**Space, time and visual analytics**

How does purpose/end goal change the type of temporality you employ in spatiotemporal analysis? Is there something similar to the MAUP with time?

How does our changing interactions online (google, social media, etc.) affect the way we process information visually, and therefore how we should design it?

I didn't realize how in-depth the science of data visualization was researched, was this something that surprised others as well.

The authors state that “everyone is a spatio-temporal analyst”, and in their example of The Town, illustrate the various ways that spatio-temporal data can be used on a daily basis by multitude of different people, from average community members to leaders and decision-makers. Spatio-temporal data analysis clearly has a multitude of uses in science, politics, industry, and many other fields, as well as in many aspects of day-to-day life. Considering this, do you think it would be of benefit to society if the basic skills and knowledge used in this discipline were taught to everyone, instead of just geography students and other specialists?

The authors discuss how processing and analysis of visual/spatio-temporal information by humans can be limited by the extent of human perceptual and cognitive abilities, especially when such data is presented in the form of interactive and/or dynamic maps. Do you think implementing current AI technology as a means of interpreting and analyzing complex visuals of spatio-temporal data would help to overcome this problem, or should such analysis be left to humans, as humans are the ones who will be making the final decisions based off these analyses?

Generally speaking, human beings perceive time in an ordered, linear fashion. Why do you think our brains naturally perceive this structure, rather than other structures such as ordered cyclic time, branching time, and time with multiple perspectives?

What modern tools or innovations could help tackle some of the "large data" problems they discussed in the paper to help better visualize analysis

At several points in the article, they provide very in-depth visualization examples that illustrate their argument in favor of maps that better incorporate spatial and temporal elements. However, several examples were hard to understand without detailed explanations. Even though they argue that it will be successful because everyone is a spatio-temporal analyst, how do you think these more complicated maps will translate to educating laymen on common topics, and do you think it will be better than static maps?

How do non-static maps enable a more smooth integration between different academic disciplines, removing the cyclical “stovepipe” effect discussed in the article by Micheal Goodchild?

The authors seem to present proposed scenarios for use of space-time models without so much as taking note of possible ethical issues related to the uses proposed (e.g. privacy issues related to some of the data collection described or the ethics of insurance companies making the types of granular analyses described). That is to say, insurance is about aggregating risk so as to compensate for traumatic losses by a few by distributing the cost across a larger group. As insurance companies become more able to pinpoint those at greatest risk, they begin to distribute the costs of traumatic losses across a smaller and smaller number of people, thus maximizing thier profit while doing less and less for the people they are purportedly protecting. Is that an ethical goal for temporal GIS?

The paper does a good job of acknowledging that while some spatial analysts are professionals, others will be members of the general public. It strikes me that the examples related to the general public accessing information related to on-going public emergencies only barely touches (if at all) on acknowledging that some platforms and technologies may not be nearly so available in some areas or to some constituencies. For example, the aftermath of Hurrican Maria in Puerto Rico left hundreds of thousands of people without power and/or internet for months and months. While smart phones were likely widely available in those areas, there availability meant nothing if they had no service to connect to and/or no way to charge their devices. In short, there are some important social equity questions involved here that the paper does not really mention.

For certain spatial-temporal datasets, it is hard to consistently collect accurate data, especially for historical data. Can visual analytics help reflect the accuracy of certain data points or the confidence that analysts have in their accuracy?

Are there ways to visualize data with non-standard units of time, or is scale pretty much confined to standard units of distance and time?

Why might map animation be considered a limited way of presenting temporality in a map? Can you think of an example where map animation might be misleading?

Excluding OECDeXplorer, can you think of any examples of geovisual analytics software that is user-friendly and easily accessible?

When different scales of analysis are used the results of the data can be skewed and illustrate different findings. How do cartographers and analysts know what scale to use to illustrate unbiased data?

Should there be standard and required training for spatial analysts to reduce misinterpretations of data?

1. How does geovisualization make processing of geographic information faster and help in creating new maps that focus on design and the use of novel maps?

Geovisualization speeds up processing geographic information by using visual representations and creating innovative maps. It makes exploring data dynamic, aiding in quicker decision-making and enabling the design of creative maps. Emphasizing visual presentation also contributes to the accessibility of geographic data, allowing a broader audience to engage with and understand the spatial information more easily.

 How can visual analytic tools be combined with computational techniques and why is collaboration support important?

Visual analytic tools can be integrated with computational techniques by the incorporation of spatial statistics, data mining, and simulation models into the visual analytics workflow. Collaboration also shows support for knowledge sharing and collective problem-solving while enabling experts from different fields to contribute their perspectives.

what would be the effect of incorporating spatio-temporal analysis earlier in the education cycle? what if these concepts were presented in elementary or middle school?

This journal was written in 2010. How might the recent evolution of Artificial Intelligence technology have addressed some of the concerns/issues with analyzing spatiotemporal data that were mentioned?

What are some features that visual displays of spatial-temporal data should include to be easily analyzed by the public?

What types of spatio-temporal data would you like to see in a visual form as a convenient tool in your everyday life?

Why is geovisualization more effective than standard approaches to analysis? What of the concerns that current geovisualization analysis puts to heavy the emphasis on spatial rather than temporal; does this detract from the general population’s full understanding?

What are some ways that experts can convey knowledge and geovisualization skills to the general population that does not require higher education or specialized K12 curriculum?

Why is it important to consider how time is organized— such as ordered, cyclical, branching, or having multiple perspectives? Can you think of situations where these choices might really matter in understanding and representing information?

To understand what scale of analysis would be adequate, analysts often have to use 'trial-and-error' approaches. What are some criteria you may consider as you search for the right scale?

When considering how to geovisualize something, how can we determine what an appropriate spatial or temporal resolution is for displaying what we are trying to show? How far much information do we need to have on something to determine that a trend is emerging? How can we ensure we are not drawing arbitrary lines around temporal and spatial ranges when analyzing a dataset or problem?

I found the authors' discussion of the selection of scale of analysis particularly interesting—they argue for a semi-automated approach to determining the most appropriate scale of analysis alongside human input in order to best reflect the phenomenon under consideration.

* When it comes to something like sea level rise or other environmental effects of climate change, this question of where to begin or the scale at which you consider something becomes inherently political, involving what might be considered 'qualitative' considerations—e.g. the question of do we 'start' with Doctrines of Discovery in the 1400s, with the Enlightenment, etc in framing a spatio-temporal analysis that relates to climate change?

I also noted their discussion of spatial and temporal dependences: "Events in time have an effect on future rather than past events." I found it interesting that they say this in a matter-of-fact way (thereby endorsing temporal linearity) while at the same time acknowledging that there are multiple ways the time is conceived (cyclic for example).

The reading mentions that spatial and temporal dependencies allows for “interpolation and extrapolation, which can be used to fill gaps in incomplete data.” To what degree of accuracy can we be certain when extrapolating the data, and how do you relay to the audience that the data is extrapolated and not exact measurements?

The article mentions “visual analytics researchers need to consider all of society as potential users of their techniques,”

What groups have not been catered towards and is there a barrier of entry?

How can we make these tools more usable and accessible since a variety of people and professions use them?

How can combining different data sources, like social media and internet data, improve the reliability of GeoVisual Analytics tools? What challenges and ethical issues might come up in this process?

For GeoVisual Analytics to be useful to a wide range of users, how should visual displays of spatial and temporal information be designed? What factors need to be considered to ensure that these tools are user-friendly for both specialists and non-specialists?

What advantages and challenges come with collaborative approaches to geovisualization, and how might they influence decision-making?

Real-time tracking data systems are becoming so commonplace, with ethical and privacy considerations often tossed aside. How can we act as ethical geographers in the face of this age of data? We must recognize that not all data will be used for good (think… “defense”). 

Geographers, according to the article, are sometimes considered “Jack or Jill of both worlds but a master or mistress of neither.” How has your joint study in these fields allowed you to flourish intellectually?

Considering the concept of analytics and collaboration between human and electronic data processing, what kinds of ethical problems could come from development of spatial/temporal tools?

How could natural/man-made factors (geographical heterogeneity and/or barriers) influence the strength of the dependencies specified on page 1583?

While Andrienk et al. provide an example of lay people using Space-Time GIS, e.g., a family evaluating a hailstorm and other hazards, most of the article focuses on Space-Time visualizations for analysts. What are some ways we can visually display Space and Time in simple ways that most people would be able to interpret?

-Interactive maps seem to be one of the best ways to analyze change over Space and Time. With more computing power in society, do static maps have any real advantages?

Both articles mention the challenges present in representing and analyzing space-time data.  They both call for better integration of disciplines in order to achieve this.  How does the emergence of WebGIS respond to the calls that the authors are making?

One prominent theme the authors found is summarized in the slogan, ‘Everyone is a spatio-temporal analyst’. Do you agree with this statement, and if so, what are some examples of ways that ordinary citizens analyze spatial and temporal information in their everyday lives?

What are some of the key considerations the authors made in making visual analytics tools usable and accessible to a broad range of users?

How does the incorporation of temporal components strengthen spatial analysis?

What are some strengths and limitations of the widespread availability of spatial analytical software, and its growing accessibility?

What are common intervals or formats through which time is portrayed in spatial analysis?

What are some potential problems that arise in the analysis of spatial data sets?