

# SEARCH ALGORITHMS APPLIED TO CITIZEN SAFETY AND HARRASMENT PREVENTION

# Presentation of the team



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Literature review



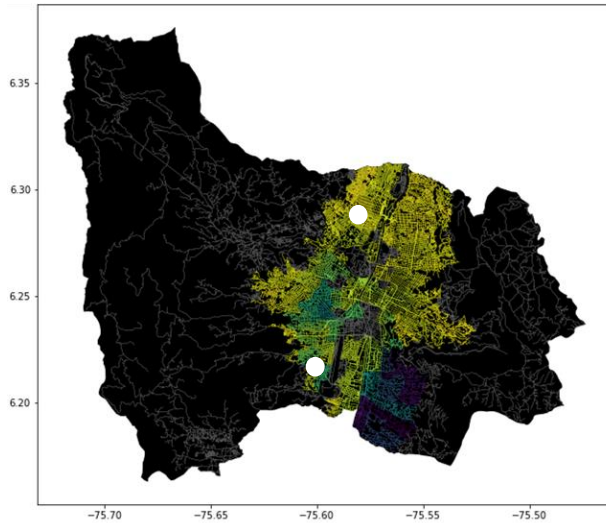
**Mauricio Toro**  
Data preparation



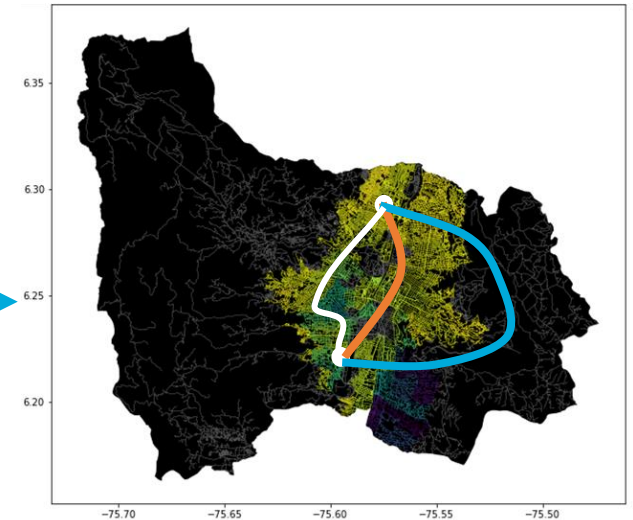
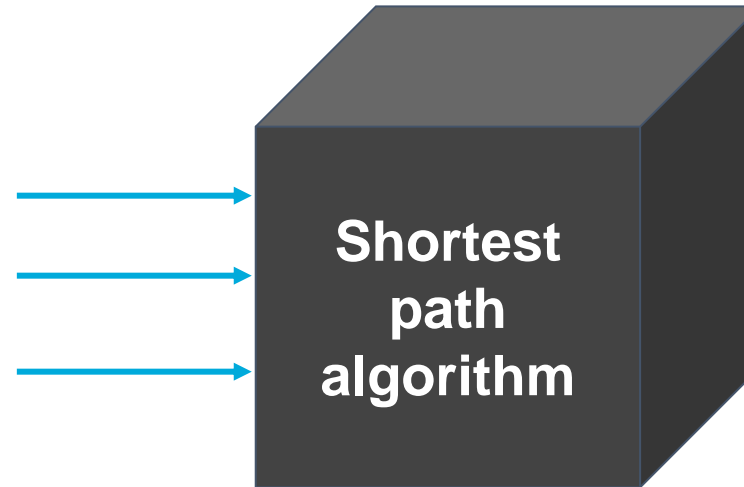
<https://github.com/julianvb03/ST0245-5001>



# Problem Statement



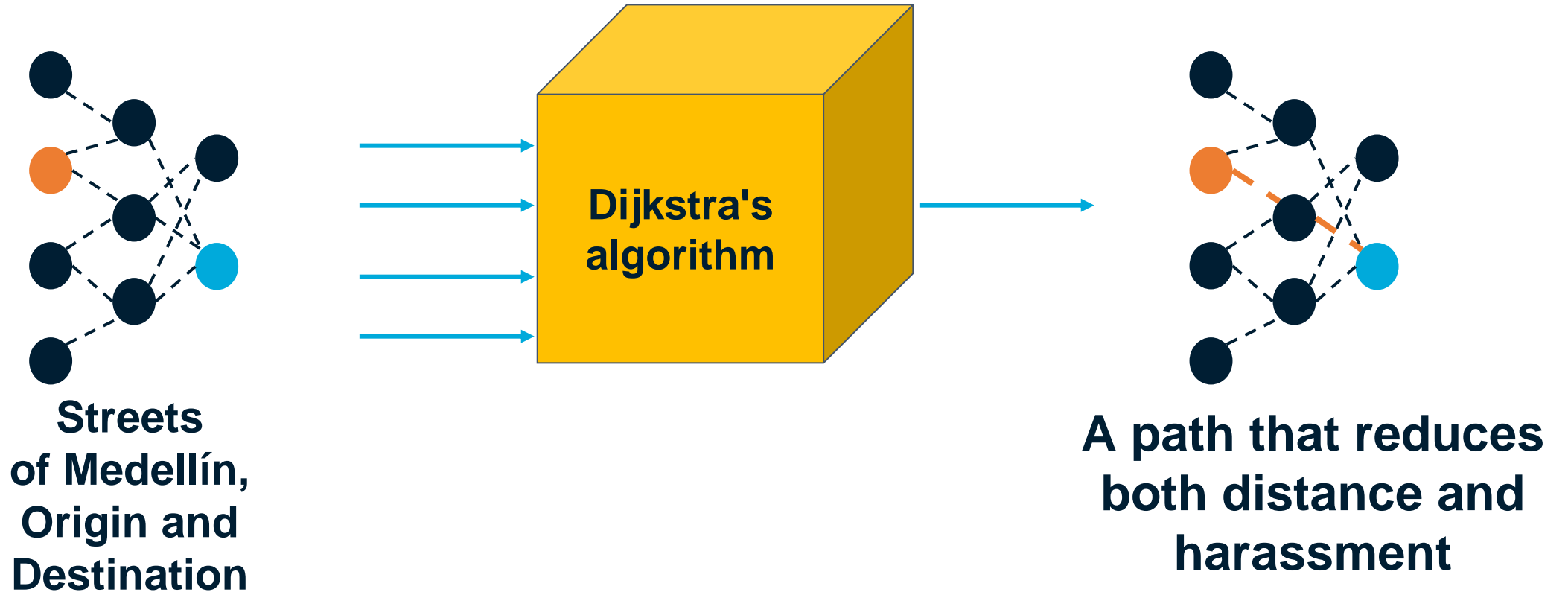
**Streets  
of Medellín,  
Origin and  
Destination**



**Three paths that reduce  
both the risk of harassment  
and distance**



<https://github.com/julianvb03/ST0245-5001>

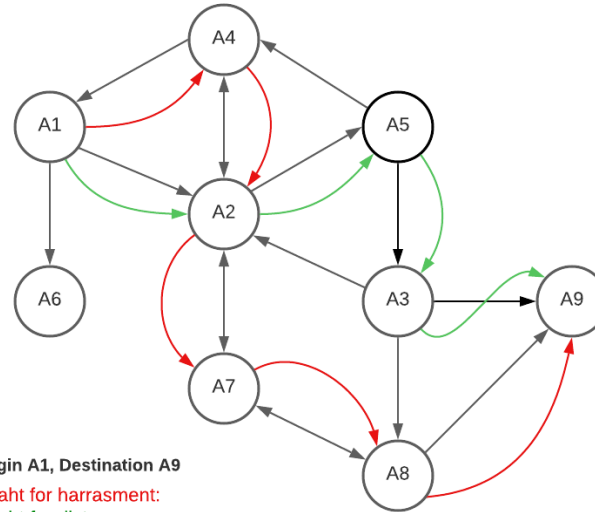
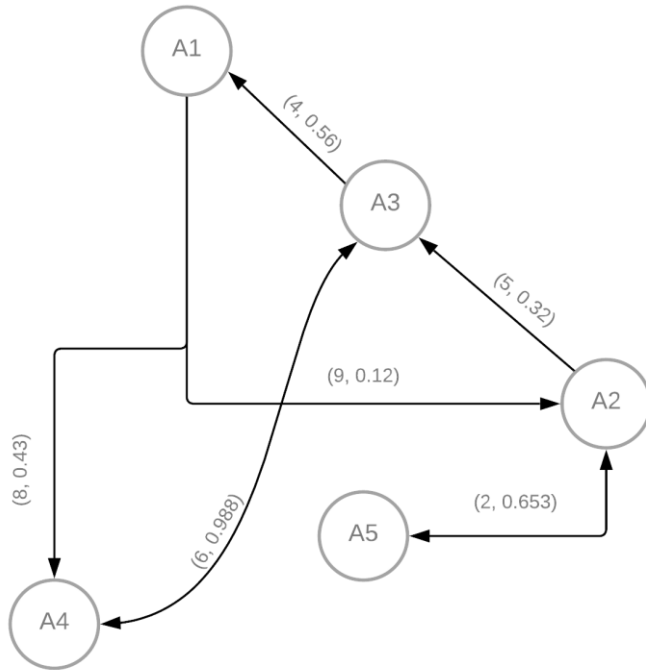




# Explanation of the algorithm



A) Example of map



Origin A1, Destination A9

Paht for harrasment:  
Paht for distance:



## Dijkstra's algorithm

We used python dictionaries to create the graph, and in our case, we have the key which is the unique origins (in polar cords), and the content which are all the adjacent nodes of the vertex. In that way, we can define a graph.



<https://github.com/julianvb03/ST0245-5001>



# Complexity of the algorithm



	Time complexity	Complexity of memory
Dijkstra's	$O((V + E) * \log V)$	$O(V + E) = O(V)$
None		



Time and memory complexity of the algorithm name.  $V$  is the number of the vertex and  $E$  is the number of edges.

## First path minimizing $d = \text{time}$



Origin	Destination	Distance (meters)	Risk of harassment (between 0 and 1)
EAFIT University	National University	7,510 m	0.7440296981960772

Distance and risk of harassment for the path that minimizes  $d = \text{time}$ . Execution time of 7.514 seconds.

The distance between EAFIT University and National University is 7,510 m and have an average time of arrival in 1 hour y 30 minutes, at 5 km/h

## Second path minimizing $d = \text{harassment}$



Origin	Destination	Distance (meters)	Risk of harassment (between 0 and 1)
EAFIT University	National University	10,430 m	0.4736598772496898

Distance and risk of harassment for the path that minimizes  $d = \text{harassment}$ . Execution time of 7.514 seconds.

The distance between EAFIT University and National University is 10,430 m and have an average time of arrive in 2 hours y 5 minutes, at 5 km/h



## Third path minimizing $d$ = average of both

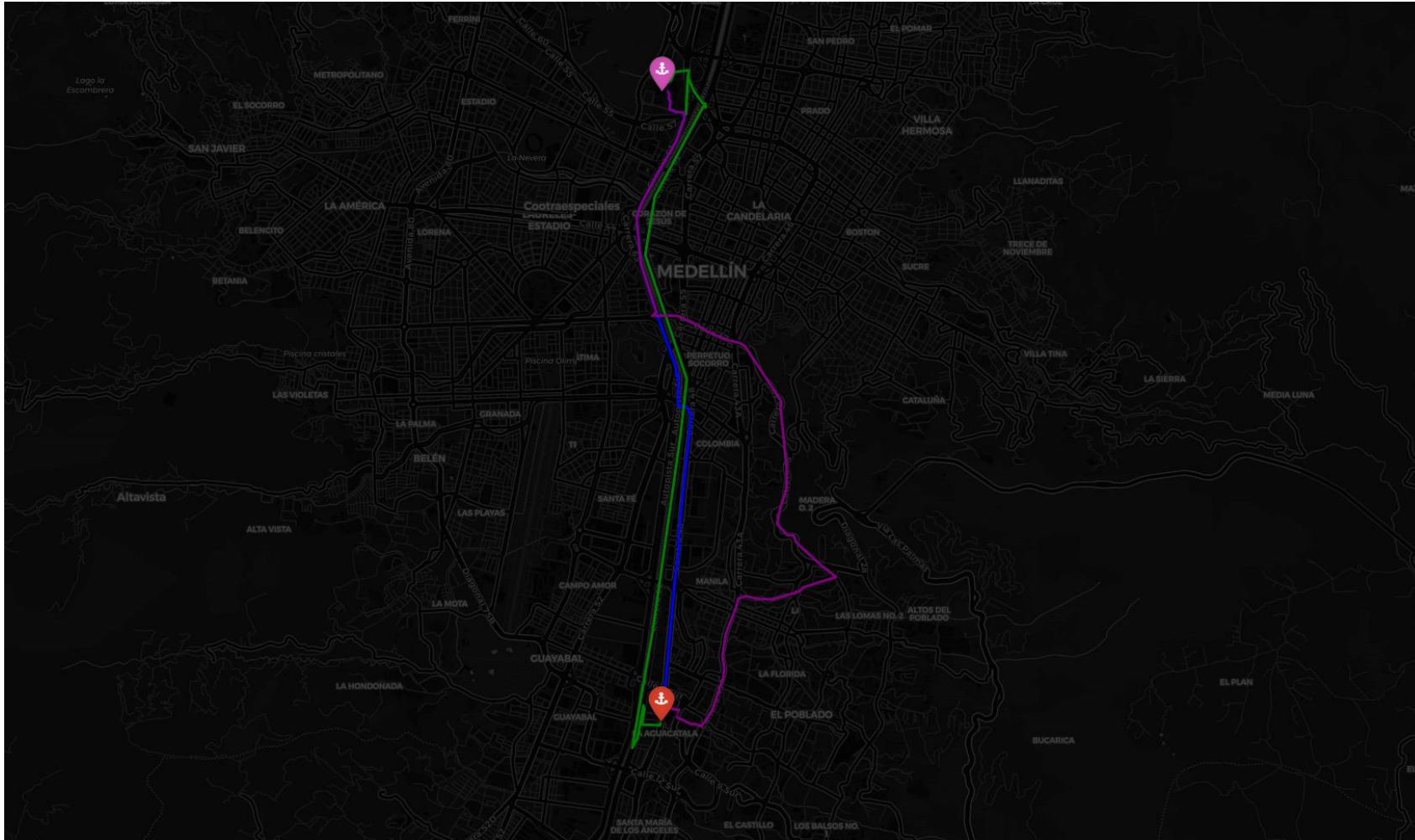


Origin	Destination	Distance (meters)	Risk of harassment (between 0 and 1)
EAFIT University	National University	10,050	0.5957425859642945

Distance and risk of harassment for the path that minimizes  $d$  = average of both.  
Execution time of 7.514 seconds.

The distance between EAFIT University and National University is 10,050 m  
and have an average time of arrive in 2 hours, at 5 km/h

# Visual comparison of the three paths





## Databases

### • • • • • Other variables

In a future we would like to add some databases and optimize the way we input the manage the dates

## Project 1

### • • • • • Web application

It's true possible that in the future we must upload a web application 100% functional for our users

## Software Engineering

### • • • • • Mobile application

As well that we like to with a web application we also need to create a mobile application, to have more reach with the users and have more portability



Gomez, Marco, Julian E. V. Bolaños, Samuel Rico, Isabel Mora, Valeria C. Velasquez, Gregorio Bermúdez, Julian D. R. Lopera, et al. 2022. "SEARCH ALGORITHMS APPLIED TO CITIZEN SAFETY AND HARASSMENT PREVENTION." OSF Preprints. November 8. [osf.io/cw9y8](https://osf.io/cw9y8).

The screenshot shows the OSF preprint interface for the document "SEARCH ALGORITHMS APPLIED TO CITIZEN SAFETY AND HARASSMENT PREVENTION". The title is displayed in large white letters on a dark background. Below the title, the authors are listed: Marco Gomez, Julian Estiven Valencia Bolaños, Samuel Rico, Isabel Mora, Valeria Carmona Velasquez, Gregorio Bermudez Ocampo, Julian Dav Riascos Salas. Under the "AUTHOR ASSERTIONS" section, three items are shown: "Conflict of Interest: No" with a dropdown arrow, "Public Data: Not applicable" with a dropdown arrow, and "Preregistration: Not applicable". At the bottom of the screenshot, a PDF viewer interface is visible, showing the document title and a "Download" button.



# THANK YOU!

**With the support of**  
our most sincere thanks to the monitors who helped  
us throughout the semester.  
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