

Development of a navigational algorithm with a rating system for commuters

de la Cruz, Sanchez, Calungsod

Team Introduction

Team Introduction

Diana Mae de la Cruz b21.diana.delacruz@pshs.edu.ph code, presentation,
input data

Danielle Francesca b21.danielle.sanchez@pshs.edu.ph input data
Marie Sanchez

Dhaniel Calungsod b21.dhaniel.calungsod@pshs.edu.ph

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

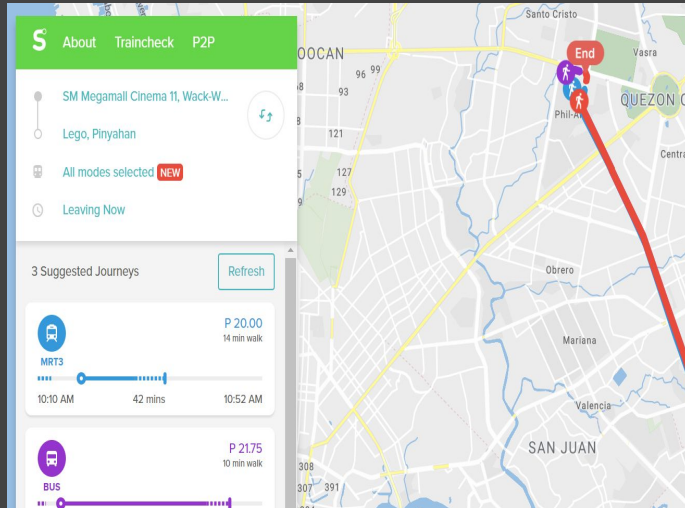
Fare (double) - how much does it cost in Php

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