Recommending Green Routes for Pedestrians to Reduce the Exposure to Air Pollutants in Barcelona

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Pedestrians are Heavily Impacted by City Air Pollution

- *Poor air quality* in urban areas can lead *respiratory* and *cardiovascular diseases*
- *Pedestrians* are the *most exposed* individuals among those who commute in a city
- Can we *reduce the exposure* to air pollutants by walking greener routes?

Potential Users of Our Green Routes Prototype

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even if I have to take a little detour?

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Main Features of Our Green Routes Prototype

- We recommend routes that *minimize* the *exposure* to air pollutants
- We consider *historical* Air Quality Index (AQI) data by Barcelona's city council
- We consider *real-time* AQI data from Barcelona's sensors (only 7 in the city)
- We account for low-resolution data with our *GNN algorithm* (Calo *et al.*, 2024)

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System Architecture

Hi-Res Historical Air Quality Data

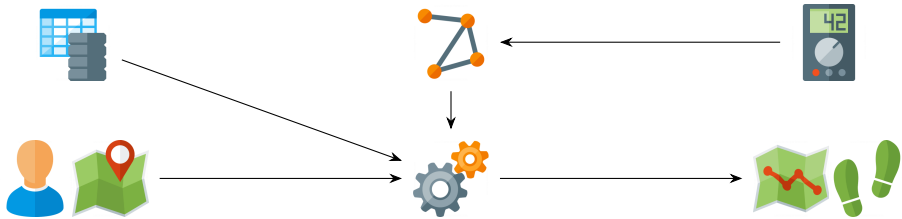
(Open Data BCN)

Our Air Quality Data Reconstruction Algorithm

(Calo *et al.*, Graph Neural Network)

Low-Res Real-Time Air Quality Data

(Barcelona's Sensors API)



Input Locations

(OpenStreetMap API + `osmnx`)

Routing Algorithm

(`networkx`)

Green Route

(`plotly`)

Takeaway Message: Green Routes are Good!

- Tests with *Barcelona*'s NO_2 concentration data result in a median reduction of -7.23%
- *Encouraging* results have also been obtained in *London*, *California*, and *Melbourne*
- *Green routes* can be a simple, yet very effective solution to *improve citizens' health*