ALGORITHMS TO FIND THE SHORTEST SAFE ROUTES TO PREVENT SEXUAL HARASSMENT

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Presentation of the team

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https://github.com/jcbermudec/ST0245-001

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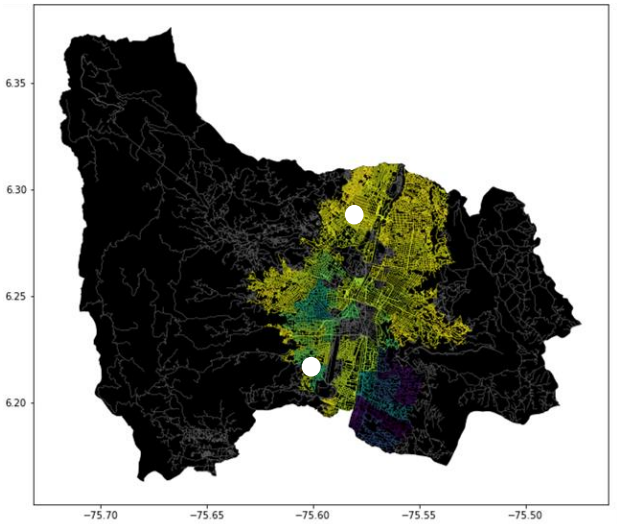
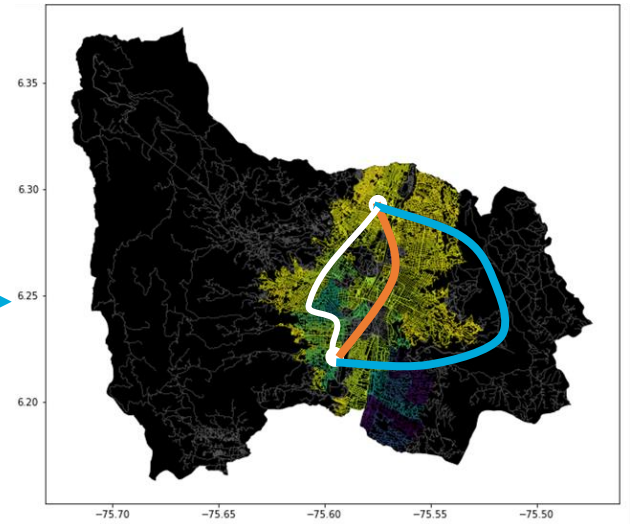
Problem Statement



Shortest path algorithm



Streets of Medellín, Origin and Destination

Three paths that reduce both the risk of harassment and distance

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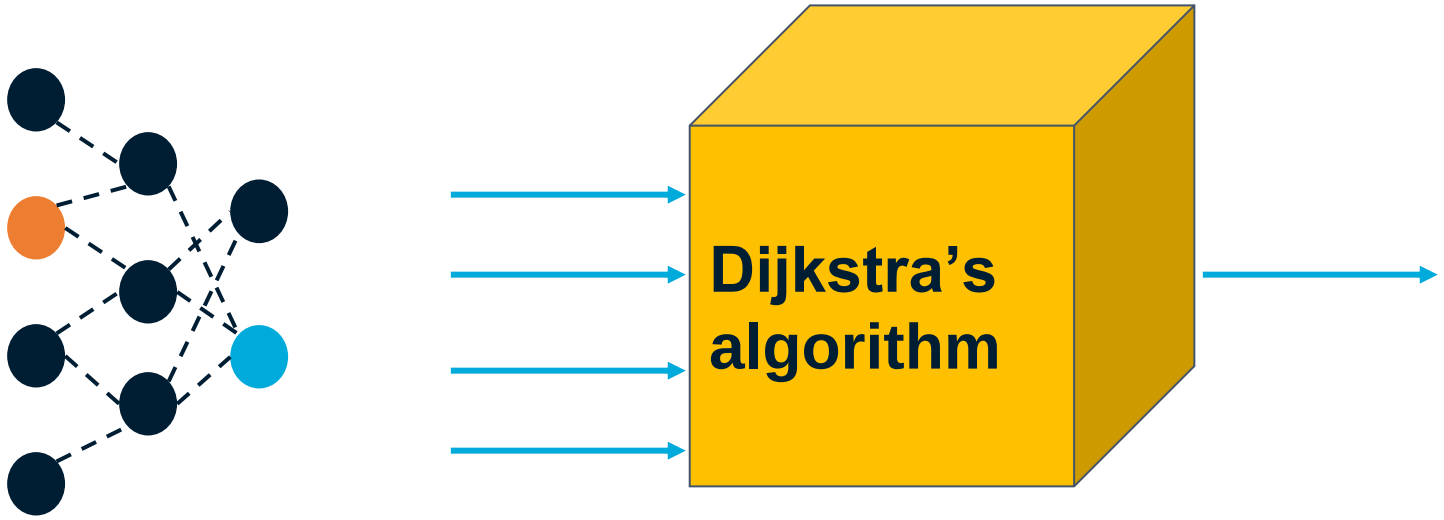
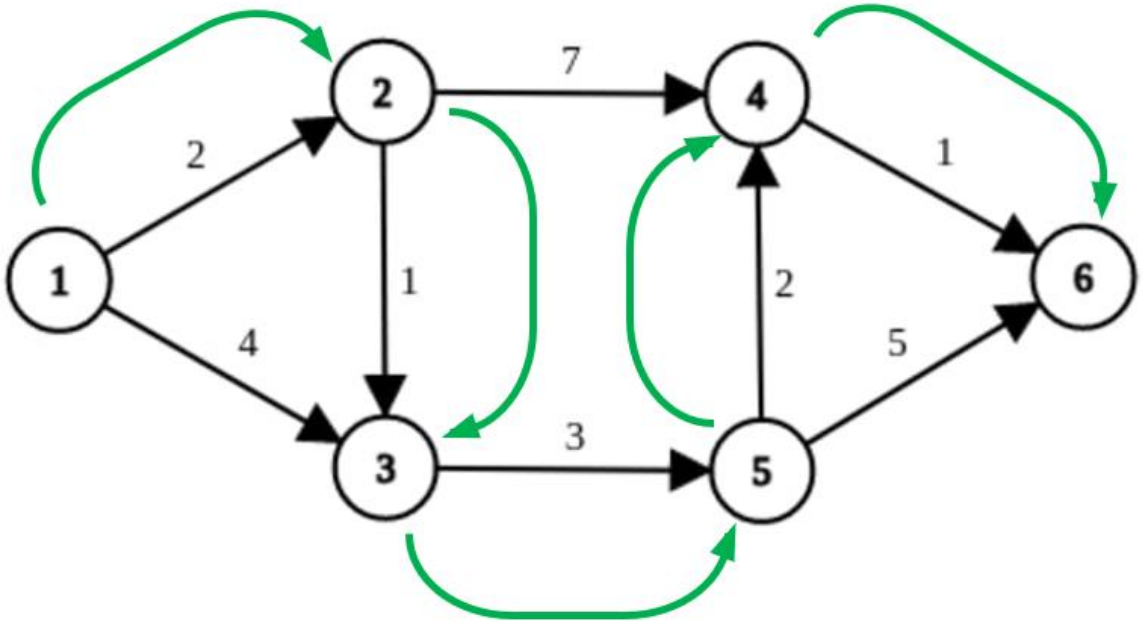
Solution Algorithm



Streets of Medellín, Origin and Destination

A path that reduces both distance and harassment

Explanation of the algorithm



Dijkstra’s algorithm

In the graph shown above, the path found by the algorithm is illustrated with a starting node “1” to a destination node “6” with the lowest distance and risk of harassment

Complexity of the algorithm

	Time complexity	Complexity of memory
Dijkstra's algorithm	O((V+E)*log V)	O(V)

Time and memory complexity of Dijkstra's algorithm. Where "V" means vertex and "E" means edge

First path minimizing d = 9832

Origin	Destination	Distance (meters)	Risk of harassment (between 0 and 1)
EAFIT University	National University	9832	0.572

Distance and risk of harassment for the path that minimizes d = 9832. Execution time of 0.1011 seconds.

Second path minimizing d = 9401.977

Origin	Destination	Distance (meters)	Risk of harassment (between 0 and 1)
EAFIT University	National University	9401.977	0.6394

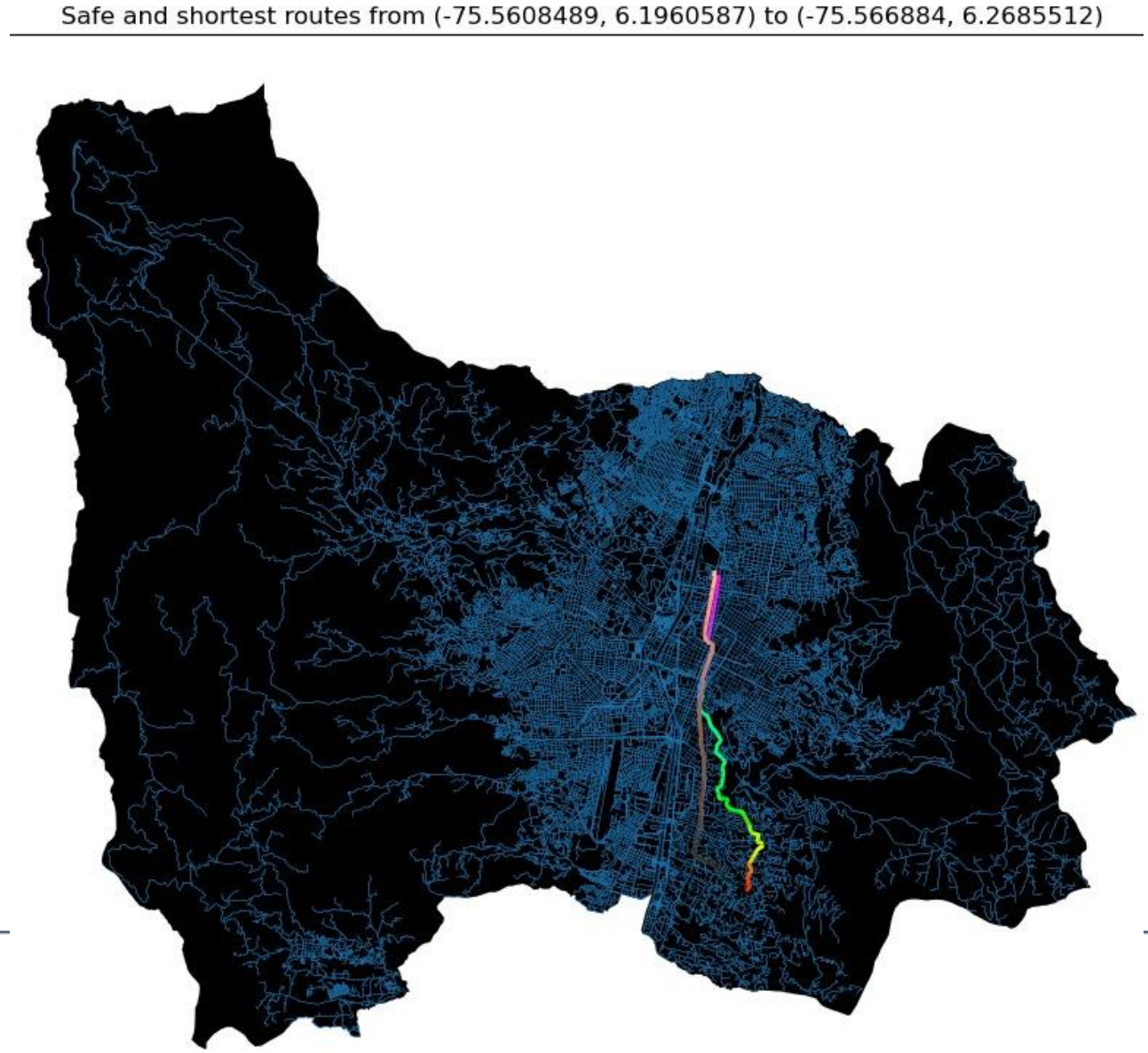
Distance and risk of harassment for the path that minimizes d = 9401.977. Execution time of 0.13978 seconds.

Third path minimizing d = 9353.253

Origin	Destination	Distance (meters)	Risk of harassment (between 0 and 1)
EAFIT University	National University	9353.253	0.7045

Distance and risk of harassment for the path that minimizes d = 9353.253. Execution time of 0.0957 seconds.

Visual comparison of the three paths



Future work directions

It would be nice to plot the map and roads in a **3D** environment, instead of a flat (2D) image.

It would also be interesting to carry out tests with **linear regressions** that seek to find the best optimization between distance and risk of harassment.

Using **Queueing theory**, we can make better estimates of how the traffic will behave.

THANK YOU!

With the support of

The first two authors were supported by the Sapiencia grant, financed by the municipality of Medellín. All authors are grateful to the Vice Rector's Office for Discovery and Creation, Universidad EAFIT, for their support in this research.