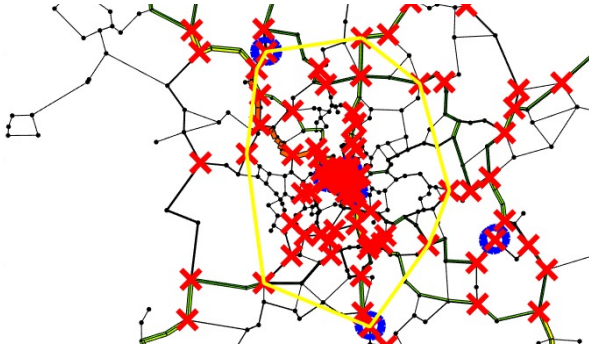
How big is too big? Should we keep traffic away from dense city centres?



Problem description

Major cities worldwide are gradually revising their mobility plans, attempting to reduce the amount of private transportation that can access their innermost core. This trend is expected to improve liveability, reduce pollutant emissions and foster the adoption of Public Transportation.

In cities like London, Milan, Stockholm, etc., congestion charging has been introduced so to disincentivise driving through the cities' cores, and instead invite travellers to park their cars at a location outside the centre and proceed by Public Transportation. The congestion charging gates act as a (pay-to-enter) geofence, which effectively separates the city into multiple areas.

Recent research has established a link between how effective traffic control in city-like environments can be and the geographical spread and organisation of the individual controlling entities (e.g. Traffic Light controlled intersections), highlighting how controllers tend to organise themselves in 'structural geofences', surrounding the city's most vulnerable areas.
Continuing this research, in this thesis you will investigate i) if these theoretical results hold for a number of real-life road networks and ii) if there is a dependency between how dense and large city centres are and the formation of structural geofences.

Assignment

- Develop a bespoke algorithm to detect traffic controller locations forming a structural geofence.
- Investigate the shape / size / existence of structural geofences as a function of network density & demand, considering increasingly complex real life networks.

Candidate

- Should have ample coding skills in MATLAB
- Should be comfortable with working with geospatial data (Open Street Map data extraction & import)

Research group

Departments: Transport & Planning department (CEG)

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TBD (AMS Institute participation)