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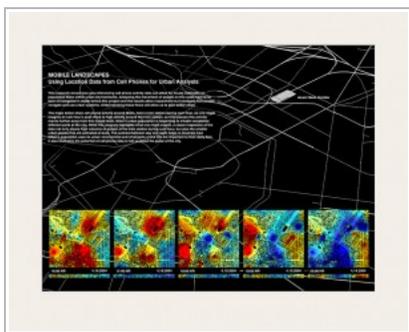
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Mapping Science: The Power of Visualization

By Lyndsey Garcia



We are constantly surrounded by visuals: television, advertisements and posters. Humans have been using visuals such as cartographic maps of the physical world to help guide our exploration and serve as a reminder of what we have already learned.

But as research has moved into more abstract environments that are becoming more difficult to interact with or visualize, the art of science mapping has emerged to serve as a looking glass to allow us to effectively interpret the data and discern apparent outliers, clusters and trends.

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Mobile Landscapes: Using Location Data from Cell Phones for Urban Analysis

the exhibit Places & Spaces: Mapping Science (<http://scimaps.org/>) serves as a fascinating and intriguing example of the features and importance of science mapping.

The end result of a ten-year effort with ten new maps added each year, all one hundred maps are present at Duke at three different locations: the Edge in Bostock Library, the third floor of Gross Hall, and the second floor of Bay 11 in Smith Warehouse.

Science maps take abstract concepts of science and make them more visible, concrete, and tangible. The scope of the exhibit is broad, including science maps of the internet, emerging pandemics in the developing world, even the mood of the U.S. based on an analysis of millions of public tweets. Science mapping is not limited to the natural or technological sciences. Several maps visualize social science data such as Visualizing Bible Cross Connections and Similarities Throughout the Bible (http://scimaps.org/mapdetail/visualizing_bible_cr_125), where the axis represents the books of the Bible and the arches portray connections or similar phraseology between the books.

Angela Zoss, the exhibit ambassador who brought the project to Duke, comments, "The visualization helps at multiple phases of the research process. It helps the researcher communicate the data and understand his or her data better. When we try to summarize things with equations or summary statistics, such as the average, the mean, or the median, we could be glossing over very important patterns or trends in the data. With visualization, we can often visualize every single point in space for small data sets. One might be able to detect a pattern that you would never have been lost in simple summary statistics."

The physical exhibit holds importance to the Places & Spaces project due to the physical printing of the maps. Some of the details on the maps are so intricate that they require an in-person viewing of the map in order to appreciate and understand the information portrayed. Such as, A Chart Illustrating Some of the Relations Between the Branches of Natural Science and Technology (http://scimaps.org/mapdetail/a_chart_illustrating_124), is a hand-drawn map from 1948 showing the relationships between the branches of natural sciences and technology by using a distance-similarity metaphor, in which objects more similar to each other are more proximate in space.



(http://scimaps.org/mapdetail/a_chart_illustrating_124)

A Chart Illustrating Some of the Relations between the Branches of Natural Science and Technology. Used by permission of the Royal Society

The maps look more like works of art in a museum than a collection of maps to interpret data. Angela Zoss explains her love of visualization as, "Visual graphics can inspire an emotion and excitement in people. It can encourage people to feel for information that would otherwise seem dry or intangible. The exhibit heightens those emotions even more because you see so many wonderful examples from so many different viewpoints. Every visualizing person is going to make a different choice in the details they want represented. Being able to see that variety gives people a better idea of how much more is possible."

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