# Interactive Maps

## ENVS456 – week 4
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# Agenda

- Interactivity
- Interactive (Web) Maps
- Interactivity building blocks

# Design Principles

- Legibility: Maps should be clear and straightforward
- Accuracy: maps should be a consistent representation of reality.
- Aesthetic Appeal: visually engage the audience

Important: Sourcing

# Interactivity

# Interactivity: *What*

- Ability to dynamically modify a visualisation

- Action/response as part of the experience

*"[…] two-way flow of information, […] responding immediately to the latter's [user's] input"* ([Oxford English Dictionary](#))

# Interactivity: *Why*

- Cause the view to change.
- Support investigation at multiple levels of detail.
- Expand the capabilities of vis (many idioms depend on it).
- Handle complexity (Munzner, 2014).

# Interactivity: *When*

- Too much to visualise all at once
- Both "big picture" and "detail" matter

*"[when] seeing the dataset structure in detail is better than seeing only a brief summary of it"*
Munzner (2014)

# Interactive (Web) Maps
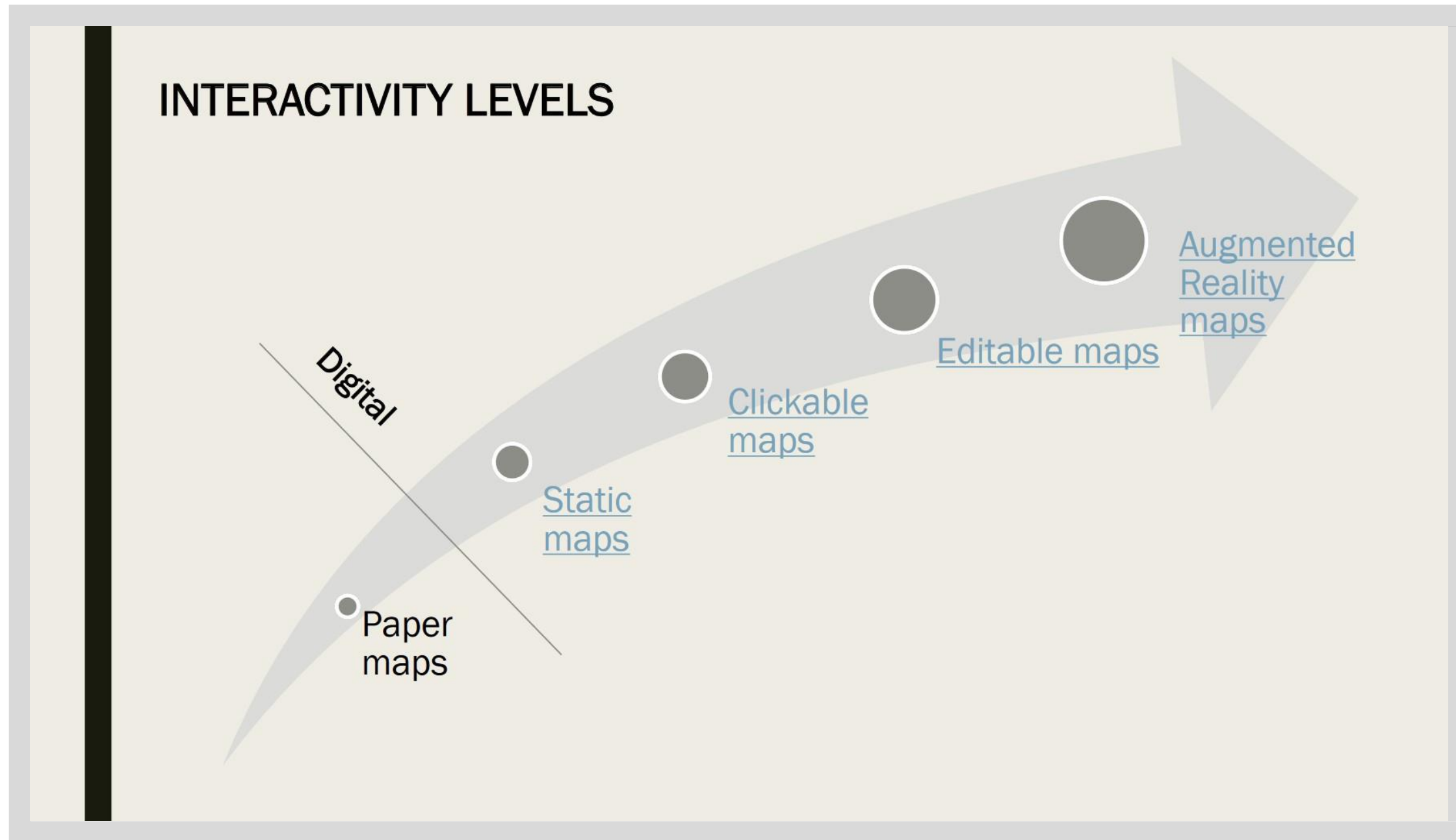
# Interactive (Web) Maps



**INTERACTIVITY LEVELS**

Digital

Augmented
Reality
maps

Editable maps

Clickable
maps

Static
maps

Paper
maps

Image: A. Calafiore

# Interactive (Web) Maps

- Efficient medium for high information throughput
- Maps as "windows" into large datasets

"A map of many maps"

# Interactivity Building Blocks

# Interactivity Building Blocks

- Filtering
  - Pan
  - Zoom
  - Subset
- Perspectives/Volumes
- Tooltips
- Split
- Animate

# Filtering

Widely used design choice in visualisation
Reduction of the set of elements being displayed
Discard geographically or attribute-based

# Filtering: *Pan*

- **What**: Travels within a single scale
- **Use**: Segment a map geographically
- **Abuse**: Map is meant to focus on just a single region



**MIGRATIONS IN MOTION**

● Birds   ● Mammals   ● Amphibians

As climate change alters habitats and disrupts ecosystems, where will animals move to survive? And will human development prevent them from getting there?

This map shows the average direction mammals, birds, and amphibians need to move to track hospitable climates as they shift across the landscape. ↓
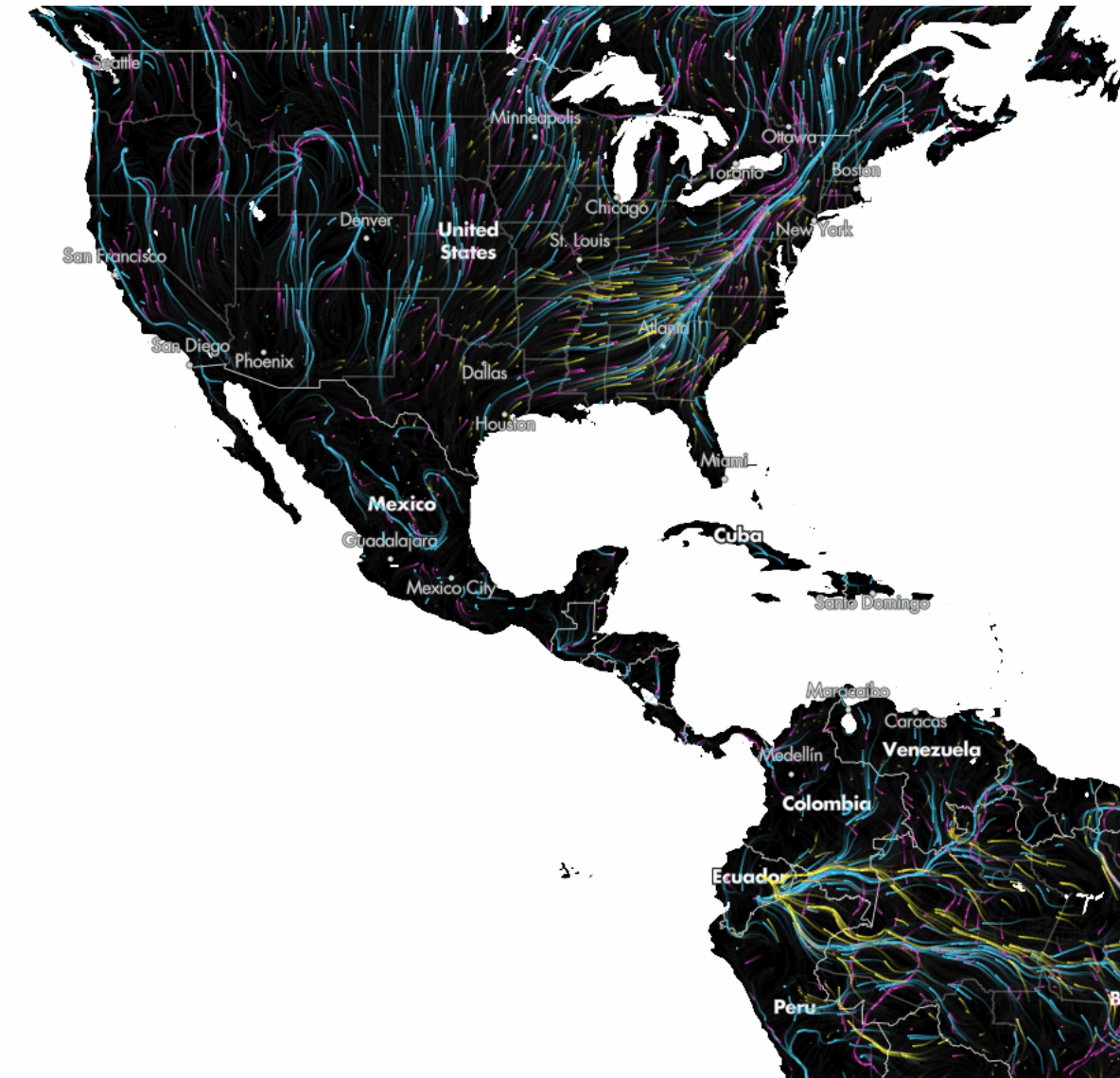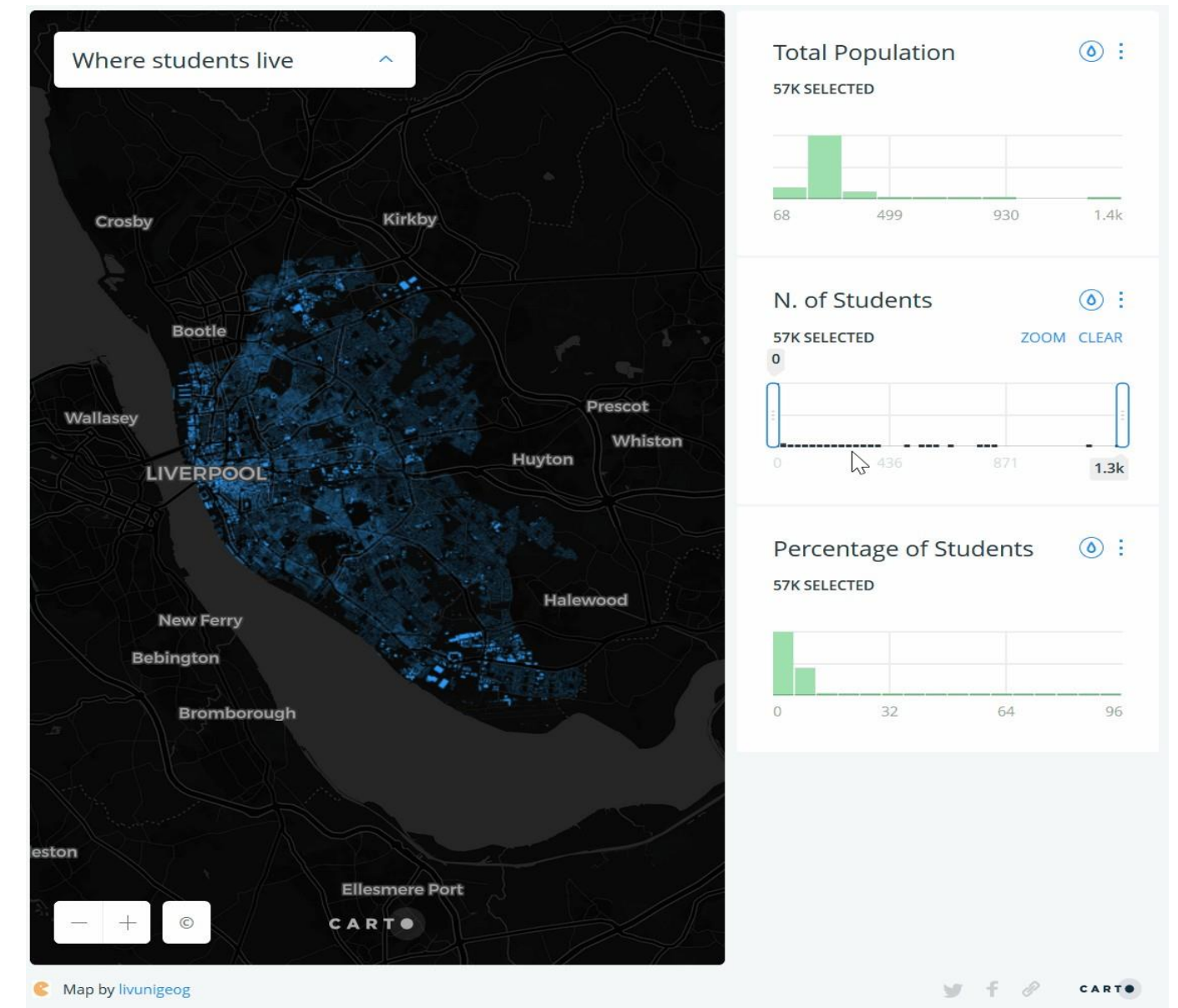
# Filtering: *Zoom*

- **What**: "Travel" across scales
- **Use**: Present different degree of detail
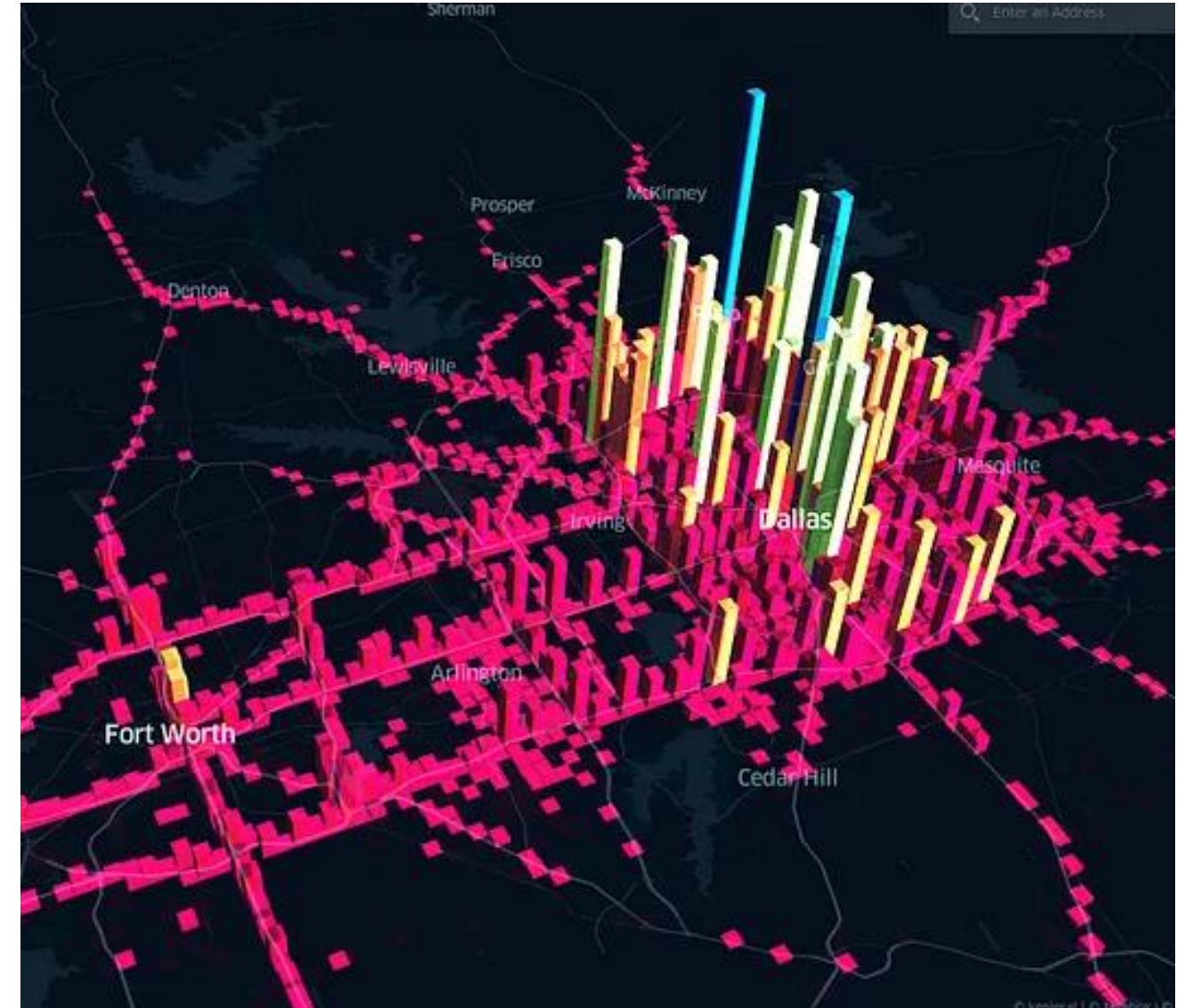- **Abuse**: Focus is on the global pattern

# Filtering: *Subset*

- **What**: Restrict data showed (by attribute)
- **Use**: Explore patterns by value or category
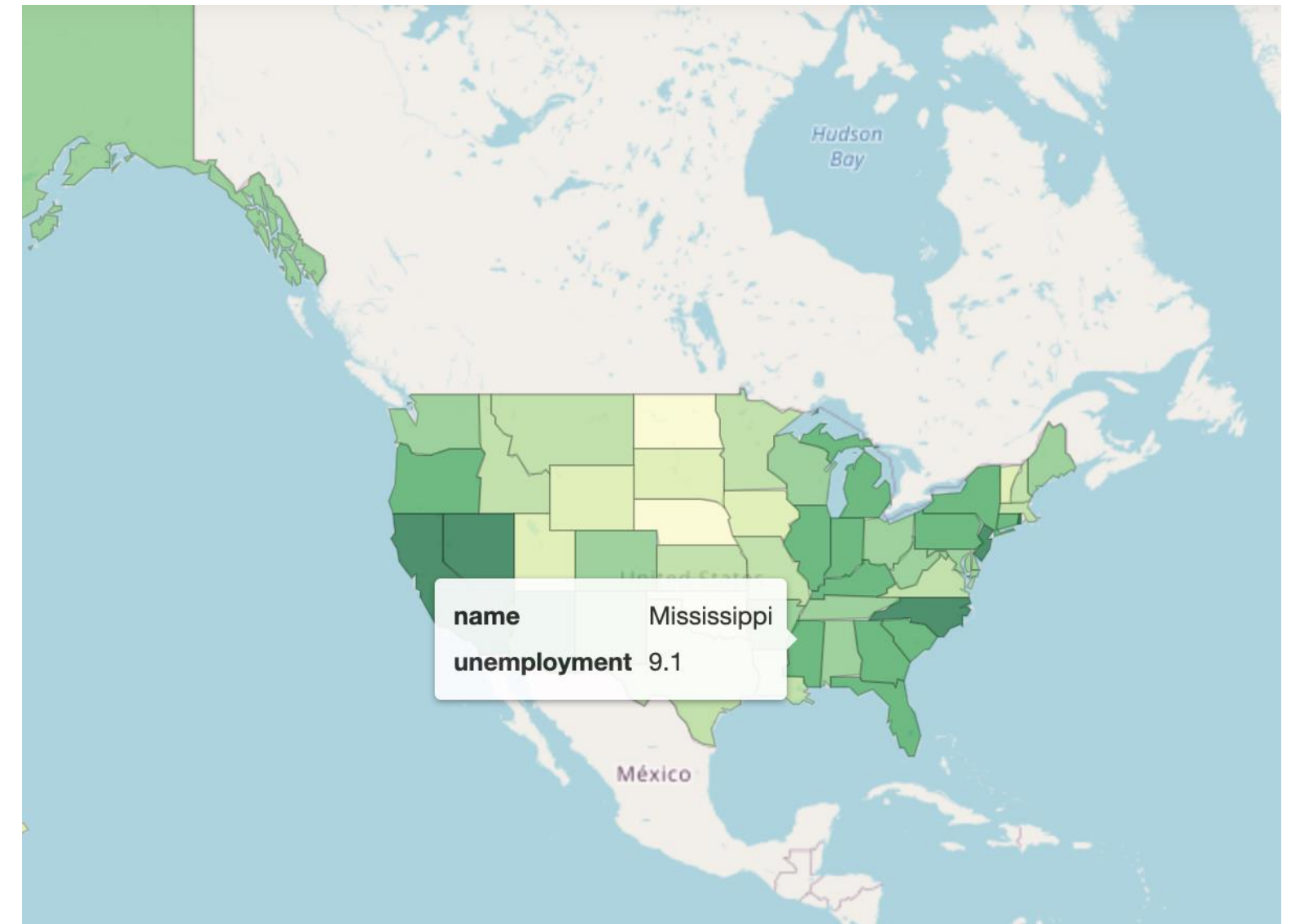- **Abuse**: Focus is on the global pattern

# Volumes/Perspectives

- **What**: Add a 3<sup>rd</sup> dimension (or a 2.5d)
- **Use**: Volumes or perspectives are relevant
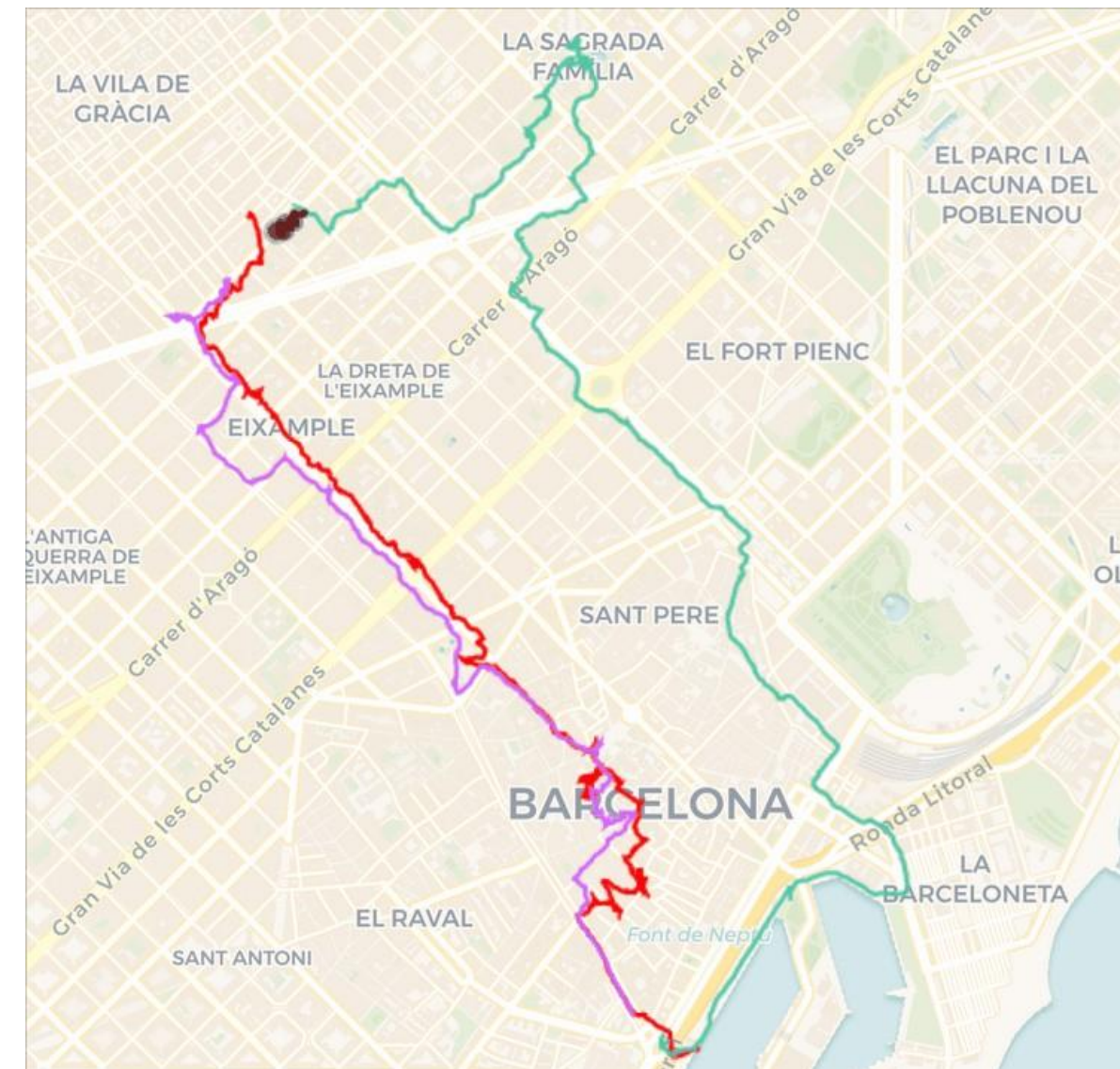- **Abuse**: Any other case

# Tooltips

- **What**: Contextual (non-geo) information, on demand
- **Use**: Let the user explore the feature's attributes
- **Abuse**: Include too much data in the tooltip.



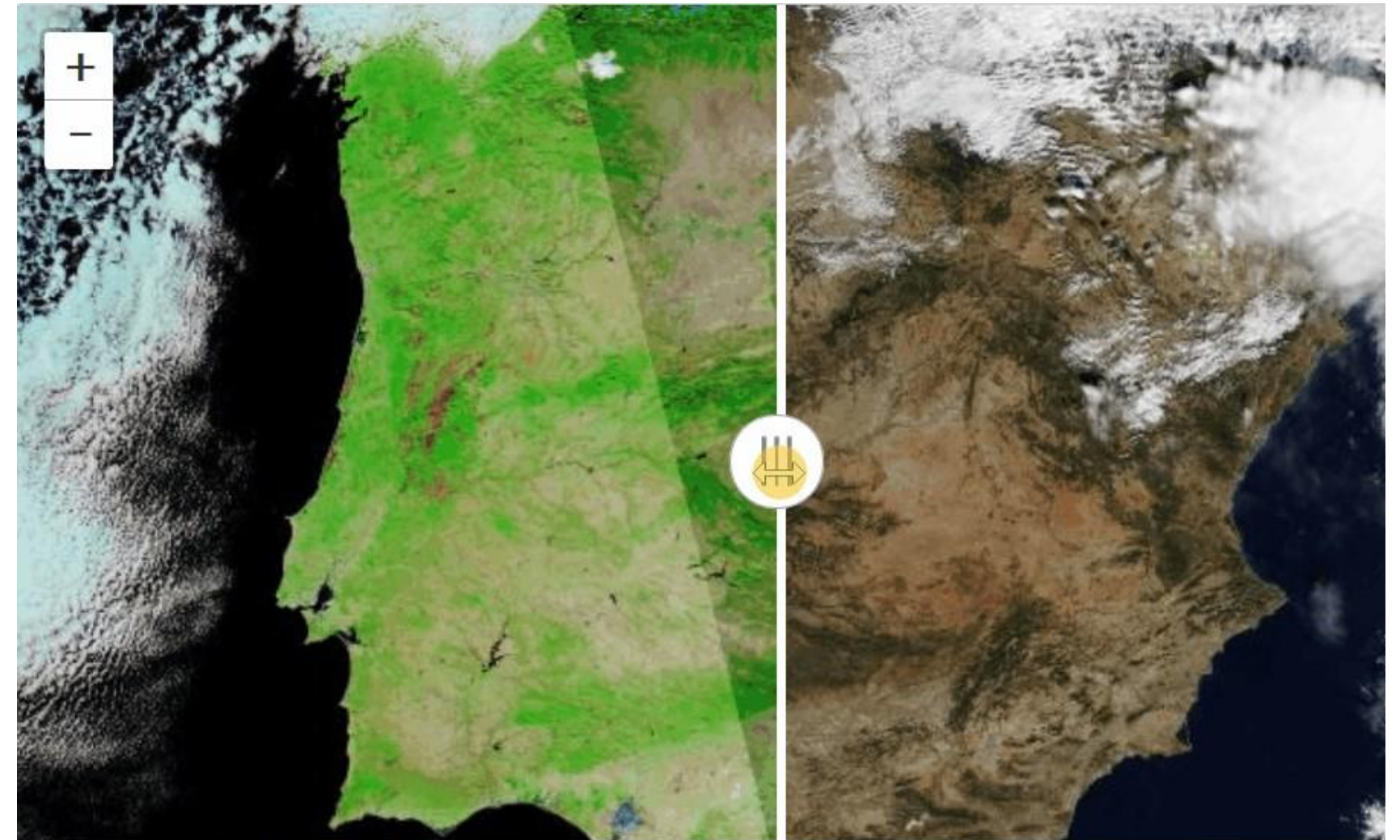| name | Mississippi |
|------|-------------|
| unemployment | 9.1 |

# Animate

- **What**: Add temporal dimension through compilation of slices
- **Use**: Explore space-time Patterns
- **Abuse**: Communicate cross-sectional insights

# Split

- **What**: Overlay two maps of the same location
- **Use**: Compare pattern changes
- **Abuse**: When you need to see the same location in both maps



Leaflet | Map data (c) OpenStreetMap contributors, Imagery provided by services from the Global Imagery Browse Services operated by the NASA/GSFC/Earth Science Data and Information System (ESDIS) with funding provided by NASA/HQ.

# General tips

- Think about the experience first, then consider the technology.
- Avoid feature overload.
- Interactivity is not binary.

# Let's talk about [Assignment I](#)

# References

- Tamara, Munzner. *Visualization Analysis and Design*. CRC Press, 2014