

URBAN SPATIAL DATA ANALYSIS

Towards Safe, Inclusive, and Sustainable Spaces



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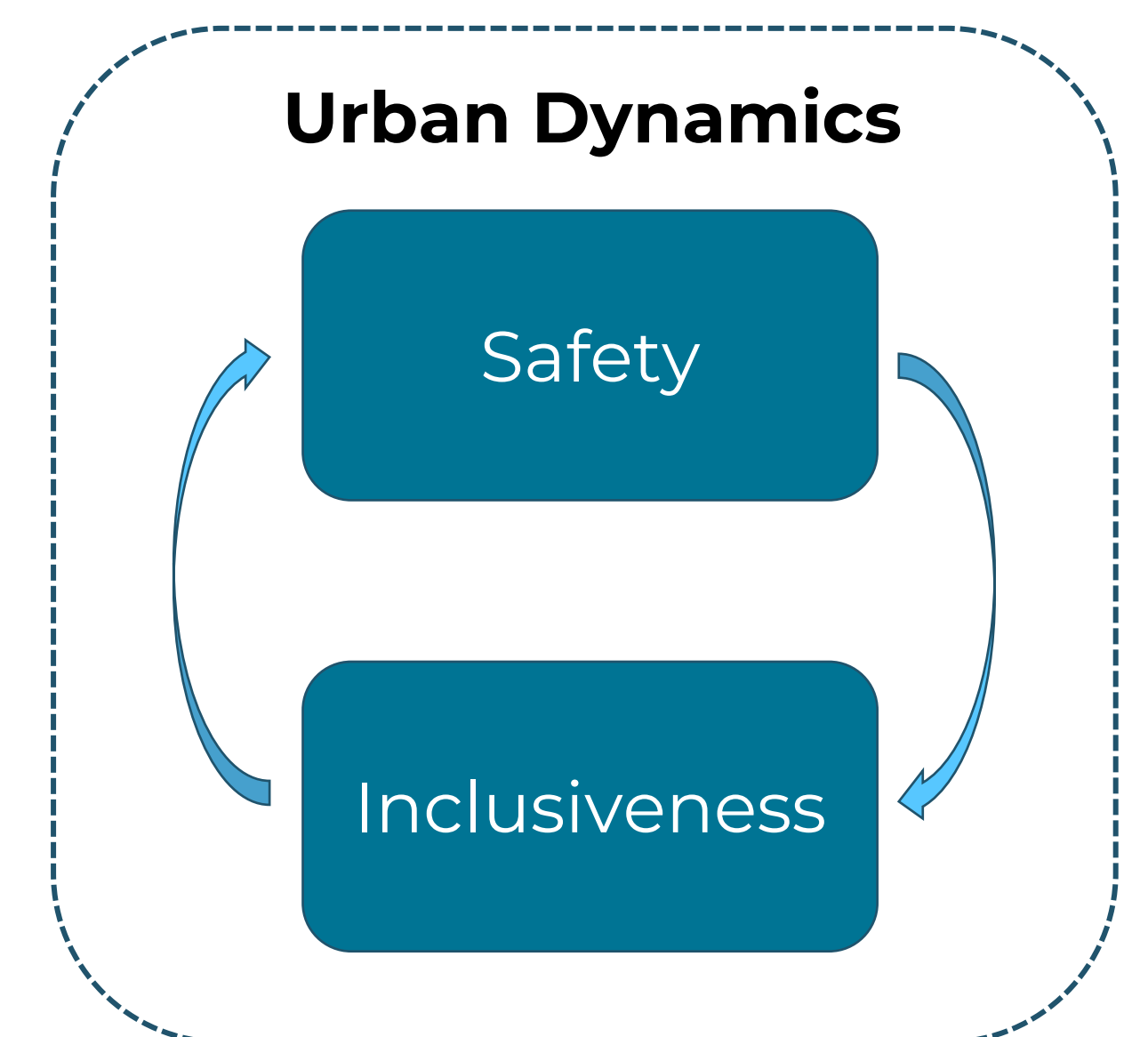
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Urban Spaces

Urbanization is one of the most important socio-economic phenomena. The urban growth and the demands for sustainable environments pose challenges to urban planners, mostly because they need to design the city in a way that responds to people's needs without compromising future generations. With the population increase in urban areas, it is important to guarantee that all zones are safe and inclusive for all citizens.

Understanding urban dynamics such as how people move, socialize, and interact across the different zones is of main interest to evolve and promote human livability. Through spatial data analysis, insights on how to create liveable cities can be taken and used to develop sustainable environments, with safe and inclusive spaces.



Objectives

This project focuses on discovering factors that impact the development of sustainable environments, mainly urban space dynamics, safety, and inclusiveness, through the analysis of spatial data.

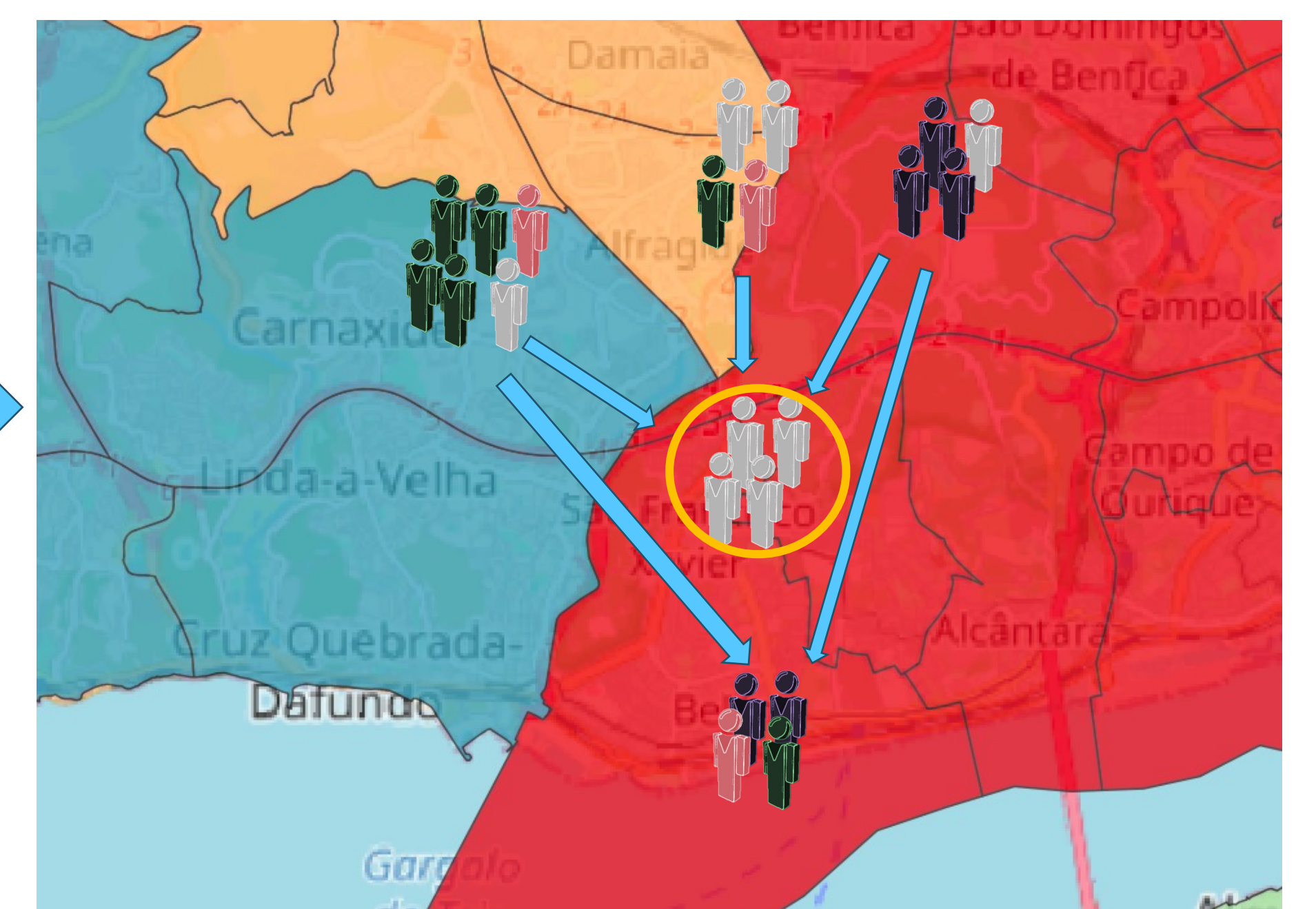
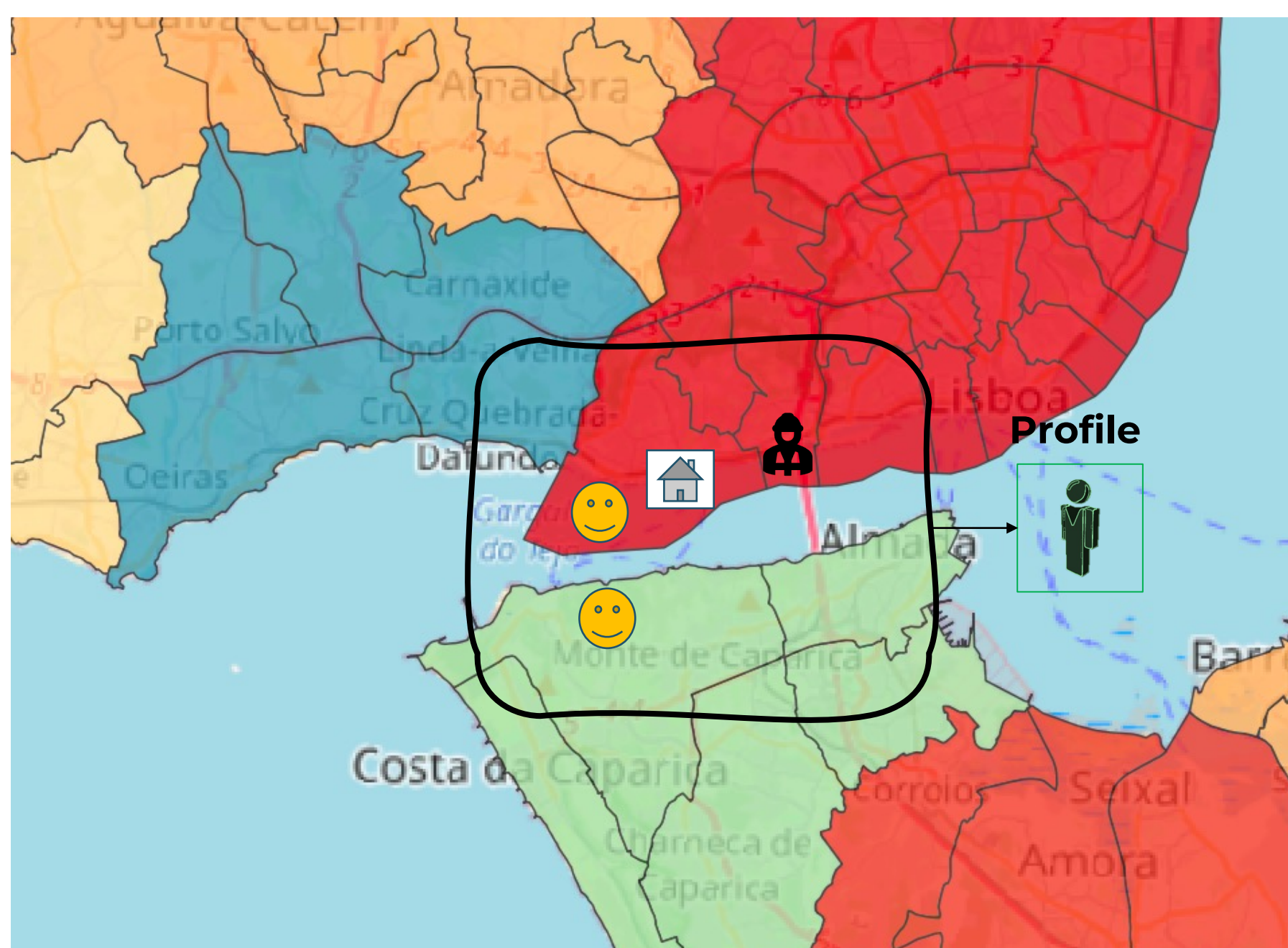
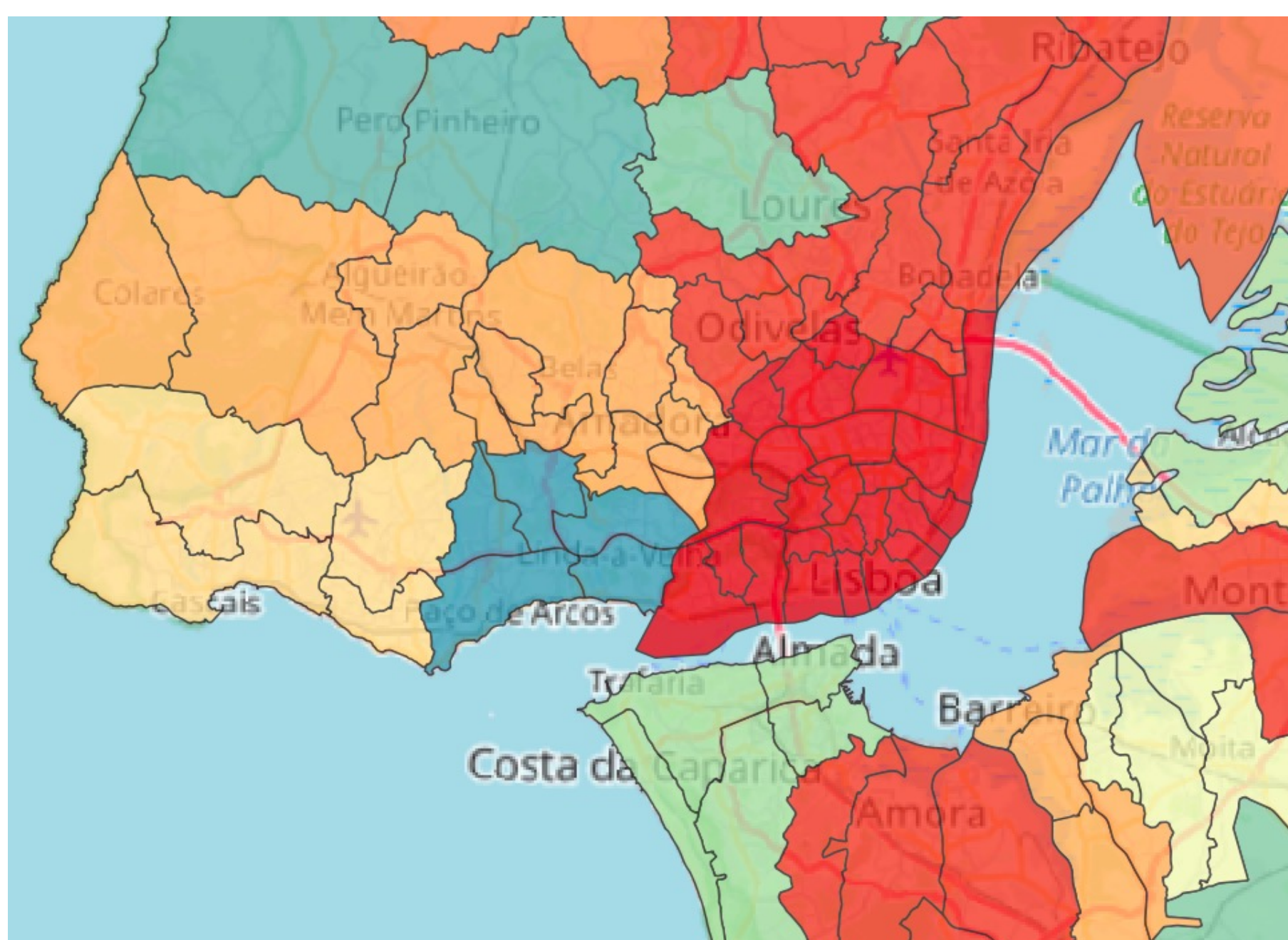
Spatial data, generated from mobile phones, represents most of the population groups and plays a crucial role in inferring human mobility and communication patterns. By fusing information of the semantics of the areas, (that characterize the city's areas), with mobile phone data indicating who frequents them and when, we can have a perspective on how people move and interact across the space and identify patterns of connectivity and zones that lack inclusiveness and safety.

Methodology

Identification of zones with different characteristics (socio-demographic, services, land use, crimes, etc.)

Profile generation according with frequently visited locations (mobile phone data - antenna level)

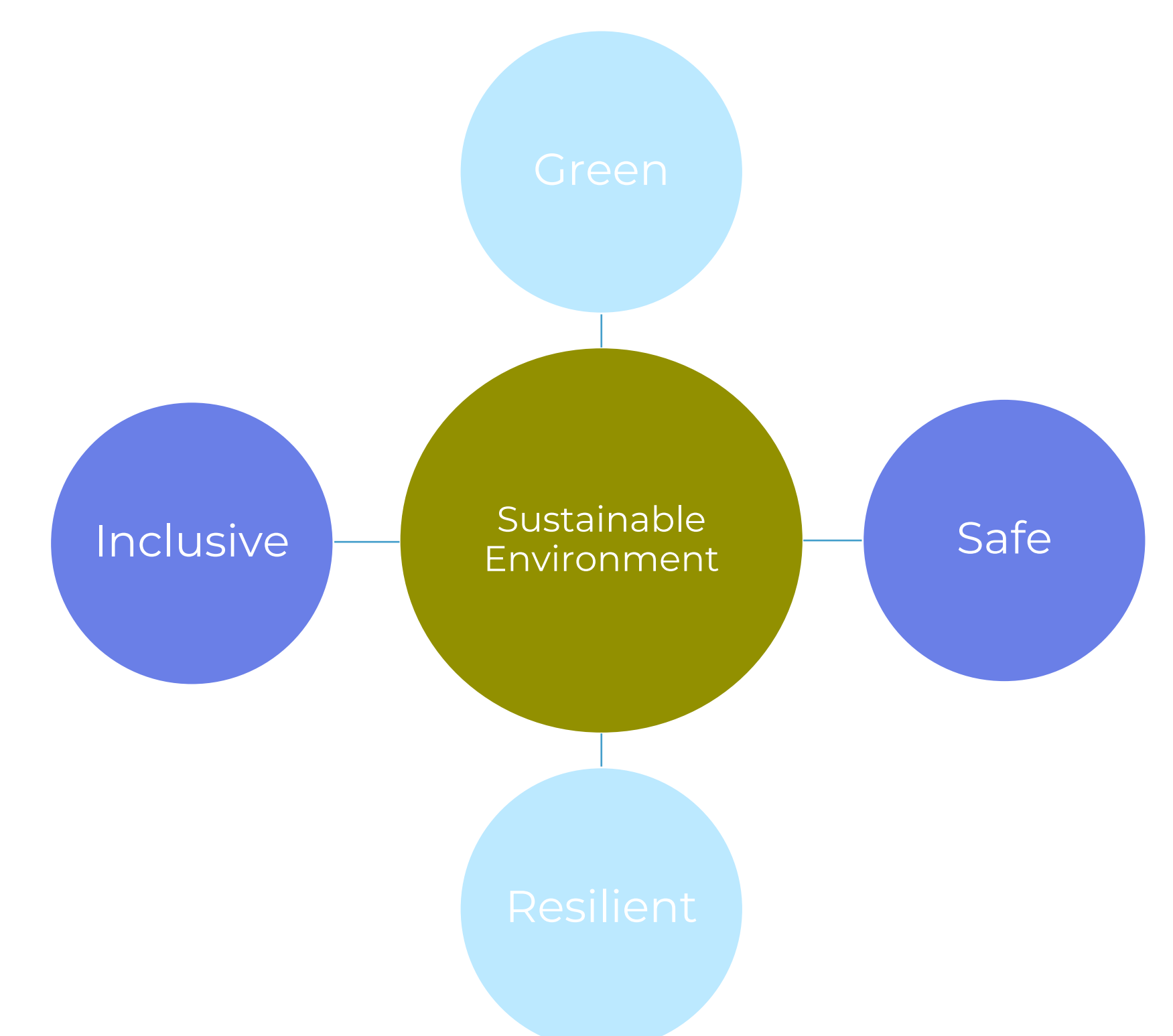
Identification of zones that lack inclusiveness mostly because of safety



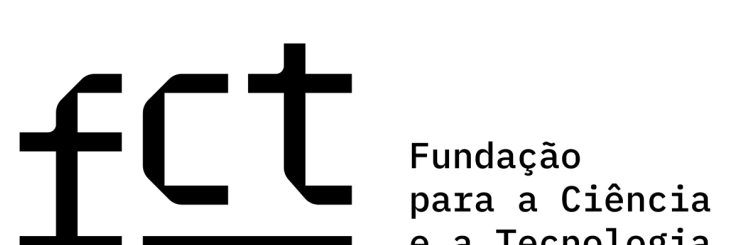
Results and Contributions

Modeling human mobility and homophily (how people move and interact) to understand individual patterns and movement flows in a city brings useful insights for a variety of applications, including urban planning and security. The population density and movements can reflect the dynamic development of a city, including its growth, land use, urban economic development, safety, and inclusiveness.

The identification of vulnerable areas in public spaces can be used to promote safety and inclusiveness actions. This information is valuable for decision-making, in order to prevent crime, avoid potentially isolated communities, and generally, improve the quality of living in urban areas. Additionally, the recognition of citizens' mobility patterns can be used to improve public transport and, therefore, reduce traffic congestion and environmental pollution, which are consequences of accelerated urbanization.



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