Interactive Exploration of LEHD
A Case Study in Knowledge Discovery

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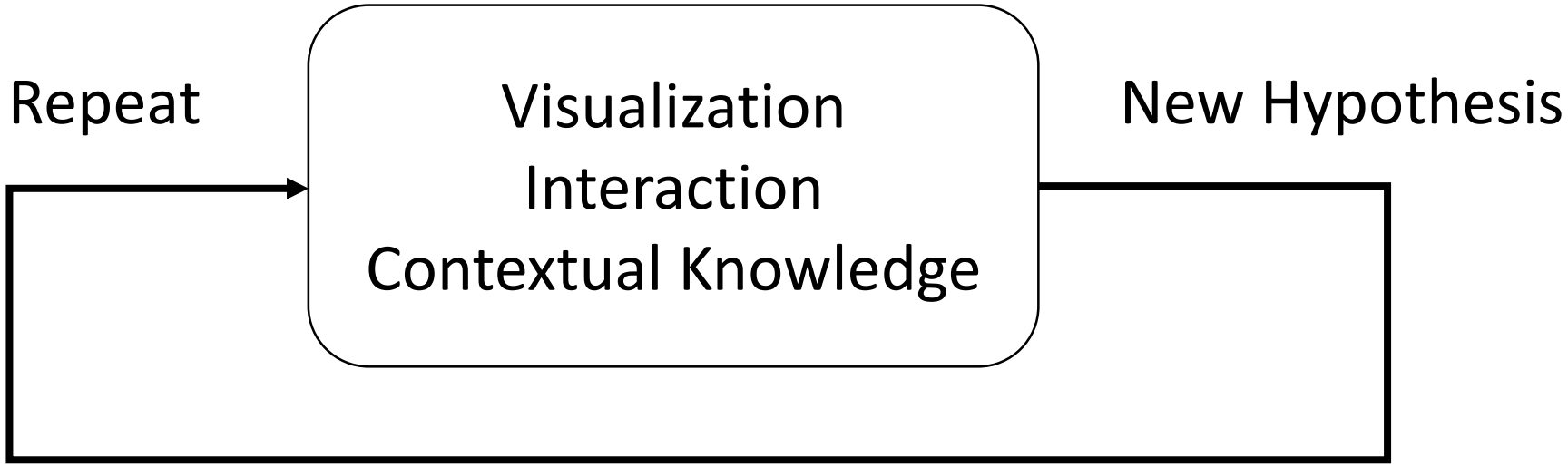
Sensemaking Loop



This loop should happen fast, otherwise we lose our train of thought

Sensemaking and Big Data

Data Production >>>>>> Data Consumption

How to visualize Petascale data?

How to visualize hundreds of dimensions?

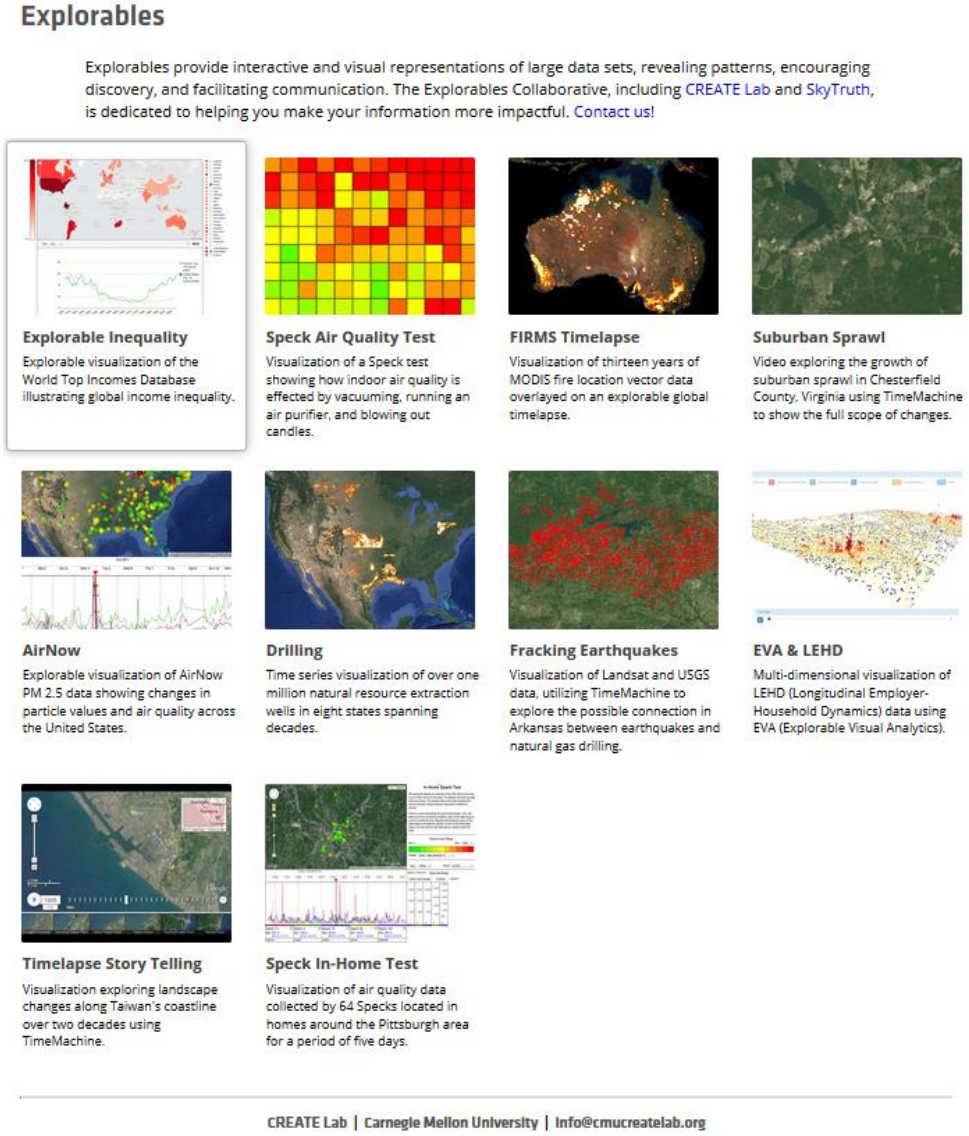
How to make the process responsive? (delay cost)

What is a good question to start with?

The Explorables Collaborative

http://explorables.cmucreatelab.org/

An effort to understand the challenges in visualizing, exploring, and analyzing large and complex data.



Explorable Visual Analytics

http://eva.cmucreatelab.org

Browser-based

Supporting large-scale data

Easy navigation in a high dimensional space

Responsive interaction; facilitating knowledge discovery

Shareable stories; facilitating knowledge dissemination

EVA Demo↗

Data? large, complex, high spatial and temporal resolution, opportunities for real and meaningful discoveries

Census Longitudinal Employer-Household Dynamics (LEHD)
http://lehd.ces.census.gov/

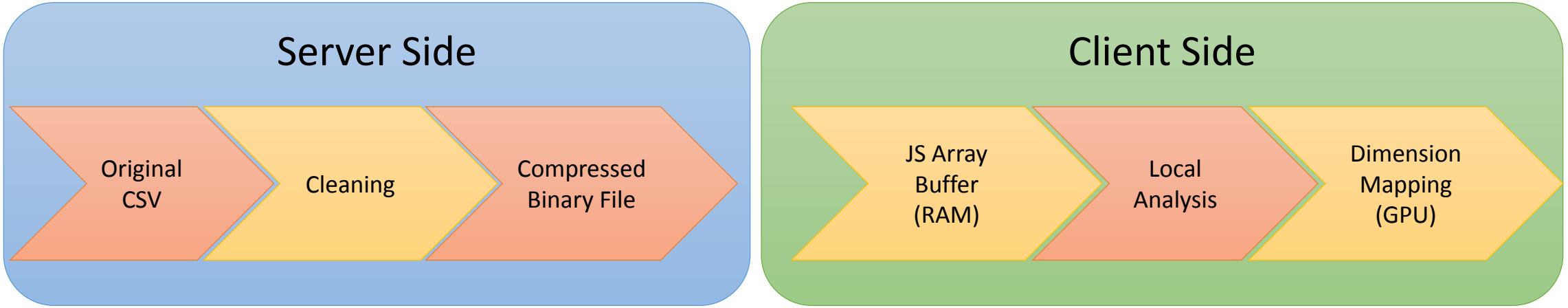
Pennsylvania section (~2.8 million data points with 45 dimensions), Census Blocks geospatial resolution, spanning over 10 years

Technical Aspects

Technologies: Web-based, JavaScript, HTML, Three.js & WebGL (http://threejs.org/)

Open Source: https://github.com/nebeleh/EVA

Current Capability: 4~5 M points with 10s of dimensions (1~2 GB of RAM)



Observations

High Resolution: Knowledge discovery is highly dependent on the amount of details a user can see.

Explorability: Seeing the data from multiple perspectives increases the chance of recognizing unexpected patterns. This can be beneficial in the formation of new hypotheses and possible new discoveries.

Responsiveness: Facilitates an uninterrupted train of thought.

Storytelling: Guided tours as a powerful means of knowledge dissemination.

Next Steps: Human Data Interaction

Inaccurate but fast vs. accurate but slow:

screen-aware solutions which benefit from our cognitive limits

Non-episodic interaction:

steering and active feedback, interactive query building

Interactivity:

compensation for our inability to perceive high-dimensional space

Thank You

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