

Understanding and Improving Information Extraction From Online Geospatial Data Visualizations for Screen-Reader Users

Ather Sharif¹ Andrew M. Zhang¹ Anna Shih¹
Jacob O. Wobbrock² Katharina Reinecke¹

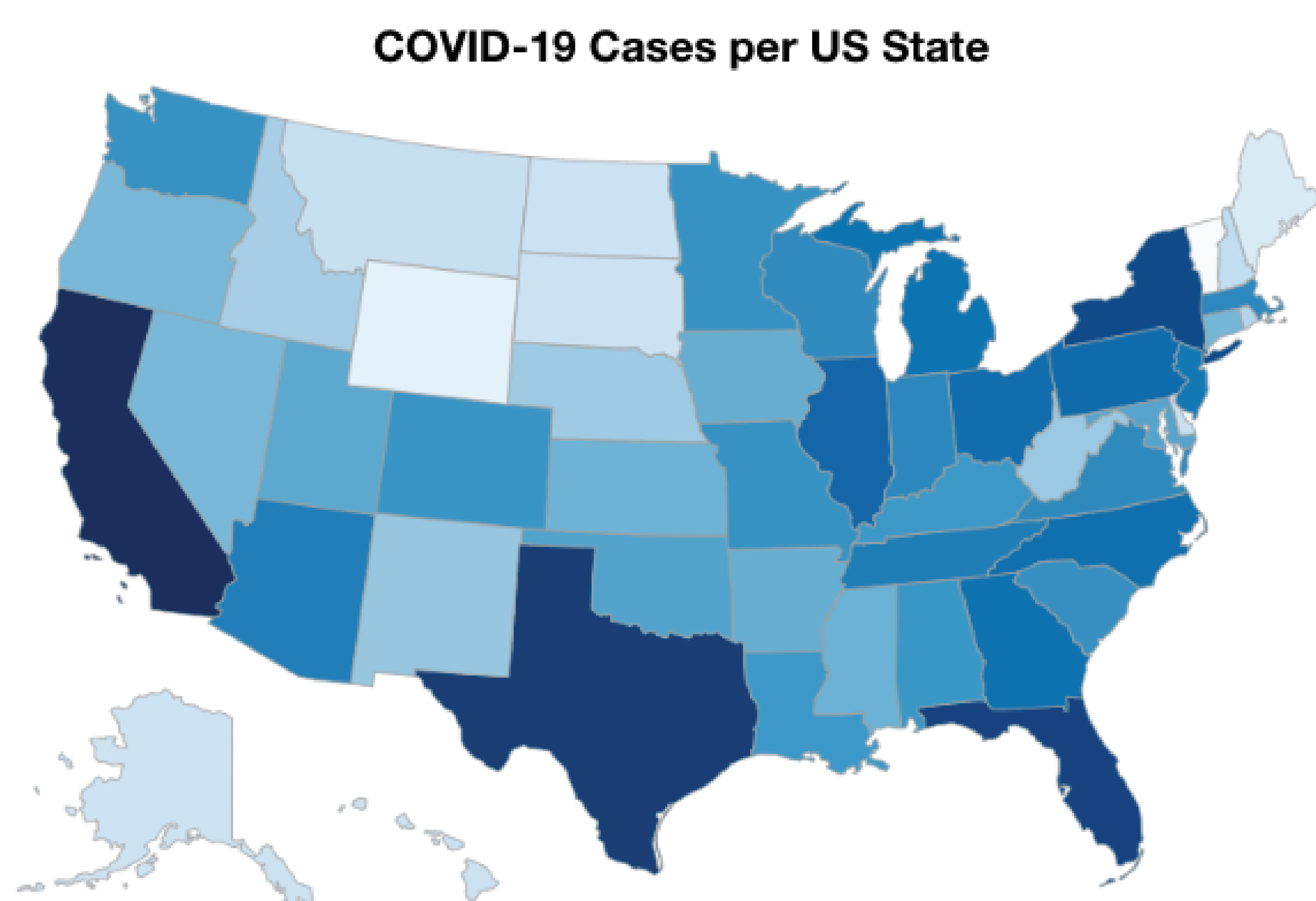
¹ The Paul G. Allen School of Computer Science & Engineering

² The Information School

DUB Group; University of Washington

Motivation

Online data visualizations effectively communicate large volumes of data to their audience and enable users to identify outliers, recognize patterns, and explore oddities in the data that may be challenging to determine from a simple table. The benefits of data visualizations are especially applicable to map-based visualizations that assist users in exploring, summarizing, and analyzing geospatial data. However, the interactions of screen-reader users with online geospatial data visualizations, commonly used by visualization creators to represent geospatial data (e.g., COVID-19 cases per US state), remain unexplored.



Q: Tell me the maximum and the average number of cases

A: Average cases are 1,514,426.41. Maximum cases are 8,767,944 belonging to California.

Q: How is the east coast vs. west coast?

A: Average cases for West Coast are 2,256,606.4. Average cases for East Coast is 1,662,346.41. Cases for West Coast are greater than East Coast.

Q: Which states are the top 3 and which are the bottom 3 in cases?

A: Top 3 states are: California, Texas, Florida. Bottom 3 states are: Vermont, District of Columbia, Wyoming.

Interactions with a geospatial data visualization showing COVID-19 cases per US state, using our enhancements to `\voxLens`. "Q" represents questions that screen-reader users can verbally ask using our enhancement, and "A" represents the answers they would hear via their screen readers.

Research Work

1. Developed taxonomy of information sought by our screen-reader users in their explorations of online geospatial data visualizations through a user study with 12 screen-reader users.
2. Extended the capabilities of **VoxLens**, an open-source JavaScript plug-in to make online data visualizations accessible, to support information extraction from online geospatial data visualizations.

