Visualizing Spatio-Temporal Data with Dynamic Cartogram

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Fig. 1. A screenshot of the tool

Abstract—summarize map, map with dots, etc... and pitch the tool as easy to visualize change of data in time in terms of the geological density.

Index Terms—map, cartogram, trend

1 Introduction

More detailed form of abstract.

Introduce the tool, the kinds of graph it provides, and the reasoning of layout for each view.

2 Related Works

- start from introducing about the origin of maps
- go towards having data points labeled on maps, for example during wars
- Tobler, Waldo (March 2004). "Thirty-Five Years of Computer Cartograms". Annals of the Association of American Geographers.
  - evolve of cartograms
  - types of cartograms
  - how it goes beyond that, and active research
- Effectiveness of Cartogram for the Representation of Spatial Data
- Value-by-alpha Maps: An Alternative Technique to the Cartogram, talk about other alternative choices

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Manuscript received xx xxx. 201x; accepted xx xxx. 201x. Date of Publication xx xxx. 201x; date of current version xx xxx. 201x. For information on obtaining reprints of this article, please send e-mail to: reprints@ieee.org. Digital Object Identifier: xx.xxxx/TVCG.201x.xxxxxxx

3 Process

- interviews
  - why we chose to interview the people we interview
  - remember to refer to names and title
- Task 1
  - Check how the amount of tweets changed during St Patrick's day.
  - The most important feature of our visualization is that the dynamic cartogram. Users can drag the button on time axis, the cartogram will change to visualize corronsond data with animation. Users are able to observe trend easily. Also, it will be a beautiful and readily comprehensible way to do presentation.
  - Our tool also provide an option that visualize the data in small multiples. Users can add several time stamp and view cartogram for each time stamp in another tab. This is useful when user want to check the trend in a specific time interval. We also provide traditional line chart, users are able to check trend of data from line chart
- Task 2
  - How football fans emotion changed after a score during a match. Do they have correlation?
  - In cartogram, color and shape distortion can represent two attributes. So we plan to use shape distortion represent the number of tweets and color to represent the emotion of those tweets. And the map itself represent another attributes- location. So our visualization can encoding above three attributes at the same time, which is difficult to do in other visualizations.

- Task 5
  - Is there any area in which St Patrick's day more popular?
  - In cartogram, we can use shape distortion and color to encoding the same attributes, this redundant visualization(Most significant distorted state, and the highest color saturation) helps user locate maximum/minimum value in data easier.
- Task 3
  - What is the distribution of tweets amount for each state?
  - One of the most common task is to check the distribution of data. We provide standard bar chart that (with x-axis is states, and y-axis is an attributes) that allow user to do this task in our application.
- Task 4
  - Where and When is the peak of celebration in St Patrick's day.
  - To check where and when is the peak of celebration in St.Patrick's day, users can check the line chart of data. It shows the trend of data, also it is easy to find peaks in line chart. Users can also browse by dragging time button in cartrogram. It is more useful in presentation.
- Task 6
  - Compare the popularity of St Patrick's day in California and New York
  - Users are allowed to add filters to data. After applying proper filter, users can compare data in two or several states in a certain time stamp or the sum of tweets.

4 Design

- at first the website show an entrying page that says the name of the project and authors
- First Page is the main view
  - cartogram itself takes up most of the space
  - left slide bar shows the loaded data
  - right slide bar shows an extra bar graph, for detailed data
  - choice to select colors
- Second page shows small multiples from data points that the user select, and trendline graph.
  - able to choose to delete small multiple
  - able to see the exact trend change from the precise graph
  - choice to select colors

5 Discussion

- how's the usability of the project?
- difficulties in implementation?
- did we have to give up any original design thought to make the project more doable?

6 Conclusion

- draw some conclusion from discussion
- summarize about the good parts
  - how did it correspond to our task? were out task goals realistic? how much did they help?
  - any surprise good parts?
- summarize about what we could improve, change, or have done better
  - how could we have designed the interview process to make task analysis more helpful?
  - what other part did we not think about?

7 References

- Tobler, Waldo (March 2004). "Thirty-Five Years of Computer Cartograms". Annals of the Association of American Geographers.
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- more?

Acknowledgments

The authors wish to thank A, B, and C. This work was supported in part by a grant from XYZ (# 12345-67890).