Measuring accessibility and assessing the feasibility of a 15-minute city

WORKSHOP DAY 2

Cummulative Opportunities

- One of the simplest accessibility measures
- They count the number of opportunities reached within a given travel time
- Distance can also be used but less common
- We need to decide:
  - Cut-off time: 15 min, 20 min, 30 min
  - Transport mode: walk, cycle, transit, bus, car…

Main links

- https://github.com/jxbarros/15mC_Workshop/
- https://github.com/ipeaGIT/r5r

README License

r5r: Rapid Realistic Routing with R5 in R

CRAN 2.0 | downloads 917K | R-CMD-check passing | codecov 93% | lifecycle maturing

DOI 10.32866/001c.21262

r5r is an `R` package for rapid realistic routing on multimodal transport networks (walk, bike, public transport and car). It provides a simple and friendly interface to R^5, the Rapid Realistic Routing on Real-world and Reimagined networks, the routing engine developed independently by Conveyal.

r5r is a simple way to run R^5 locally, allowing `R` users to generate detailed routing analysis or calculate travel time matrices and accessibility using seamless parallel computing. See a detailed demonstration of `r5r` in the intro Vignette. More details about **r5r** can be found on the package webpage or on this paper. Over time, `r5r` might be expanded to incorporate other functionality from R^5.

This repository contains the `R` code (r-package folder) and the Java code (java-api folder) that provides the interface to R^5.

Installation

You can install `r5r`:

```
# from CRAN
install.packages("r5r")

# dev version with latest features
utils::remove.packages('r5r')
devtools::install_github("ipeaGIT/r5r", subdir = "r-package")
```

Data requirements

To use r5r, you will need:

- A road network data set from OpenStreetMap in .pbf format (mandatory)
- A public transport feed in GTFS.zip format (optional)
- A raster file of Digital Elevation Model data in .tif format (optional)

To measure accessibility you also need data on your opportunities.

These can be jobs, schools, health facilities, shops…

London tutorial – data

When calculating travel times with r5, you typically need the following datasets:

- **Road network dataset from OpenStreetMap (OSM):** used for routing of walking, cycling and driving trips, as well as access to public transport stations and stops. This data is used for finding the fastest routes and for calculating the travel times based on walking, cycling and driving. In addition, this data is used for walking/cycling legs between stops when routing with transit.
- **A transit schedule dataset in General Transit Feed Specification (GTFS.zip) -** This data contains all the necessary information for calculating travel times based on public transport, such as stops, routes, trips and the schedules when the vehicles are passing a specific stop.
- **General Transit Feed Specification (GTFS) format:** It a format for public transportation schedules and associated geographic information. Typically contains information on public transport schedules, including times and stops.

  GTFS is not actually a file format but a standardised format for information to be presented in txt files that can be read easily and combined with the transport network

  Typically a GTFS dataset is a set of txt files. See examples at https://developers.google.com/transit/gtfs/examples/gtfs-feed

  More information at https://developers.google.com/transit/

- **Data for origin and destination locations**

In addition to OSM and GTFS datasets, you need data that represents the origin and destination locations (OD-data) for routings.

- **Origin-Destination (OD) from UK Census** (MSOA level): used to obtain the number of jobs available in each MSOA

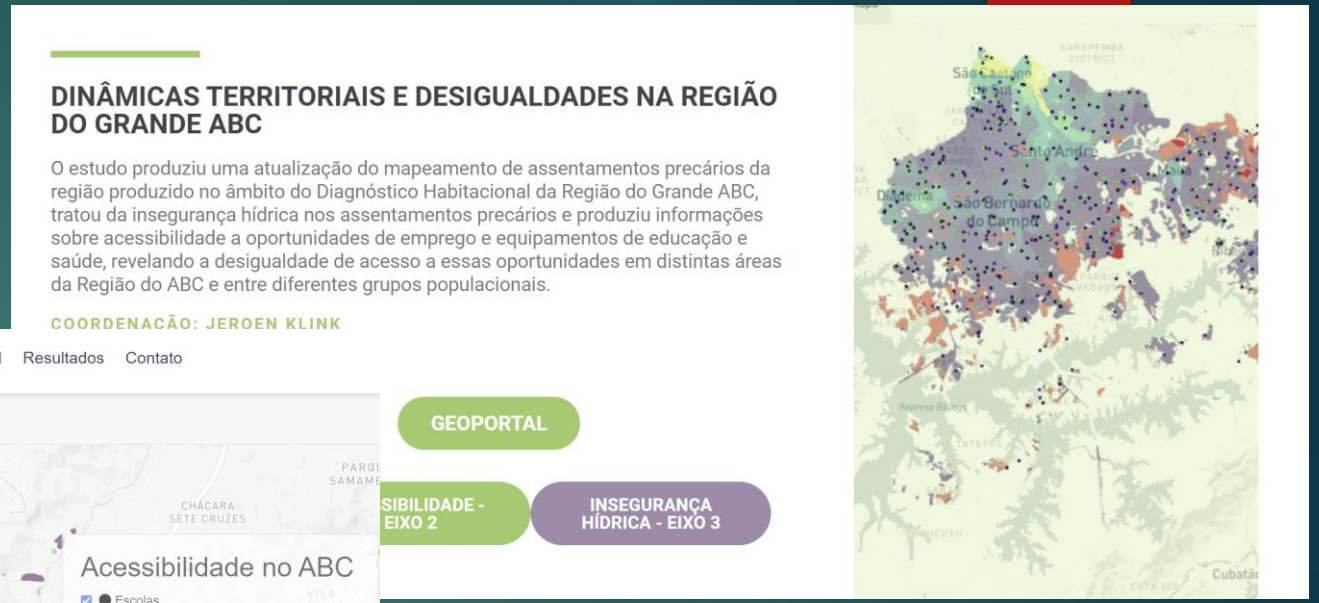
Optional data (not used in this tutorial): terrain

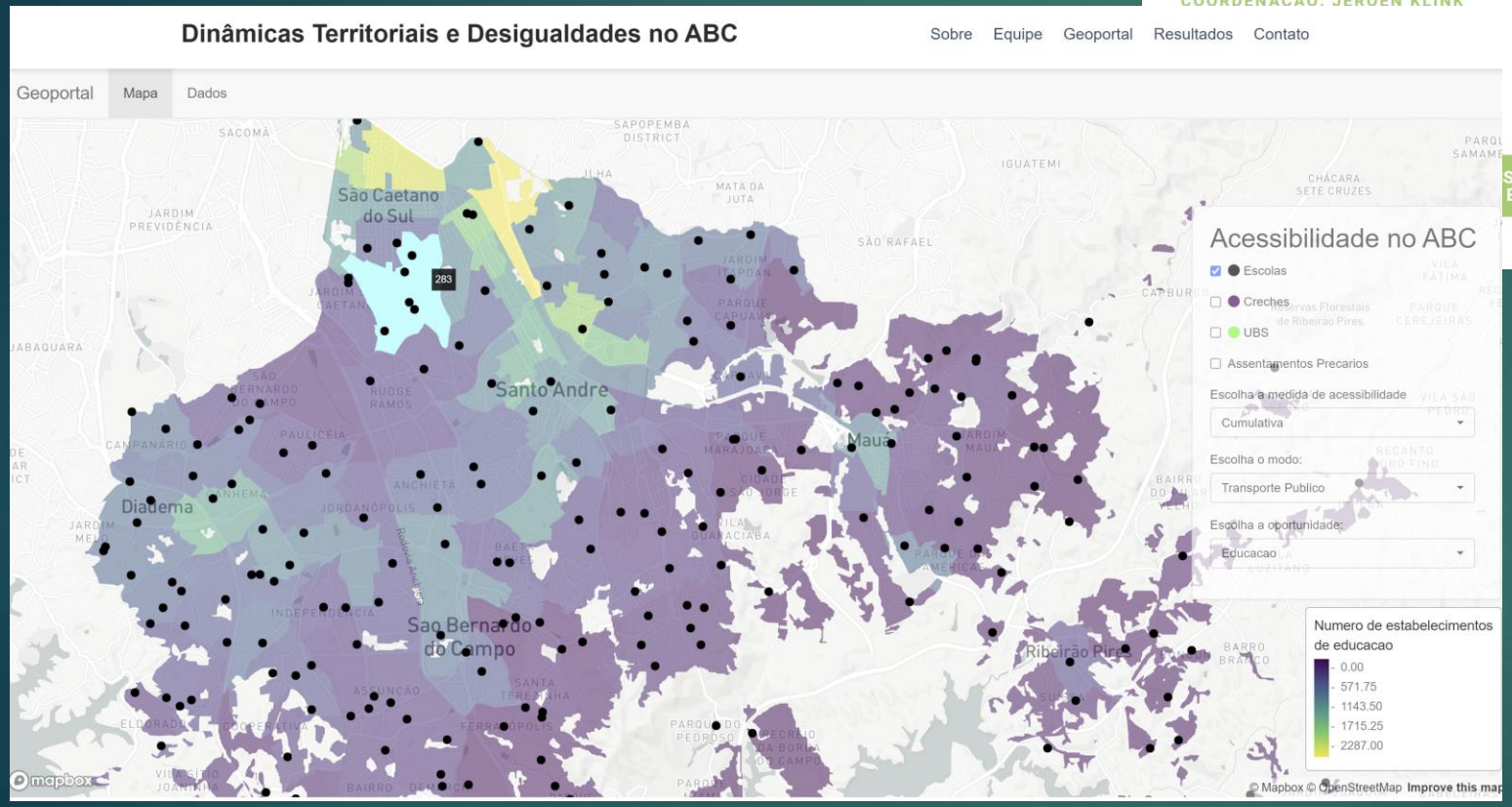
ABC – parameters to ‘play with’

- Cutoff times
- Opportunities: schools, healthcare
- Travel mode: walk, walk/transit, bus, car

https://ipeagit.github.io/intro_access_book/pt/

Accessibility ABC





https://edc77e.a2cdn1.secureserver.net/wp-content/uploads/2022/12/Eixo-02_Feitosa-et-al._Acessibilidade-a-Empregos-Saude-e-Educacao-na-Regiao-do-ABC.pdf

https://dinamicas-territoriais-abc.netlify.app/geoportal/geoportal/

Other links

OSM dataset https://mobilitydatabase.org/ -

GTFS catalogue https://access-ucl.readthedocs.io/en/latest/ -

Tutorial- https://citygeographics.org/r5r-workshop/r5r-workshop-introduction/ -

Workshop https://findingspress.org/article/21262-r5r-rapid-realistic-routing-on-multimodal-transport-networks-with-r-5-in-r

https://ipeagit.github.io/intro_access_book/ Rafael's book.