Geographic Data Science

Spatial Data

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Data, data, data

- Everything produces data
- New dense quantitative representations of the world
- But data is not useful, insights are

Data Science

"gathering data messaging it into a tractable form, making it tell its story and presenting that story to others"

Loukides (2011) What is Data Science?

Spatial Data Science

- A lot of new data is spatial data
- Spatial is special
- We don't want to reinvent the GIS wheel
- How do we bring both world together?

Good old spatial data (+)

Good old spatial data (+)

Traditionally, datasets used in social sciences are

- Collected for the purpose (carefully designed)
- Detailed and informative ("rich profile and portraits of the country")
- High quality

Good old spatial data (-)

But also

- Massive enterprises (very costly)
- Coarse in resolution (to preserve privacy they need to be aggregated)
- Slow the more detailed, the less frequent they are available

Examples

- Decennial census (census geographies)
- Longitudinal surveys
- Custom collected surveys, interviews etc.
- Economic or well-being indicators

New Forms of spatial data

New Forms of spatial data

Tied into the geo-data revolution

- Accidental : created for different purposes but available for analysis as a side effect
- Very diverse in nature: resolution and quality but, potentially much more detailed in both space and time

We will look at this more in a few weeks!

Lazer & Radford (2017)

- **Digital life**: digital actions (Twitter, Facebook, WikiPedia...)
- Digital traces: record of digital actions (CDRs, metadata...)
- Digitalised life: nonintrinsically digital life in digital form (Government records, web...)

Arribas-Bel (2014)

Three levels, based on how they originate:

- Bottom up: "Citizens as sensors"
- Intermediate: Digital businesses/businesses going digital
- Top down: Open Government Data

Opportunities (Lazer & Radford, 2017)

- Massive, passive
- Nowcasting
- Data on social systems
- Natural and field experiments ("always-on" observatory of human behaviour)
- Making big data small

Challenges (Arribas-Bel, 2014)

- Bias
- Technical barriers
- Methodological "mismatch"

All maps are wrong

All maps are wrong



Tell your neighbour how maps can lie.

All maps are wrong



Linking Spatial Info



Linking Spatial Info



Coordinate Reference Systems

Coordinate reference systems provide the context of coordinates:

- They tell whether the coordinates are ellipsoidal (angles), or derived, projected (Cartesian) coordinates
- In case they are projected, they detail the kind of projection used, so that the underlying ellipsoidal coordinates can be recovered

Coordinate Reference Systems

- Convert between projected and unprojected, or to another projection
- Transform from one datum to another
- Combine the coordinates with any other coordinates that have a coordinate reference system

Have a better look at the concepts page

Questions



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