.0003

Certify that this project was made by myself and not copy or plagiarize from other people, except that in writing expressed to the other article. If it is proven that this project was plagiarizes or copy the other, I am ready to accept a sanction.

Semarang, January 5th, 2017

Sie, Ricky Gunawan Setya

13.02.0003

ABSTRACT

Traveling Salesman Problem (TSP) is problem that has been deeply developed by many researcher. Which the rules is to visits cities once and go back to the start city after finished. Many algorithms have been compared to find the optimal solution, but yet still not gives optimal solution.

This project will solve the problem using algorithm. Algorithm that will be used is A algorithm and Genetic algorithm to compare which algorithm that is better in solving TSP. For this to be happened, this project will create programs that using Java Programming Language.*

The result of this project is to compare the processing time and minimum cost required of both algorithms. Conclusion of this project is Genetic algorithm have got more winning than A algorithm because of its constant of processing time even with many cities visited in one travel.*

Keywords : *Traveling Salesman Problem, A*, Genetic, Java*

PREFACE

Traveling Salesman Problem (TSP) is one of the most difficult problem that still being developed to find more optimal solution when visiting multiple cities. In a simple traveling with only below five places might not be hard for people to understand. But what if the traveling routes takes more than five places. Surely it will give more confusion for people to choose the best route. Many algorithms have been used but yet people still not knows what type of algorithms that bests in solving TSP. So this project will used two algorithms that have totally different solving type in order for comparison matters. This algorithms are A* algorithm and Genetic algorithm.

For the first chapter of this report will explain about background, scope, and objective of this project. In the chapter 2, this report will explain about literature of the problems and algorithms which is important thing to note. Then, the chapter 3 will explain the process of how this project will be done. After that, in the chapter 4 will give analysis and design of the project. In chapter 5, explanation of the program implementation and testing of how it will be done are going to be reviewed in this chapter. And at the chapter 6 will explain about conclusion and result of this project, and also future research to developed the project to be more better.

TABLE OF CONTENTS

Cover Page.....	i
Approval and Ratification Page.....	ii
Statement of Originality.....	iii
Abstract.....	iv
Preface.....	v
Table of Contents.....	vi
Table of Figures.....	viii
Chapter I : INTRODUCTION.....	1
1.1. Background.....	1
1.2. Scope.....	2
1.3. Objective.....	2
Chapter II : LITERATURE STUDY.....	3
2.1. Case of Problems.....	3
2.1.1. Traveling Salesman Problem.....	3
2.1.2. Google Maps Direction.....	3
2.2. Algorithms.....	4
2.2.1. A* algorithm.....	4
2.2.2. Genetic algorithm.....	4
2.3. Results.....	5
Chapter III : PLANNING.....	6
3.1. Research Methodology.....	6
3.1.1. Analysis.....	6
3.1.2. Collecting Information.....	6
3.1.3. Program Design.....	6

3.1.4. Testing and Finishing.....	7
Chapter IV : ANALYSIS AND DESIGN.....	8
4.1. Analysis.....	8
4.1.1. Use Case Diagram.....	8
4.2. Design.....	9
4.2.1. A* Flowchart.....	9
4.2.2. Genetic Flowchart.....	10
4.2.3. A* Class Diagram.....	11
4.2.4. Genetic Class Diagram.....	13
Chapter V : IMPLEMENTATION AND TESTING.....	15
5.1. Implementation.....	15
5.1.1. City Setting.....	15
5.1.2. Starting Main Process.....	17
5.2. Testing.....	18
5.2.1. Using 4 cities.....	18
5.2.2. Using 5 cities.....	19
5.2.3. Using 6 cities.....	20
5.2.4. Using 7 cities.....	21
Chapter VI : CONCLUSION.....	22
6.1. Conclusion.....	22
6.2. Future Research.....	23
REFERENCES.....	24

TABLE OF FIGURES

Figure 1. User Use Case Diagram.....	8
Figure 2. System Use Case Diagram.....	8
Figure 3. Flowchart of A* algorithm.....	9
Figure 4. Flowchart of Genetic algorithm.....	10
Figure 5. Class Diagram of A* algorithm.....	11
Figure 6. Class Diagram of Genetic algorithm.....	13
Figure 7. Saved City List menu position.....	15
Figure 8. Interface of Saved City List menu.....	15
Figure 9. Interface after inserting city.....	16
Figure 10. Interface after resets chosen cities.....	16
Figure 11. Result of updating inserted cities.....	16
Figure 12. Interface of Main Process menu.....	17
Figure 13. Result of Algorithms.....	17
Figure 14. Result using 4 cities.....	18
Figure 15. Result using 5 cities.....	19
Figure 16. Result using 6 cities.....	20
Figure 17. Result using 7 cities.....	21