SAFEST PATH FINDING ALGORITHMS ON STREET HARASSMENT PREVENTION

UNIVERSIDAD EAFIT®

Presentation of the team

Lina Ballesteros
Author

Camilo Córdoba
Author

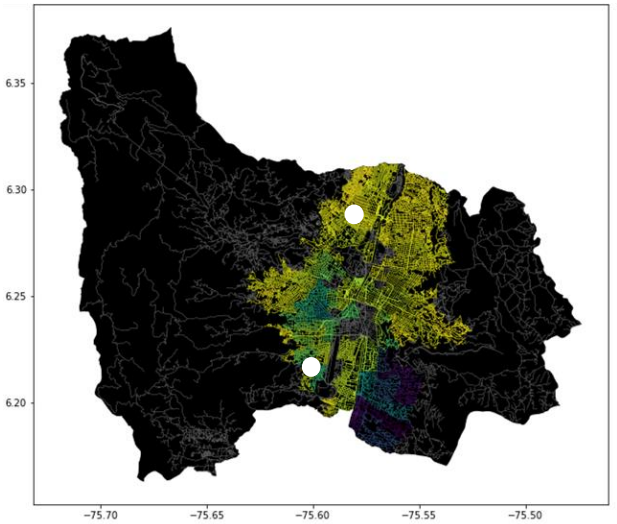
Andrea Serna
Literature review

Mauricio Toro
Data preparation

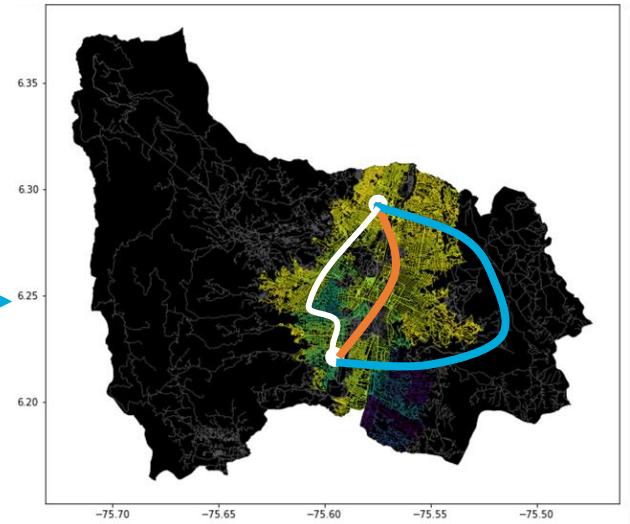
https://github.com/linasofi13/StreetHarassmentProyect_2022-2

UNIVERSIDAD EAFIT

Problem Statement



Shortest path algorithm

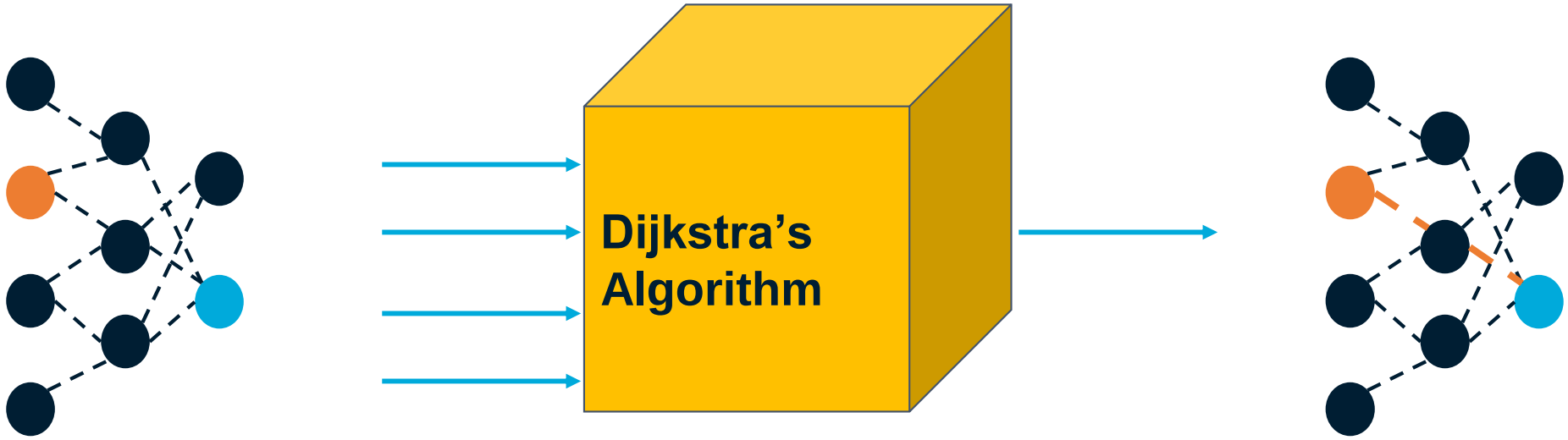


Streets of Medellín, Origin and Destination

Three paths that reduce both the risk of harassment and distance

UNIVERSIDAD EAFIT

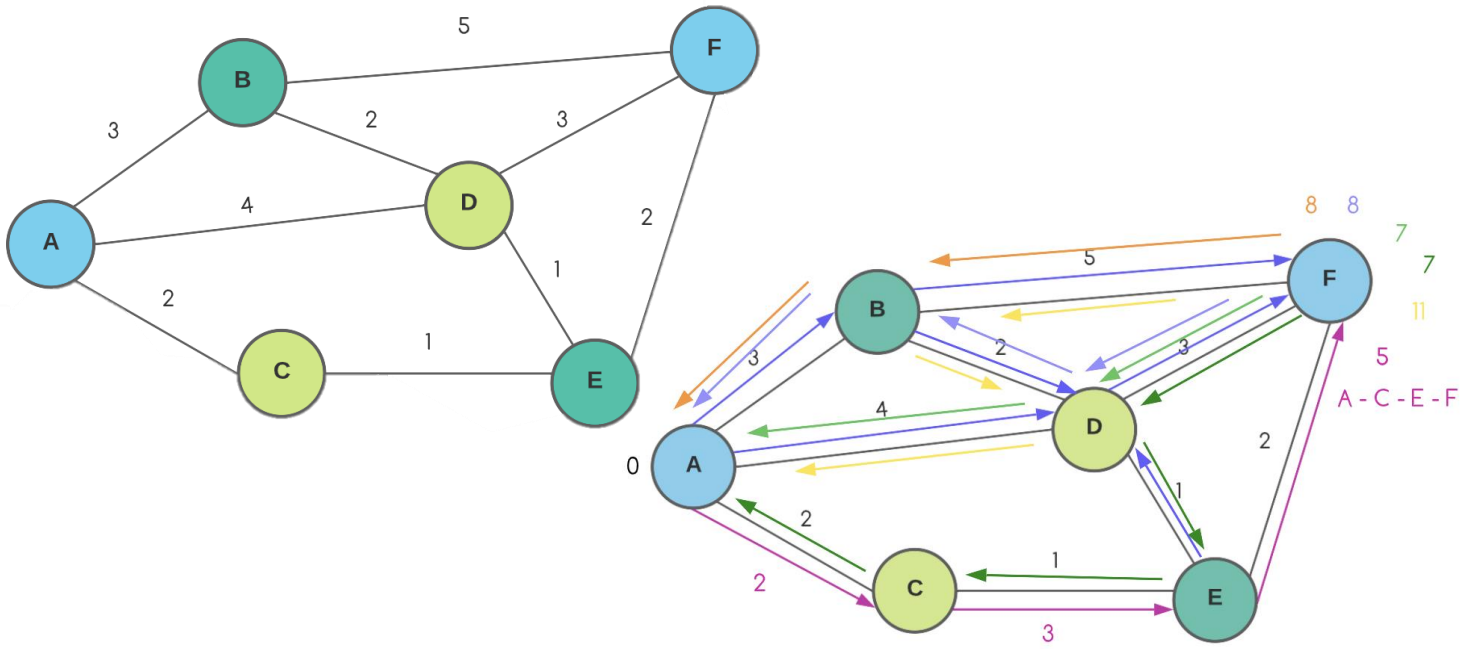
Solution Algorithm



Streets of Medellín, Origin and Destination

A path that reduces both distance and harassment

Explanation of the algorithm



Dijkstra’s Algorithm

Dijkstra’s Algorithm implementation for the shortest and safest path from A to F. The algorithm checks for the path with the minor total cost from the origin node to the final node. In this case is the path with a cost of 5.

Complexity of the algorithm

	Time complexity	Complexity of memory
Dijkstra's Algorithm	O((V + E) Log V)	O(V + E)

Time and memory complexity of Dijkstra's Algorithm using a priority queue, where V is the number of nodes and E is the number of edges in the graph.

First path with variable v = d * r

Origin	Destination	Distance (meters)	Risk of harassment (between 0 and 1)
EAFIT University	National University	15399.647 m	0.33579

Distance in meters and risk of sexual street harassment (between 0 and 1) to walk from EAFIT University to the National University with variable v = d * r. Execution time of 0.082 seconds.

First path with variable v = d^{2r}

Origin	Destination	Distance (meters)	Risk of harassment (between 0 and 1)
EAFIT University	National University	12228.437 m	0.6787

Distance in meters and risk of sexual street harassment (between 0 and 1) to walk from EAFIT University to the National University with variable v = d^{2r}. Execution time of 0.110 seconds.

First path minimizing with variable v = d + 80r

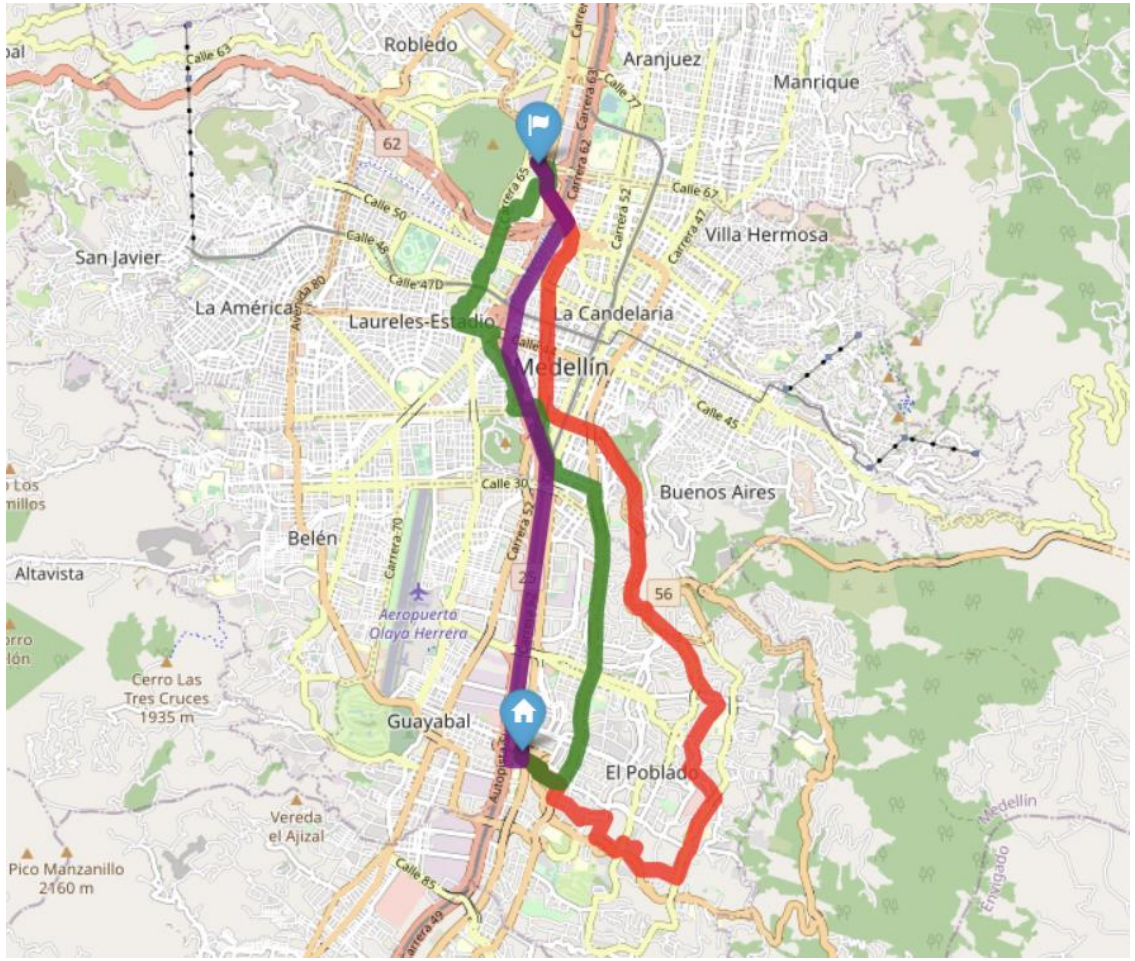
Origin	Destination	Distance (meters)	Risk of harassment (between 0 and 1)
EAFIT University	National University	5422.5 m	0.5470

Distance in meters and risk of sexual street harassment (between 0 and 1) to walk from EAFIT University to the National University with variable v = d + 80r. Execution time of 0.077 seconds.

Visual comparison of the three paths

Map of the city of Medellín showing three pedestrian paths that reduce both the risk of sexual harassment and the distance in meters between the EAFIT University and the National University.

Red path represents the variable v=d*r, green path represents the variable v= d^{2r} and the purple path represents the variable v=d+(80r).



Future work directions

Databases

Taking into consideration Other variables, such as time and robbery risk. And naming the coordinates

Project 1

Implementing the program as Web application with user-friendly inter face

Software Engineering

Develop an interactive user-friendly mobile application to find the path

Project 2

Improve our program with the help of machine learning, constantly updating data

THANK YOU!

With the support of

The first two authors wish to thank their parents for their support during the project and for financing their studies at EAFIT. All authors are grateful to the Vice Rector's Office for Discovery and Creation, Universidad EAFIT, for their support in this research.