{Geospatial Analysis with SF}

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01 {

  (Geospatial Analysis)

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What is Spatial Data?

All data are spatial - data comes from observations which happen *somewhere* and at *some time*.

- If a person tests positive in Covid, the location of testing may not be important for the person's decision on whether to go into quarantine or not.
- However, for someone trying to do contact tracing, the person's location history may be most relevant.

For spatial data, we mean data for which spatial locations are known, and for which they play a role in the exploration, analysis or visualization of the data.

What is Geospatial Analysis in R?

In essence, geospatial analysis is a multidisciplinary approach that uses analytical methods, spatial data, and visualisation to obtain profound insights.

Significance:

- Provides an overview of real world situations
- Expands our understanding of spatial data and its impact

Applications:

- Useful in diverse sectors: urban planning, environmental, and public health
- Facilitates problem-solving and decision-making in geographical contexts
- Assists experts in addressing spatial issues such as efficient land use, climate change analysis and tracking disease outbreaks and reaching well-informed conclusions

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02 {

  (The 'SF' Package)

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What is the SF package?

R has developed into a powerful tool for geospatial analysis due to its many packages and libraries available for processing and analysing geographical data
One of its useful packages is the ‘sf’ package that specializes in working with spatial data

The ‘sf’ package, an acronym for “simple features” is essential for working with spatial or geographical data.

Capabilities:

- Handling
- Analyzing
- Visualizing

Significance:

- Facilitates data analysis, visualization and mapping

Applications:

- Urban planning, environmental studies, public health
- Analysts, decision-makers, and researchers

Core Features of ‘sf’

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Data Manipulation

(Preparing and structuring spatial data, conducting analyses and creating visualizations. Fundamental step in the geospatial analysis workflow.)

Visualization and Mapping

(Creating graphical representations of geographic data to convey and comprehend spatial relationships, patterns, and insights.)

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03 {

  (Case Study)

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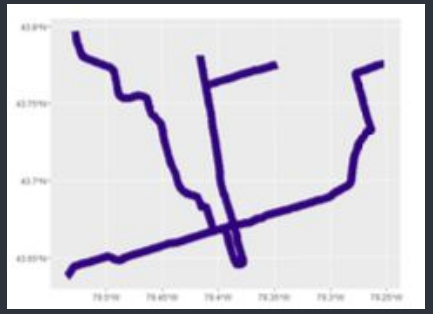
Urban Planning with ‘SF’ {

(A city planning for new public transportation routes to improve connectivity)



Workflow

* **Data preparation**: importing road, land and demographic data
* **Data Manipulation**: filtering and cleaning data to narrow down on relevant areas
* **Spatial Analysis**: spatial joins to determine the locations with high population and poor access to transportation
* **Geospatial Visualization**: creating maps to visualize results

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Urban Planning with 'SF' {

SF Functions

* **st_read()**: used to read and import data from files and datasets into R for geospatial analysis.
  - Importing and reading geospatial data related to existing infrastructure
* **st_buffer():** makes a polygon that, within a specified distance, encompasses all of the geometry's points.
  - Identify buffer zones around routes to evaluate proximity to key areas of the city and potential impacts on surrounding areas.
* **st_intersection():** creates geometry between shared points.
  - Identify areas where transportation routes cross through densely populated areas to enhance connectivity.

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Getting started with ‘SF’

- [R for Spatial Data Science]
- [GeoData and Spatial Data Analysis with R | Data Science Summer School]
- [Geospatial Data Wrangling with R]

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{THANK YOU}

Any
Questions?