Annotated Sources

Author: Michael Correll and Jeffrey Heer
Title: Surprise! Bayesian Weighting for De-Biasing Thematic Maps
Year: 2017
Aim: This paper introduces Surprise Maps as a new visualization technique, designed for addressing the biases contained within traditional map visualizations such as choropleth maps. This approach makes interesting spatial patterns more salient and helps offset misleading patterns. They present a comprehensive framework for creating Surprise Maps, including selecting relevant event models, sedimenting events into a map, updating Bayesian models based on data, and visualizing surprise values.
Conclusion: This paper creates a compelling argument showing the value of surprise maps over standard map visualizations. This paper also shows the framework for creating surprise visualizations for others in the research community to further study the visualization.
How does what they're saying inform how we design interventions / feedback for people?
This paper introduces the type of visualization that we are creating. The authors discuss the benefits of creating a surprise map as opposed to a standard choropleth map. They also illustrate a framework for creating the surprise maps, which is important for our comprehension of how to create surprise maps off of our military spending data.
Author: Akim Ndlovu Hilson Shrestha Lane T. Harrison

Title: Taken By Surprise? Evaluating how Bayesian Surprise & Suppression Influences Peoples' Takeaways in Map Visualizations
Year: 2023
Aim: This study evaluates the effectiveness of two new map visualization techniques, Surprise metrics and Value Suppressing Uncertainty Palettes (VSUPs) in enhancing the interpretation of choropleth maps by users. The findings revealed that Surprise maps directed users towards areas with significant population differences. It also highlights the challenge of ensuring that users correctly interpret complex metrics like Surprise.
Conclusion: This paper further explores Bayesian surprise and expands upon it by using VSUP, and also evaluates the effectiveness of these maps through a 300 person study, giving a stronger baseline for the effectiveness of enhanced map visualizations.
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This paper is a continuation of "Surprise! Bayesian Weighting for De-Biasing Thematic Maps," and further strengthens the argument for using Surprise maps. This paper shows that Surprise maps minimize interpretation bias while highlighting areas with significant population differences. We will build off of this paper while creating our visualizations that also include a change in time in the surprise calculation.

Author: Pierre Baldi and Laurent Itti
Title: Of bits and wows: A Bayesian theory of surprise with applications to attention
Year: 2010
Aim: The paper explores the idea of "surprise." Surprise is the metric of variance that a data point differs from its expected value, which is graphed in tandem with other data points on a map visualization, and can be computed using Bayes' Theorem. The authors believe that there is a relationship between surprise and attention, particularly related to learning theory. A more surprising image is likely to draw the attention of a natural or artificial system.
Conclusion: The paper was able to explore the idea of surprise on a neural network and went through a series of videos and images. A limitation of surprise is that it doesn't capture the semantics of the data. However, it opens multiple avenues for different applications. Surprise can be greatly utilized in multiple areas to find novelty in the data and benefit the learning process.

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While the result of this paper does not directly benefit us, the background section and detailed explanation of the calculation of surprise is beneficial. It strengthens our understanding of surprise and how Bayes' Theorem works.

Author: Doris Seyser, Michael Zeiller
Title: Scrollytelling – An Analysis of Visual Storytelling in Online Journalism
Year: 2018
Aim: This article investigates the use and integration of infographics in long-form online journalism, known as scrollytelling. The authors highlight the pioneering role of The New York Times in utilizing information visualization for storytelling. The study notes that while scrollytelling articles are rich and engaging, their production is more resource-intensive compared to traditional articles, making them ideal for in-depth explorations of complex issues.
Conclusion: This paper makes many strong points for the use of scrollytelling, showing that this is a form of portraying data that is worth future exploration. It also points out that scrollytelling should be implemented on an equally complex dataset, and that there is a need to further establish scrollytelling as an effective means of displaying data by implementing it in a variety of different fields of study and through different user experiences.
How does what they're saying inform how we design interventions / feedback for people?
This article highlights how important scrollytelling is in portraying content-rich visualizations, and because maps with Bayesian surprise weighted over time are very complex, this supports our decision to include scrollytelling into our visualization. This article also supports multimodality for engagement, which is what we plan to implement on our website.scrollytelling as an effective means of displaying data by implementing it in a variety of different fields of study and through different user experiences.

Authors: Sarah Mittenentzwei, Laura A. Garrison, Eric Morth, Kai Lawonn, Stefan Bruckner, Bernhard Priem, Monique Meuschke
Title: Investigating user behavior in slideshows and scrollytelling as narrative genres in medical visualization
Year: 2023
Aim: The authors of this paper are exploring how different mediums of visualization can affect conveying medical topics. They used 2 types of stories, and one was made using traditional slideshows while the other was made with scrollytelling. They want to see which method was more effective and would be well received by the general public.
Conclusion: The results show that people find slideshows easier to navigate and interact with compared to scrollytelling. The problem with scrollytelling is that people did not realize they needed to scroll to view more content, but this also allowed them to revisit earlier content. Scrolling was another major factor that impacted the participant's review on scrollytelling. In general, the topic does not seem directly related to the ratings and people tend to prefer more interaction rather than less.
How does what they're saying inform how we design interventions / feedback for people?
The work of Mittenentzwei et al. leads us to believe that scrollytelling is a viable way of informing a general audience. The comments from the participants about the scrollytelling version provide insight into our design. We should take scroll speed into account and provide a visual explanation that indicates the page is to be scrolled upon to revisit prior content and view new information.