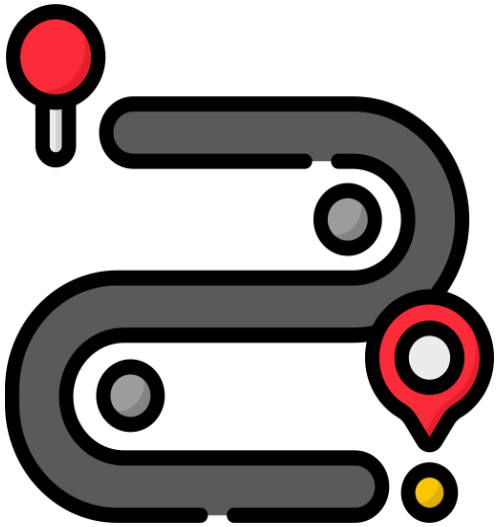
The Safest Path



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Team

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Andrea Serna
Literature review

Mauricio Toro
Data preparation

https://github.com/Nicorenox/ST0245-02-ProyectoV1-

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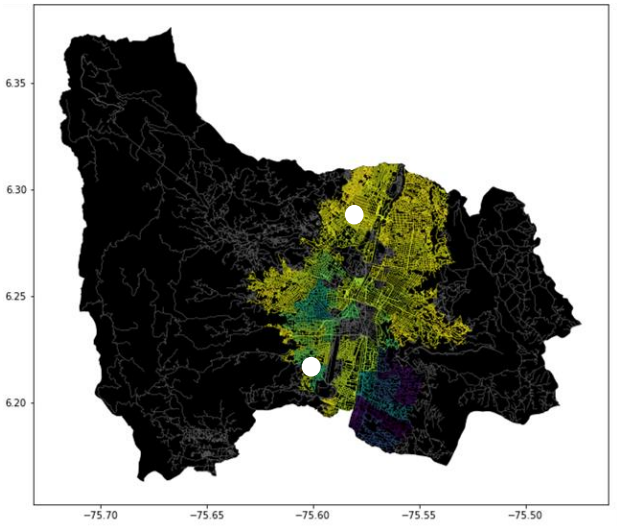
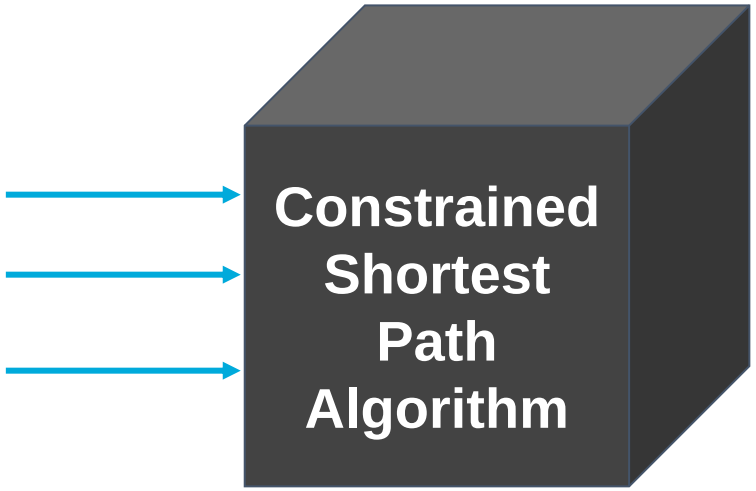
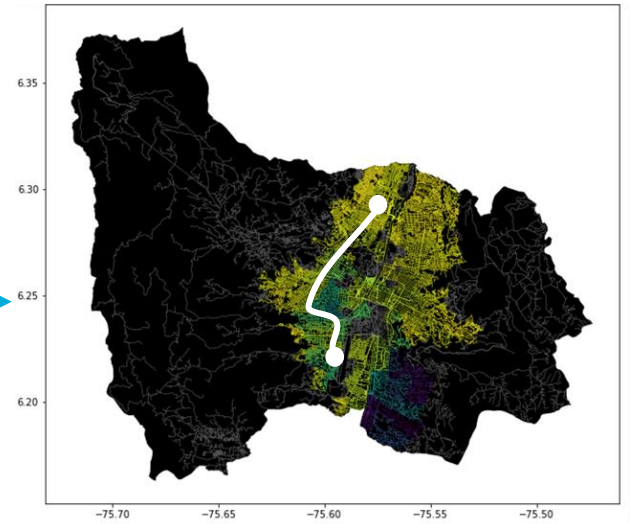
Problem Statement



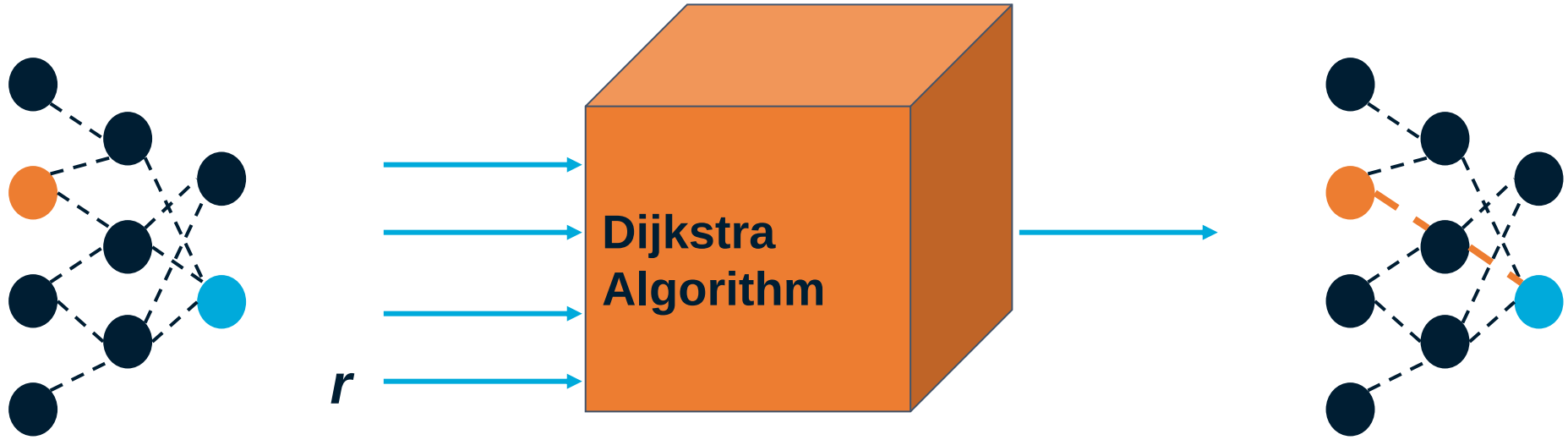
Streets of Medellín, Origin and Destination





Constrained Shortest Paths

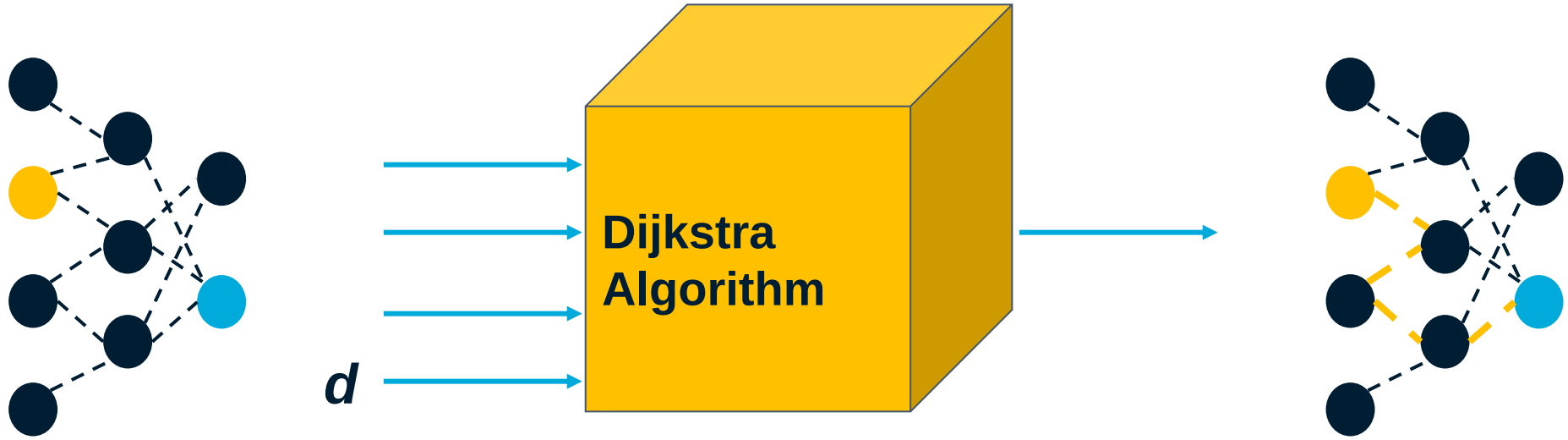
First Algorithm



Streets of Medellín, Origin and Destination

Shortest path without exceeding a weighted-average risk of harassment *r*

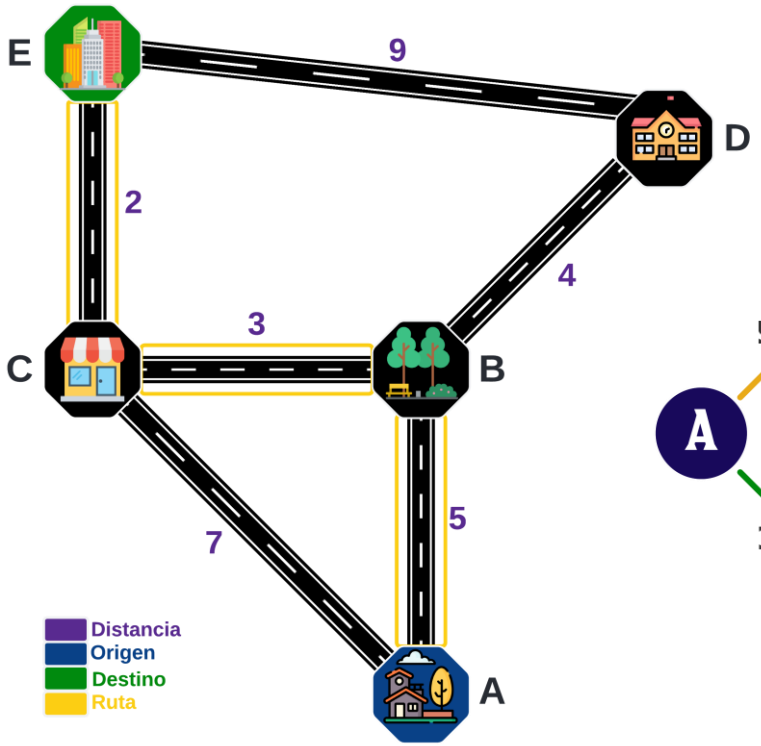
Second Algorithm

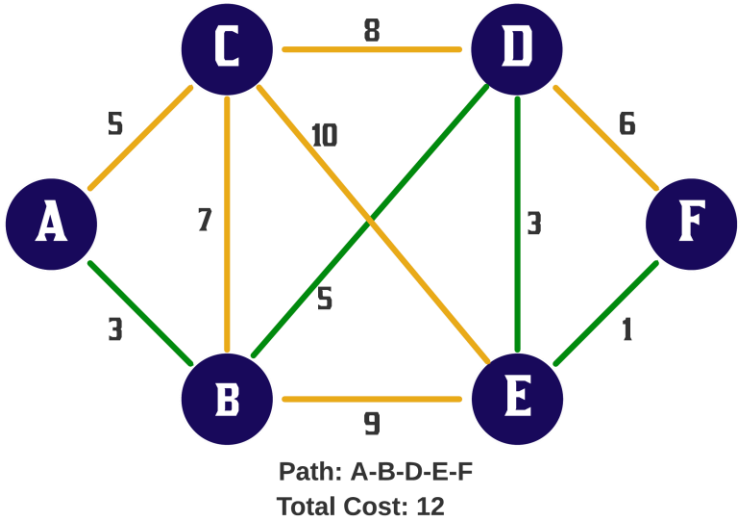


Streets of Medellín, Origin and Destination

Path with the lowest weighted-average risk of harassment without exceeding a distance *d*

Algorithm Explanation





Dijkstra Algorithm for the Constrained Shortest Path.

Starting from the source node, in this case A, the algorithm search the node with the minimum distance in the adjacent nodes, the node with less distance is selected and so on to reach the final node. This returns the final path and the entire cost of the path.

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Algorithm Complexity

	Time Complexity	Memory Complexity
Dijkstra Algorithm	(E+VlogV)	$O(V^2)$

Time and memory complexity of the Dijkstra Algorithm. Where E is the number of edges in the graph and V is the number of vertices in the graph.