

# Development of a navigational algorithm with a rating system for commuters

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# Team Introduction

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# Problem Background

## Problem

Transportation is  
one of the  
problems many  
Filipinos face day  
to day.



# Problem



Traffic, however is a major hurdle for most Filipinos.

## Problem

Daily transportation cost in 2012 was estimated to be Php 2.4 billion, including time cost.

## Problem

Low-income families spent no less than 20% of their income for transportation.



## Problem

One problem is that the large amount of private cars on the road can cause congestion.

## Problem

Private cars were said to take up  
78% of road space in 2012.

## Problem



A way to mitigate this problem is to encourage people to commute.

## Problem

Commuting, though, is complicated, which can intimidate those new to it. Safety is also another concern for commuters

# Idea Concept

## Idea

Create a navigational algorithm for commuters that implements a user-based rating system.

# Approaches on Algorithmic Solution

## Algorithmic Solution

For this problem we used a Dijkstra algorithm with slight modifications



## Algorithmic Solution

Dijkstra is an algorithm used for finding the shortest path for a weighted graph.

## Algorithmic Solution

We used a modified Dijkstra algorithm to find the shortest paths in terms of distance, fare, and travel time.

## Algorithmic Solution

It was also used to find the path with the highest average rating.

## Algorithmic Solution

In all other versions, paths with ratings lower than a certain value were avoided.

# Inputs and Data

## Inputs

Our algorithm uses the following  
as input:

# Main Method

Number of Test Cases (int)

Number of Nodes [Sources/Destinations] (int)

Names of Nodes (String)

Edge [Terminal] data

Find best path for: distance/fare/rating/time (String)

## For Edges (Terminals)

Name of the Terminal (String)

Source (String or int) - where you came from

Destination (String or int) - where you want to go

Distance (double) - how far is it in km

Fare (double) - how much does it cost in Php

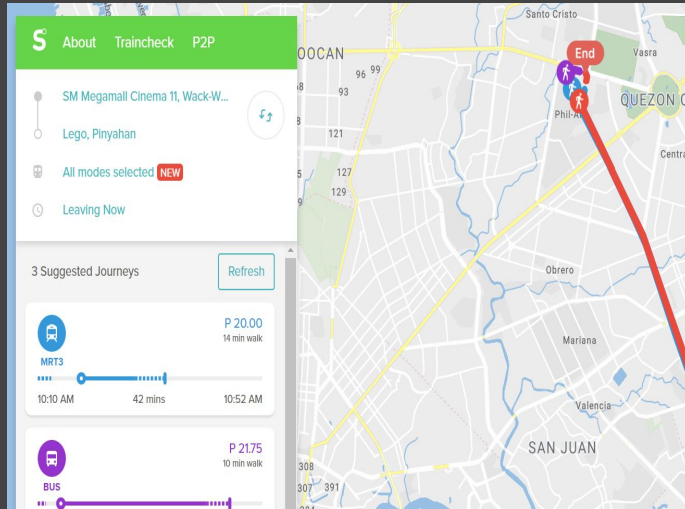
Average Speed (double) - how fast does it usually go in kph



## Test Data

We used three sets of data to test our code.

# Test Data



The first set is data retrieved from sakay.ph and Google Maps.

## Test Data

73735	45963	78134	63873
02965	58303	90708	20025
98859	23851	27965	62394
33666	62570	64775	78428
81666	26440	20422	05720
15838	47174	76866	14330
89793	34378	08730	56522
78155	22466	81978	57323
16381	66207	11698	99314
75002	80827	53867	37797
99982	27601	62686	44711
84543	87442	50033	14021
77757	54043	46176	42391
80871	32792	87989	72248
30500	28220	12444	71840

For the second set, all the data was completely randomized.

# Test Data

Republic of the Philippines  
Department of Transportation and Communication  
**LAND TRANSPORTATION FRANCHISING AND REGULATORY BOARD**  
East Avenue, Quezon City

**PUJ GENERAL FARE GUIDE**  
Mega Manila

EFFECTIVE : FEBRUARY 8, 2017

Distance (kms.)	Regular	Student / Elderly / Disabled	Distance (kms.)	Regular	Student / Elderly / Disabled
1	8.00	6.50	26	41.00	32.75
2	8.00	6.50	27	42.50	34.00
3	8.00	6.50	28	44.00	35.25
4	8.00	6.50	29	45.50	36.50
5	9.50	7.50	30	47.00	37.50
6	11.00	8.75	31	48.50	38.75
7	12.50	10.00	32	50.00	40.00
8	14.00	11.25	33	51.50	41.25
9	15.50	12.50	34	53.00	42.50
10	17.00	13.50	35	54.50	43.50
11	18.50	14.75	36	56.00	44.75
12	20.00	16.00	37	57.50	46.00
13	21.50	17.25	38	59.00	47.25
14	23.00	18.50	39	60.50	48.50

And for the third, we generated it ourselves using data from the first set and fares researched as basis

# Benefits and Social Impact

## Benefits and Social Impact

There is already a navigational app that commuters can use to find their routes

## Benefits and Social Impact

..however, it does not have an option for users to rate the routes that they have taken.

## Benefits and Social Impact

This can be a problem as users won't be able to know whether a certain route is safe to take or not.



## Benefits and Social Impact

Ratings can also be a way to assess a route's perceived quality, which in turn, can help in their improvement.

# Code Demonstration

Thank you

# References

Japan International Cooperation Agency (JICA) and National Economic Development Agency (NEDA) (2014). *Roadmap for Transport Infrastructure Development for Metro Manila and Its Surrounding Areas*. Retrieved from:  
<https://libopac.jica.go.jp/images/report/12149597.pdf>.

Input based on data retrieved from:

<http://ltfrb.gov.ph/wp-content/uploads/2017/10/PUB-Ordinary-Fare-Guide-2017.pdf>

<http://ltfrb.gov.ph/wp-content/uploads/2017/10/PUJ-Fare-Guide-as-of-2-17-2017.pdf>

sakay.ph

maps.google.com