

Chapter I

Introduction

1.1 Background

In today's increasingly large population growth in each city especially in the city of Bandung, then the impact on the level of traffic density has increased. Many people today who have their own vehicle complained of this situation for various reasons such as hard to find the path to the destination without traffic density, often getting late to the destination, and the ignorance of drivers when the route that you drivers want taken not facing of the traffic density.

Almost all the residents in the city of Bandung has a personal vehicle that make the level of traffic density gets more higher, so a lot of drivers who want to travel to a place especially drivers who do not have much time to deal with traffic density or a driver who should be on time to the destination often find the high traffic density. Especially for drivers that have a lot of schedule and must to maintenance their schedule and have best route for their destination on the next day. Many drivers who have this experience especially drivers who have limited time to do their activities such as students, employees of a company, businessmen, and as well as housewives who want to travel.

In this final project tries to create a solution to the problem when drivers wishing to travel from the starting point to the end point with a specific day and hour to get control their schedule. Example from this case is there is a driver who wants to travel from point A to point H with time leaving at 8.00 on monday, and they get the fastest route with traveling time, so the drivers can save the route and planning another route in the same day or another day to suit their schedule.

The solution given of this final project is to make an application to allow drivers find the fastest route to travel from the starting point to the end point with a day and time leaving that choosen by drivers. In realizing this solution there are many methods of choice, but in this final project chose to use an algorithm A * (Star), and Decision Tree.

Algorithm A * (Star) is an algorithm that uses heuristic approach are on rank or weight to each point by estimating the best route that can be passed

that point, and check one by one based in the value of existing heuristic[1]. The author chose the A * (Star) algorithm to search the route, is fairly suitable algorithm to solve this problem because this algorithm will minimize the total cost of the path and the algorithm is to apply heuristic techniques in helping to resolve this problem. Some basic terminology contained in this algorithm is starting point, nodes, A, open list, closed list, heuristic value[1].

Starting point of this problem can be described as a starting point the drivers will depart, drivers itself as A, then the route search can be done by the route neighboring A when when it was in the starting point was added to the open list and when the nodes that have been selected by A then inserted into the closed list and do the same thing as before, and the value of heuristic are taken could be described as the weight from every single point to the finish point.

After get the distance one point to next point the distance will be add with travelling time, which later it will be filled with the value predicted traffic density that will be sought by data mining method Decision Tree. Decision Tree is a data mining method to predict the data with different data attributes and classify the data, this method is suitable to help solve the problem of traffic density [10]. In this Final Project, the Decision Tree method can be formed using the C4.5 algorithm on Weka application.

1.2 Formulation of the Problem

Formulation of problem for this final project :

1. How to find the optimal route from the starting point to the end point in Bandung City using A *(Star) algorithm with distance and travel time?
2. How to determine the traffic prediction using Decision Tree in Bandung City?
3. How to find the optimal route from the starting point to the end point in Bandung city with distance, travel time, and traffic prediction using A *(Star) algorithm?

1.3 Constraint of the Problem

Constraint of problem for this final project :

- The map used is a map of the city of Bandung.
- Coordinates used in this final project from Google Maps.
- The road used just the protocol roads or major roads located in the city of Bandung.
- Traffic density data in this final project is taken from Google Maps.

- Traffic density data take in scale per hour.
- Time that used to find route only from 08.00 to 16.00 p.m.
- Day that used to find route only from monday to friday.
- Speed of vehicle when get congestion set in 5km/hour.
- Speed of vehicle when do not get congestion set in 20km/hour.

1.4 Purpose

Purpose from this final project :

1. Determining the optimal route to the driver reached the end point in Bandung City with distance and travel time using A *(Star) Algorithm.
2. Determining the traffic prediction for every route in Bandung City using Decision Tree.
3. Determining the optimal route to the driver reached the end point in Bandung City with distance ,travel time and traffic prediction.

1.5 Activity Plan

As for the activities to be performed in this study is divided in several stages as follows.

1. Literature study.

At this stage will be studying the materials related to A * (Star) algorithm, and Decision Tree method for process data mining, how the flow of this method, and how the application of these methods. From the results of the learning materials from existing source is expected to know more and to find ways to adapt the A * (Star) algorithm and Decision Tree method .

2. Application method.

- Collecting Dataset.

At this stage, it will do the process of collecting data of traffic density for each way on a time scale of hours per day. The result data that has been obtained will be used to manufacture the program.

- Mapping Bandung city.

At this stage, it will do the process of mappingg to the city of Bandung that will become a model of road network.

- Applying the method of A *(Star) Algorithm and Decision Tree
After doing the process mapping, the author would implement A *(Star) Algorithm to find the route based on traffic density that using Decision Tree for Data Mining.

3. The manufacture and testing of the system.

- Manufacture System.

At this stage, the author will create a system that is meant to be a simulation of the completion of the scope of the problem in this final task.

- Testing System.

Once built, the system needed the system testing phase. At this stage will use the method of White Box Testing. This method is based on testing to detail design. If there is problem with the system, writer will back to Manufacture System stage. If the system had perfect, writer will continue manufacturing report.

- Evaluate System.

In this stage, writer will evaluate the system.

- Note down the shortage of this system

In this stage, writer will note down the shortage of this system. After this stage, writer will back to Manufacture System stage.

- Manufacturing report

Writer will report about this system for this final project and write down the result from the testing.

4. Conclusions and Suggestions

This step contains all conclusions and suggestions that have been examined.

1.6 Schedule of Activities

The table is schedule of activities for this final project.

Num	Activity	month-1	month-2	month-3	month-4	month-5
1	Literature Study					
2	Collecting Dataset					
3	Mapping Bandung city					
4	Applying A *(Star) Algorithm Decision Tree					
5	Manufacture System					
6	Testing System					
7	Evaluate System					
8	Manufacturing report					
9	Conclusions and Suggestion					

Table 1.1: Activity Table