iSketchVis: Data Exploration through Sketch-based Charting

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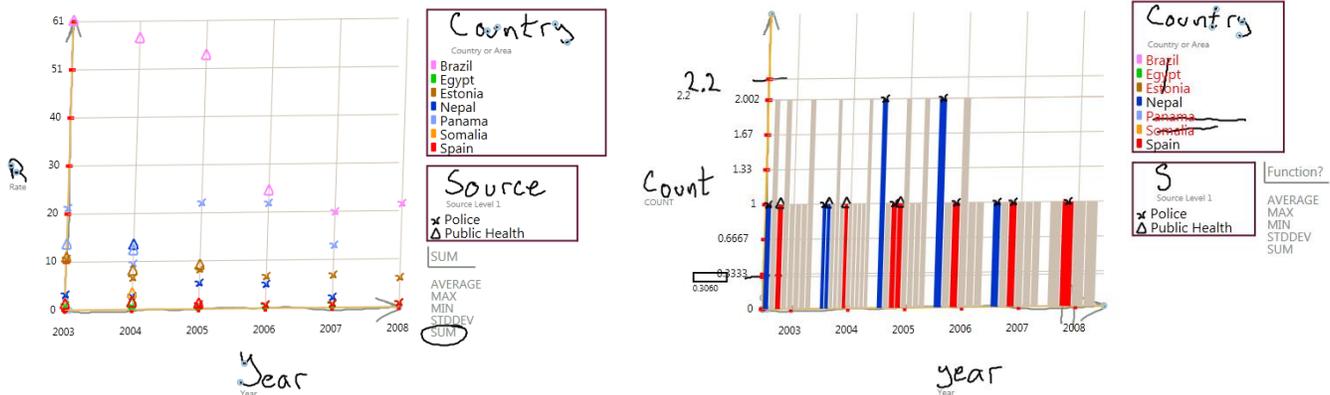
Figure 1: *Sketched scatter plot (left) and bar chart (right). The data to display is controlled by writing near the axes and can be further refined by striking through selected categories.*

1. Introduction

Basic information visualization tasks are now common operations in work places – often through the use of simple charts in spreadsheets, created on individual workstations. While these simple visualizations are incredibly useful, especially in a collaborative environment, the status quo is far more decidedly low-tech. Collaborators often share visualizations in a meeting by manually drawing them on a whiteboard. Sharing control is as easy as passing a pen, revising charts involves merely erasing and redrawing, and new charts come into existence simply by someone drawing what they want to see. However, populating hand-drawn charts with data can be tedious, and people frequently resort to indicating approximate trends for discussion purposes.

The goal of this work is to blend the strengths of computer-aided data visualization with the easy to learn and simple to use interfaces provided by a whiteboard. Towards this end, we have created *iSketchVis* to support charting of existing data sets entirely though a pen interface. Whether they are working alone or in a group, people can readily generate and manipulate high dimensional data by creating visualizations framed by queries, where aspects of the data can be selected by drawing axis labels directly. Unlike the work of Chao *et al.*, in which a combination of gestures and proto-objects are used to invoke visualizations, in iSketchVis the structure and labels of the visualization are directly drawn, recognized, and augmented with data as appropriate. Thus, data relationships can be quickly explored in-situ on the whiteboard, as quick sketches of charts are populated with real numbers. We have developed iSketchVis through a set of iterative refinements, utilizing participants' feedback to improve our design, during which most participants discovered "interesting" insights in their data sets.

2. iSketchVis Interaction

Upon launching iSketchVis, people first load CSV formatted data. To begin a chart, they simply draw two intersecting arrows to indicate its size and position, and label (by hand) the X and Y axes each as a column from the data set. The system plots the appropriate data as a scatter plot between the axes (Figure 1 left).

People can similarly label the *Color* and *Shape* legends so that plotted points will be distinguished by color or shape. Once plotted, they may perform functions over their data by writing or circling a function name (e.g., "SUM") in the *function area*.

People can also filter their data to exclude specific values by drawing strikethrough lines over their listing in the *Color* or *Shape* legends (Figure 1 right). Scaling a plot is accomplished by drawing a small tic mark on an axis, and then writing in the value that should be at that point.

References

CHAO, W., MUNZER, T., AND VAN DE PANNE, M. 2010. Poster: Rapid Pen-Centric Authoring of Improvisational Visualizations with NapkinVis. *Posters compendium of InfoVis 2010.*