Prevention of Street Harassment Through Constrained Shortest Path Algorithms

UNIVERSIDAD EAFIT

Team Presentation

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Report and algorithms

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Literature review

Mauricio Toro
Data preparation

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

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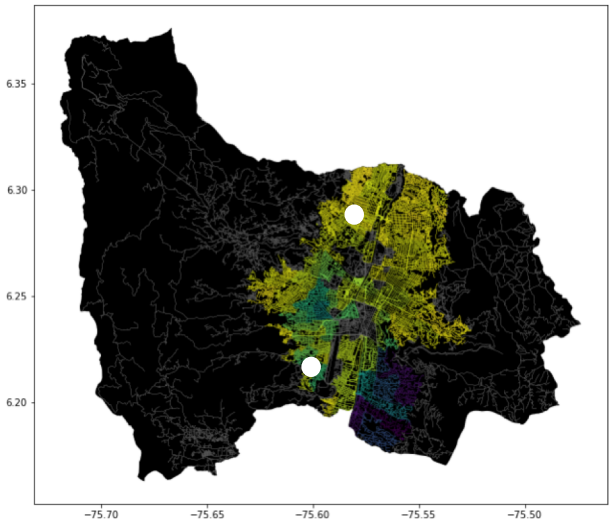
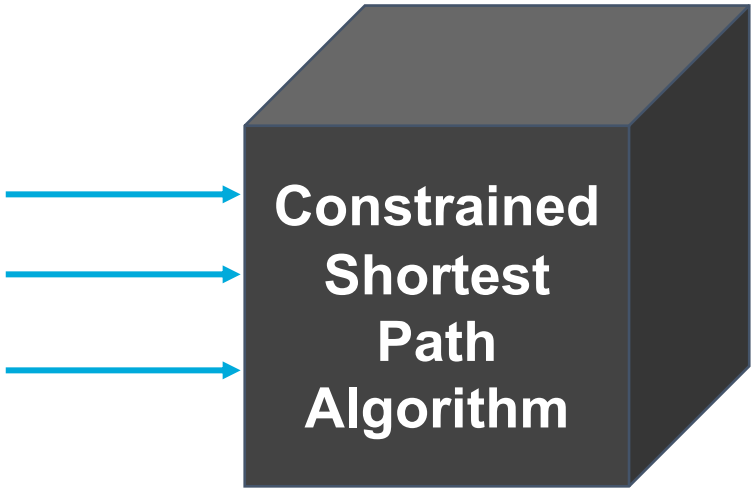
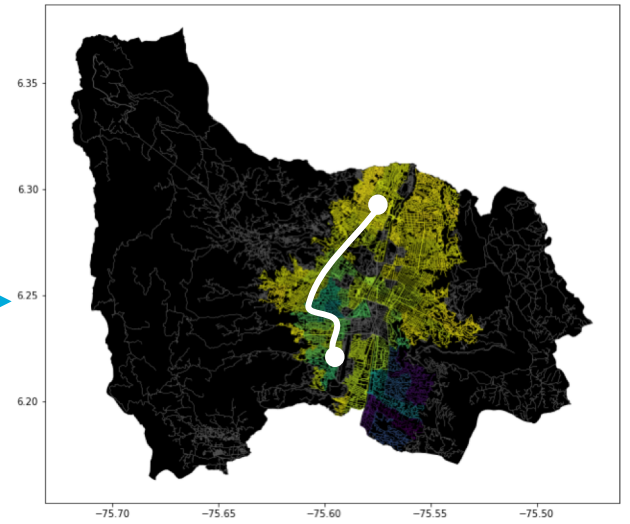
Problem Statement



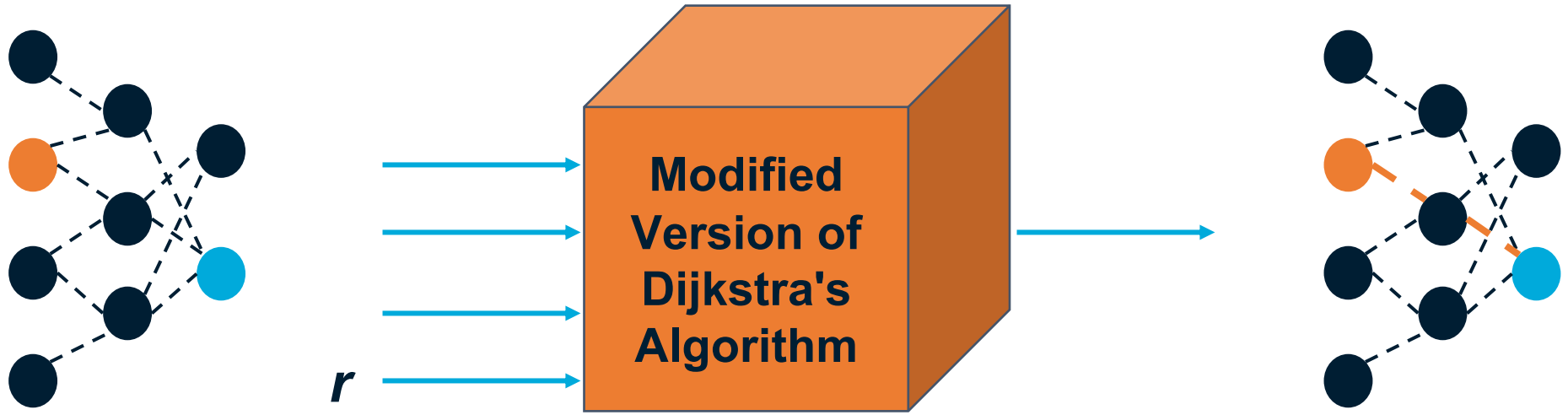
Streets of Medellín: Origin and Destination





Constrained Shortest Paths

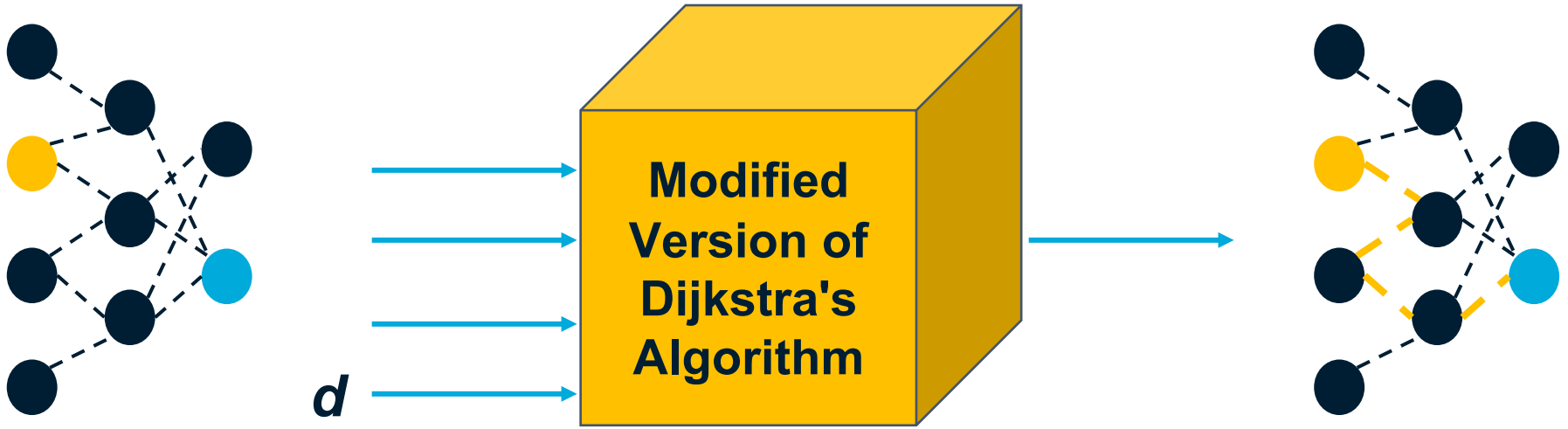
First Algorithm



Streets of Medellín, Origin and Destination

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

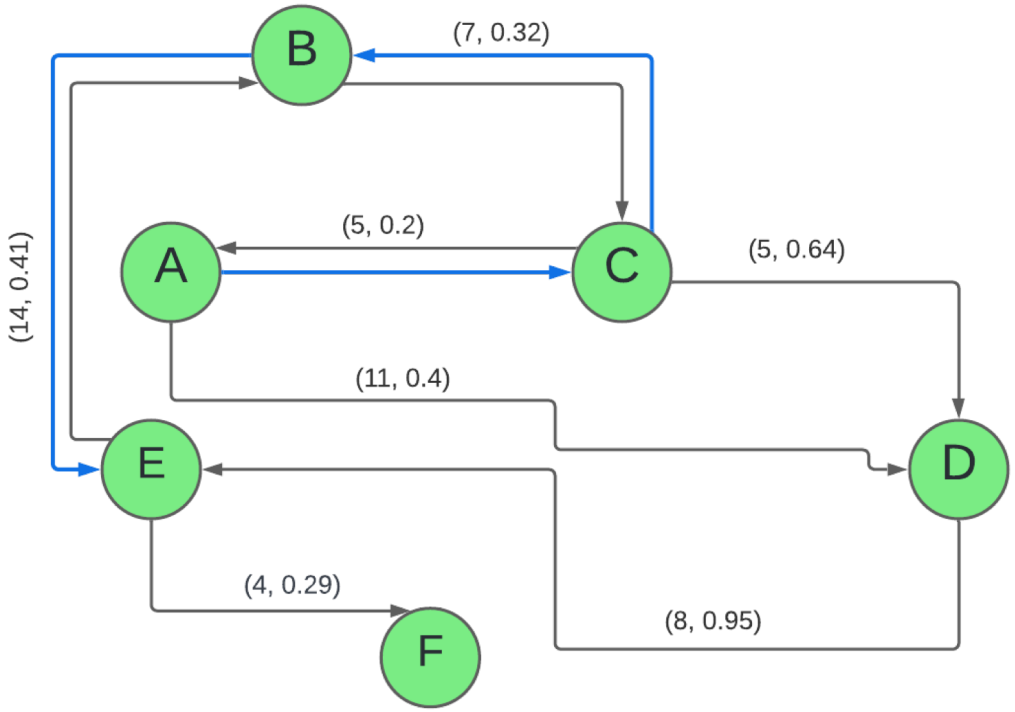
Second Algorithm



Streets of Medellín, Origin and Destination

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

Algorithm Explanation



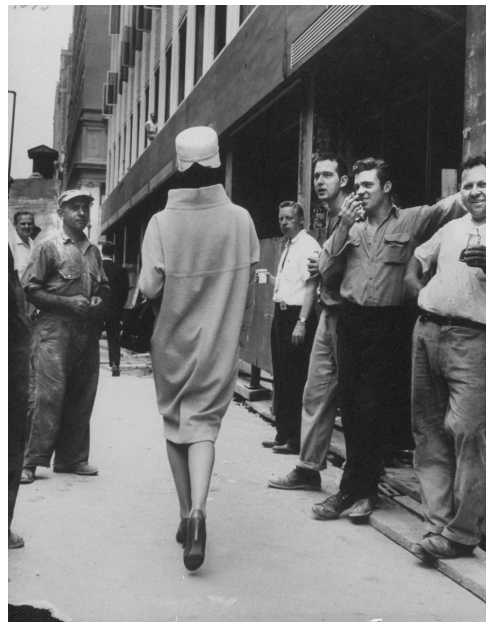
Example Execution:

Source = A
Destination = E
Max Risk = 0.5

Shortest path from A to E without exceding av. risk of 0.5
A -> C -> B -> E

Vertex	Shortest Distance from A	Prev. Vertex	Average Weighted Risk
A	0	-1	0
B	~~∞~~, 12	C	0.27
C	~~∞~~, 5	A	0.2
D	~~∞~~, ~~11~~, 10	~~A~~, C	~~0.4~~, 0.42
E	~~∞~~, 26	B	0.34
F	∞		

Queue: {~~A~~, ~~C~~, ~~D~~, ~~B~~, E}



Modified Dijkstra's Algorithm for the Constrained Shortest Path Problem