Defining *spatial closeness* with commuter flow rates

Leveraging 2011 UK Census data for spatial regression modeling

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I work with Bayesian spatial CAR models to investigate the socioeconomic forces underlaying the results of recent contentious UK popular referenda at the local authority district (LAD) level.

- SOP of defining *closeness* by border contiguity misses two facts
    - Borders are often drawn to mirror physical barriers
    - Modern transit allows people to travel great distances regularly
- *Proposal* for adjacency weights matrix: W_{ij}
    - $w_{ij} = \%$ of residents of district i that work in district j
    - $\tilde{w}_{ij} = \%$ of workers in j that reside in i
    - $W_{ij} = \max\left(w_{ij}, \tilde{w}_{ij}\right)$

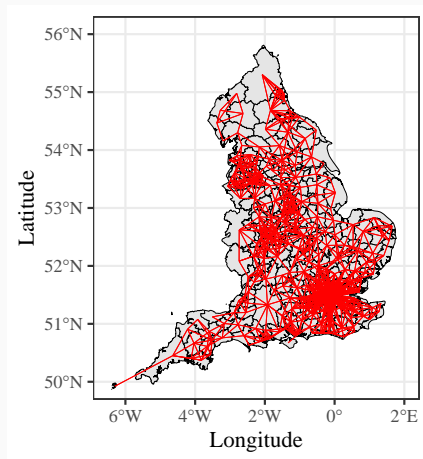One can still force W to be *symmetric* and/or have *binary* weights.

Figure 1: The grey polygons represent the 326 LADs in England. The red lines represent the 3286 unique links between districts with $W_{ij} > 0.015$ with the line thickness being related to the entry's weight value.

Resources

- R packages used: `sf, spdep, tidyverse, STAN, CARBayes`
- Open data from across UK government: ONS, HMRC, etc
- Github repository: link
- Email address: mtwest2718@protonmail.com
- Twitter handle: westbynoreaster

Any Questions?

- And do NOT think about the EVENT!!!