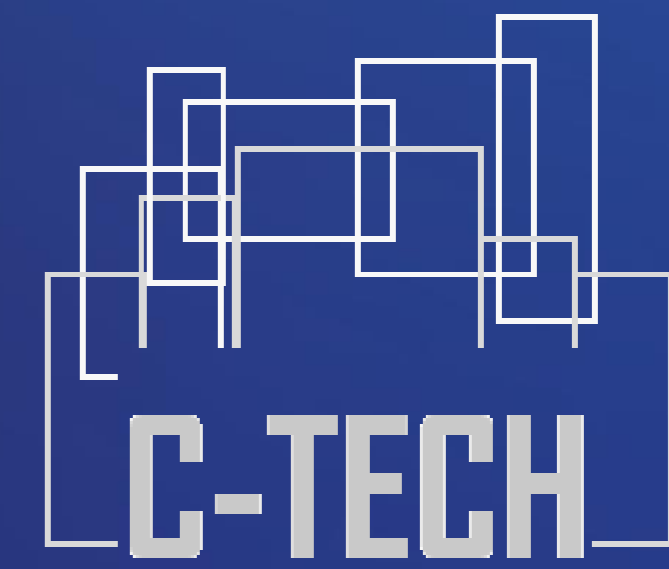


Point-level Walkability Score: Measuring the Associations between the Built Environment and Pedestrian Mobility



Climate Driven Technologies for Low Carbon Cities

Bruno Jardim

bjardim@novaims.unl.pt

Advisor: Miguel de Castro Neto

NOVA Cidade – Urban Analytics Lab¹

1. NOVA Information Management School

MIT Portugal

2022 Annual Conference

Abstract

- We present a **new microscale walkability indicator**, that provides a score of walkability for every one-meter street point.
- We evaluate the **association between walkability features and pedestrian data collected from georeferenced mobile phone communications**.
- The objective is to provide policy makers and urban planners with a **practical tool** to effectively **support the evaluation of current street conditions**, as well as **plan and gauge new local interventions**, while objectively understanding the **impacts on pedestrian mobility**.

Methodology

- Street Network** of the Lisbon parishes of **Beato, Marvila and Parque das Nações**, broken down into **one-meter equidistant points**.
- We collected **features** representative of the main **amenities** and **points of interest** and of the **conditions** and **accessibility** of the built environment.
- For each network point and feature, a **score is calculated** pondering the **number of feature locations** and their **distance** to the network point.

$$Feature\ Score_{if} = norm \sum_{k=1}^n \frac{1}{1 + \frac{D_{ik}}{d}}, D_{ik} \leq 1000$$

- Scores were calculated for all features and summed, creating the **Walkability Score**.

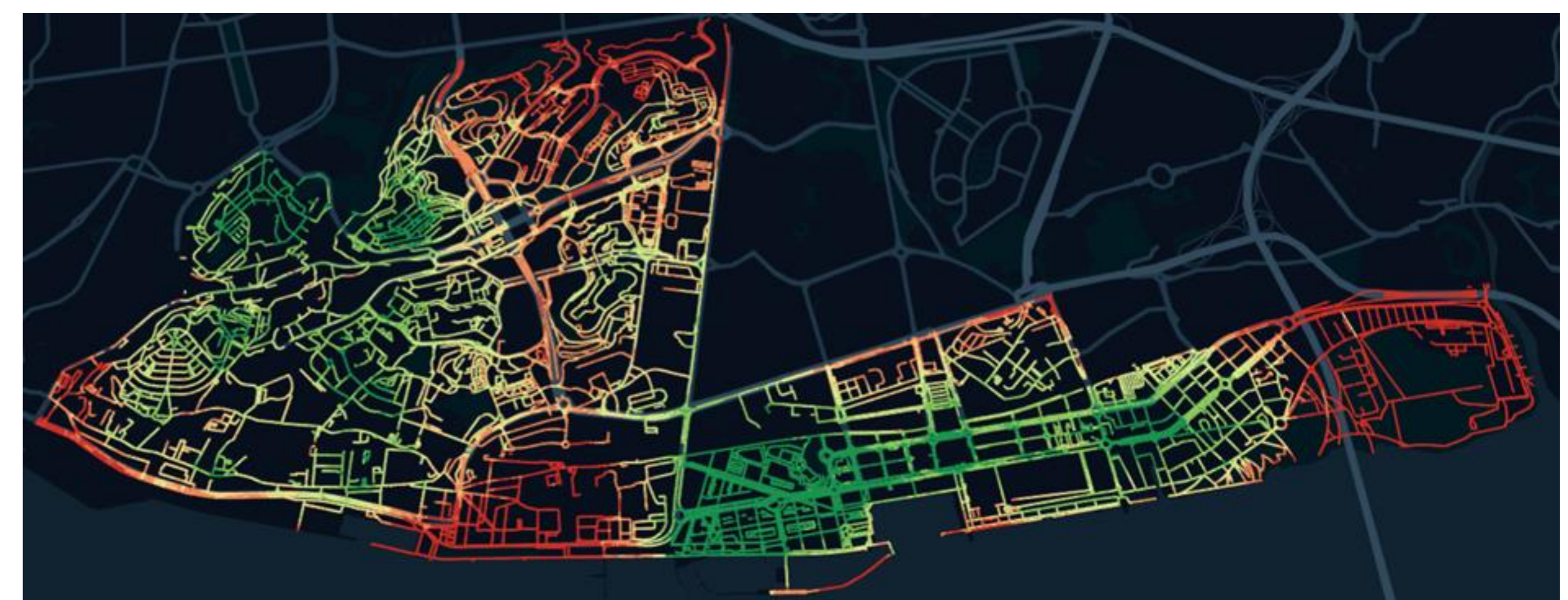
$$Walkability\ Score_i = norm \sum_{f=1}^m (feature\ score_{fi})$$

- Anonymized **data regarding mobile phone communications** was provided by NOS for **one week of March 2022**.
- We calculate a **Pedestrian Score**, based on a distance score between communication locations and a road network point.

$$Pedestrian\ Score_i = \sum_{j=1}^n \frac{1}{1 + \frac{D_{ij}}{50}}, D_{ij} \leq 400$$

Results

- The **mean** of the Walkability Score is **0.57** and the **standard deviation** is **0.19**.



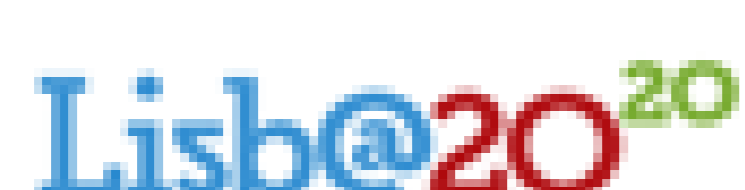
- Through **regression**, we study the **association between walkability and pedestrian flow**.

Model	R ²	Variable	Coefficient
Workdays	0.33	Commerce	0.34
Weekend	0.53	Subway	0.17
		Trees	0.13
		Crosswalk	0.02
		Public Intervention	-0.15



- A dashboard² was developed to display the results and **simulate the impact of changes in the built environment** to the **Walkability Score**.

Co-funded by:



Under the Flagship Project: C-TECH | Sustainable Cities

² – Results available in: <https://ctech.novaims.unl.pt>