PUBLIC HEALTH AND THE CITY:

A COVID-19 THEMED ROUTE PLANNER

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INTRODUCTION

The COVID-19 pandemic has had an impact on human mobility, especially in dense urban areas. In order to minimize the risk of contagion, people are advised to maintain a distance of 1.5 meters to each other. This is not always an easy task, especially as a pedestrian in a crowded public space. At the same time, sensor-based IoT technologies are increasingly used to collect data in cities.

OBJECTIVES

- build navigation web application that suggests alternative walking routes along less crowded areas
- base navigation on near-real time data
- use open source software

METHODOLOGY

Data: Melbourne pedestrian count API (66 sensor locations, 1 minute update frequency)
Street network obtained from OpenStreetMap via OSM2PO

Data analysis: ordinary kriging (R packages gstat/automap)

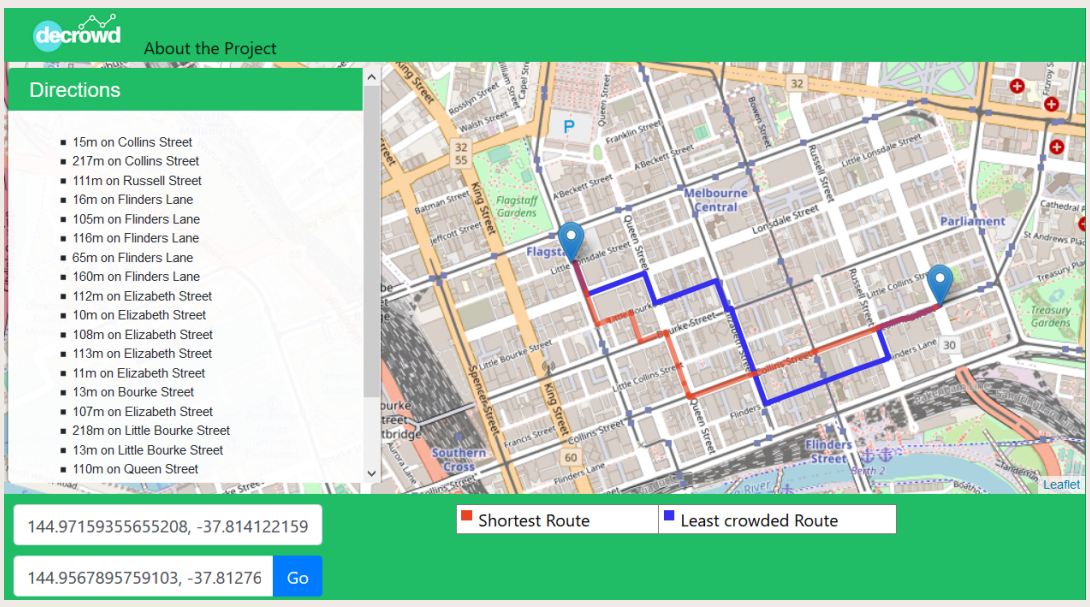
Back-end: simple client-server architecture with node.js & PostgreSQL/PostGIS

Routing: pgRouting on OSM data using Dijkstra's shortest path

Front-end: responsive bootstrap website for browsers with Leaflet for web mapping

RESULTS

- Web mapping application that displays both shortest and least crowded routes
- Directions for the least crowded route shown in sidebar
- User input by dragging markers
- Quick route calculation (<1s)
- Slow network recalculation (40s)
- Least crowded route usually longer than shortest route
- No difference when the shortest route does not pass nearby sensor



CONCLUSION

- Data collected by IoT sensors can help in mitigate infection risk during pandemics
- There is powerful open source software available to turn these data into useful applications
- Future research: more sophisticated models like anisotropic or regression kriging

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