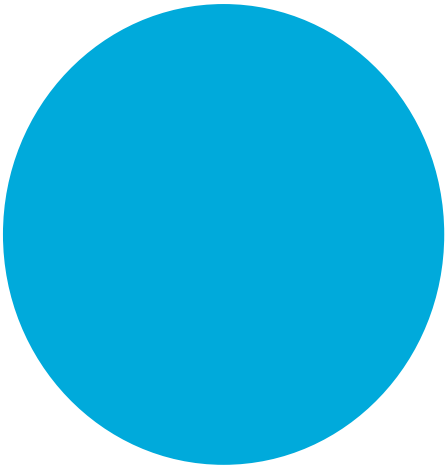


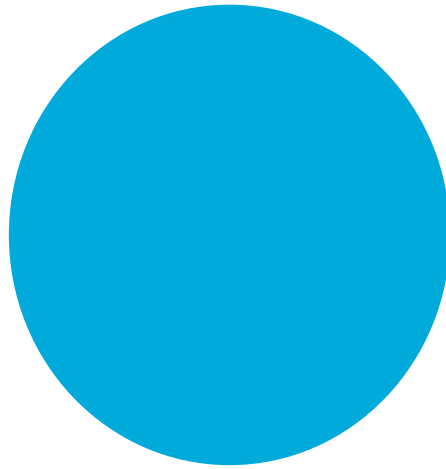


# SAFE AND FAST ROUTING FOR PEDESTRIAN

# Team presentation



**Isabela Osorio**



**Karol Cuello**



**Andrea Serna**  
Literature review



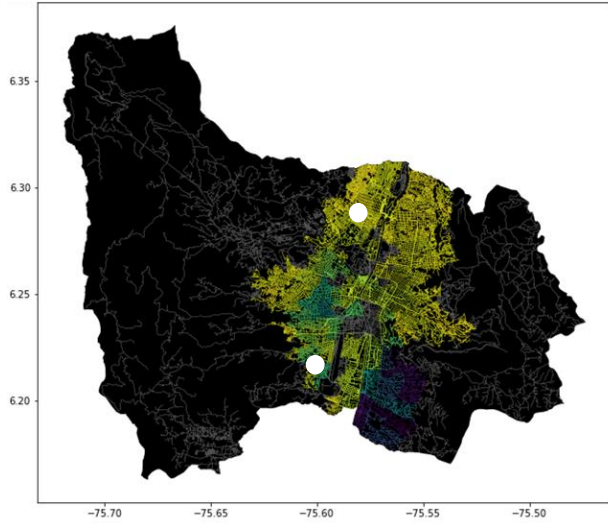
**Mauricio Toro**  
Data Preparation



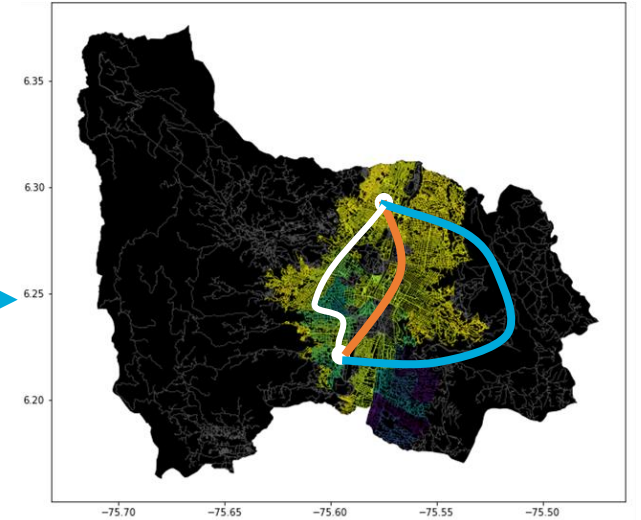
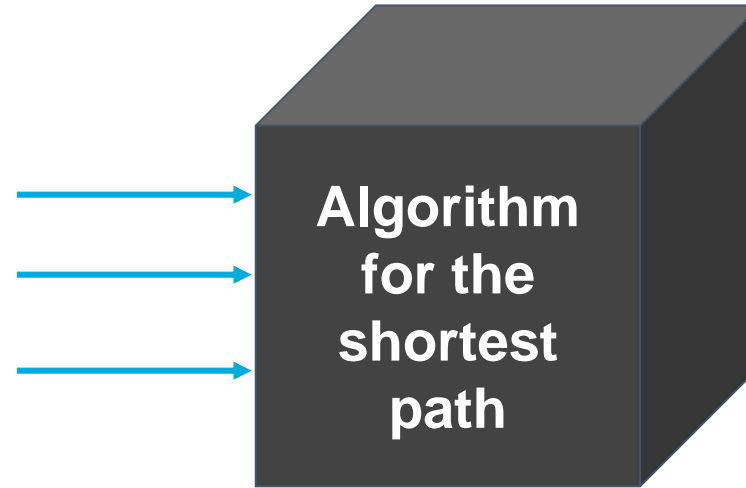
<https://github.com/kvcuellor/Proyecto-Datos-y-Algoritmos.git>



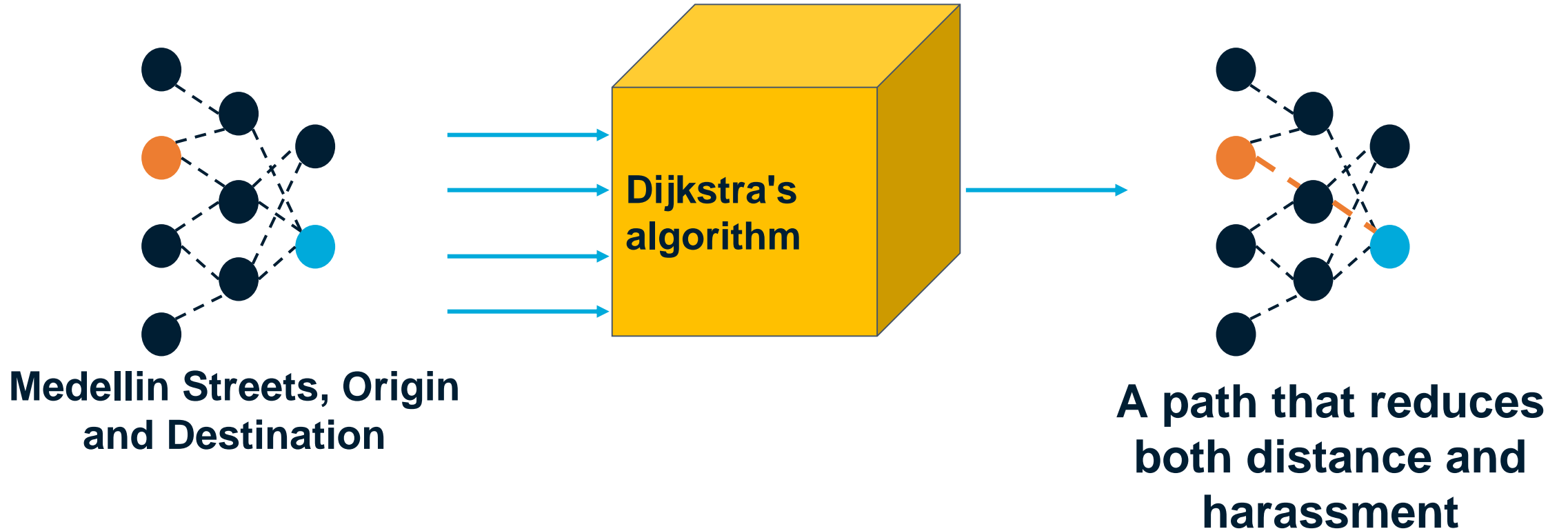
# Problem Statement



**Medellin Streets, Origin  
and Destination**

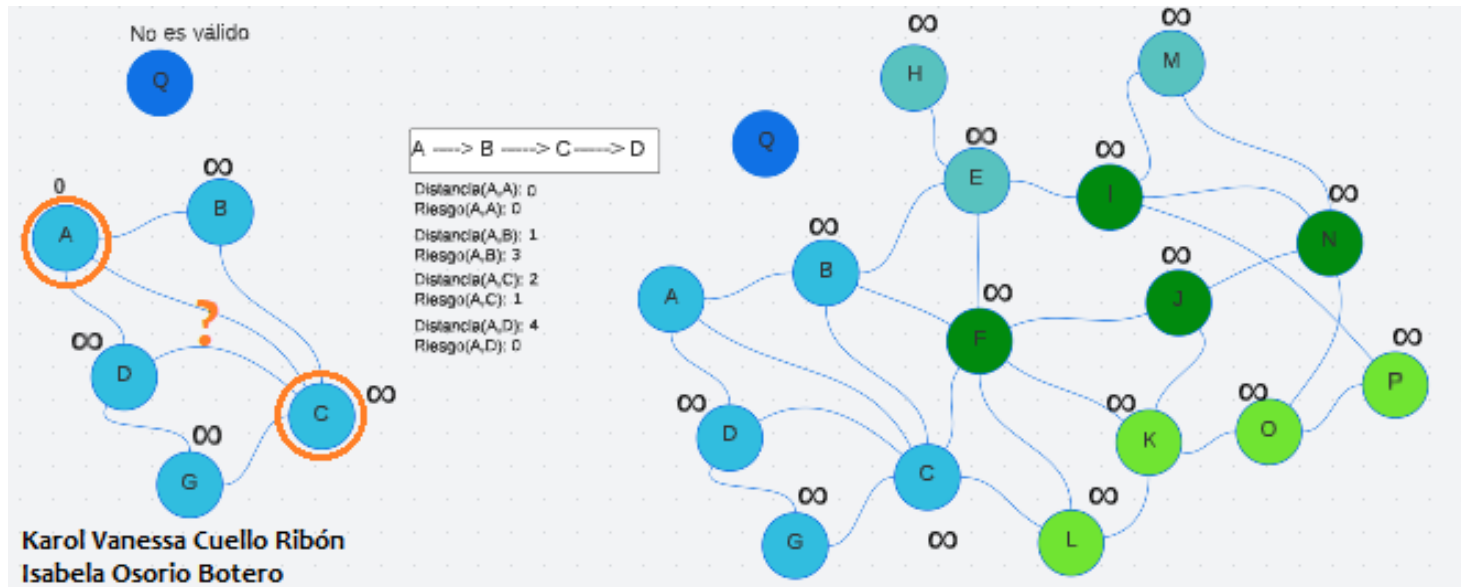


**Three paths that reduce  
both the risk of harassment  
and the distance**



# Algorithm explanation

Dijkstra's algorithm, to find the path that reduces both harassment and distance.



It starts by giving the “weights” a value of infinity and then begins to evaluate at each node looking for the lowest value to reach the destination, going through the graph moving through each of the nodes (which are taken with respect to the street address).

	Temporal complexity	Memory complexity
Dijkstra	$O(V^2)$	$O(V)$

Time and memory complexity of Dijkstra's algorithm.  $V$  represents the number of vertices or nodes.





## First path that minimizes $x = d+r$



Source	Destiny	Distance (meters)	Harassment risk (between 0 and 1)
Universidad EAFIT	Universidad de Antioquia	11305.436	0.7289

Distance and risk of harassment for the road that minimizes  $x = \text{distance} + \text{risk}$ . Execution time of 68 seconds.

## Second path that minimizes $x = d*r$



Source	Destiny	Distance (meters)	Harassment risk (between 0 and 1)
Universidad EAFIT	Universidad de Antioquia	16846.849	0.4864

Distance and risk of harassment for the road that minimizes  $x = \text{distance} * \text{risk}$ . Execution time of 71 seconds.



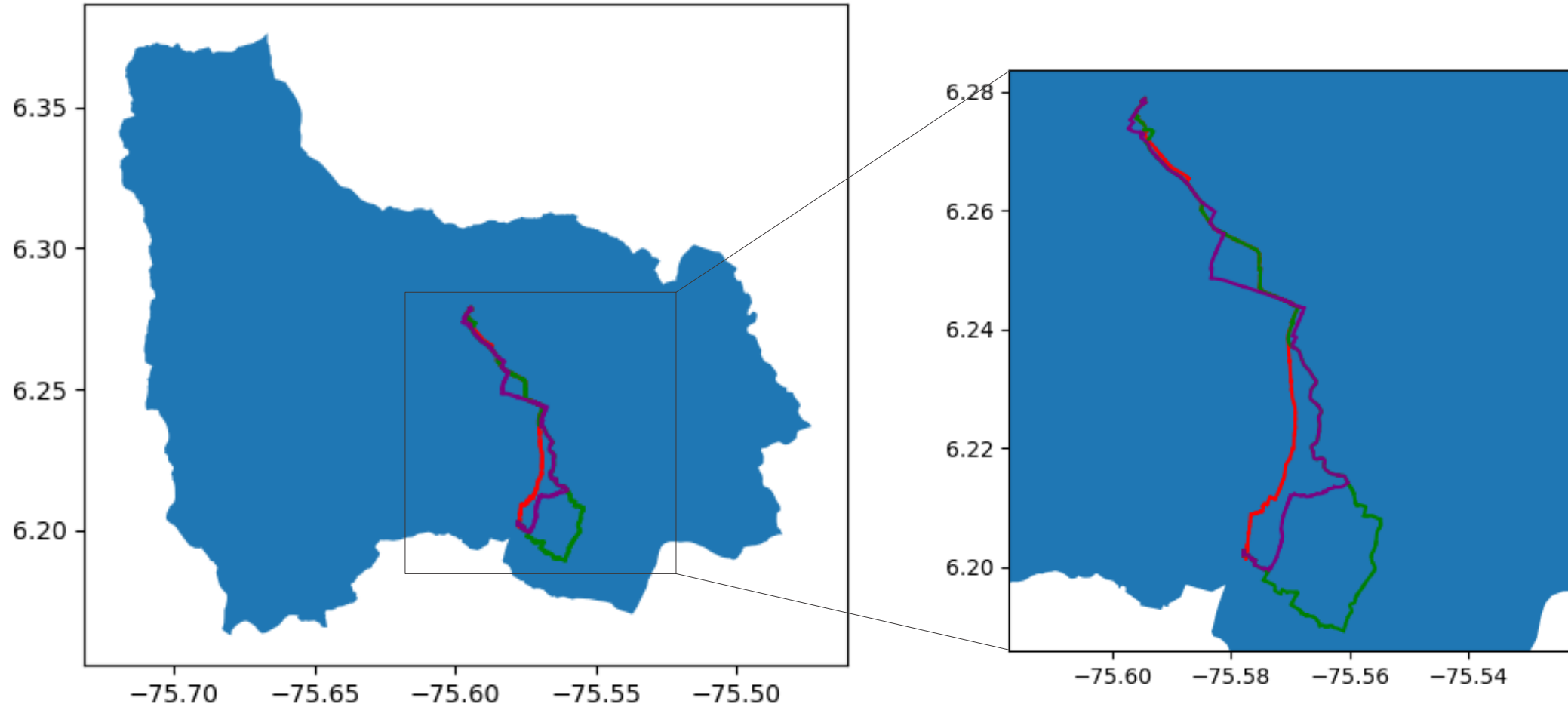
## Third path that minimizes $x = d + (r * 1000)$



Source	Destiny	Distance (meters)	Harassment risk (between 0 and 1)
Universidad EAFIT	Universidad de Antioquia	14210.585	0.5461

Distance and risk of harassment for the road that minimizes  $x = \text{distance} + (\text{risk} * 1000)$ .  
Execution time of 77 seconds.

# Visual comparison of the three paths



## Proyecto 1

• • • • •  
**Web Apps:** Since it loads on the web server and runs in the browser They are quite useful, works for all phones, no updates needed, they do not take up space unlike mobile apps, and they are also cheaper to develop.

## Proyecto 2

• • • • •  
**VR=** the two environments communicate and exchange information . The interface is a translator between the user and the virtual reality . If the user applies , the interface translates these actions.

## Probability Theory

• • • • •  
**Other risk estimates:** such as weather, vehicle traffic, time of day, etc. It helps us to make a more precise distribution of probability, to decide which risk prevails over the others.

## Optimization 1

• • • • •  
**Bi objective optimization:** Guarantees assertive decision making, thanks to human input (qualitative vision/knowledge).  
**Harvest Organization and analysis Tracing**



# ¡THANKS!

**With the support of**

The last two authors were supported by the Sapiencia scholarship, financed by the municipality of Medellín. The first two for the employee scholarship and the Andi scholarship, respectively, financed by the EAFIT University. All the authors thank the Vice-rector for Discovery and Creation, of the EAFIT University, for their support in this research.