Some Interactive Data Exploration Tools for Syndromic Surveillance

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OBJECTIVE

This paper describes several interactive data exploration tools for examining surveillance data.

BACKGROUND

Alert algorithms for syndromic surveillance that are sensitive enough to detect small to medium sized events tend produce many false alarms, and consequently manual examination of temporal and spatial data is often required to determine whether an alert requires further, epidemiological, investigation. This examination can be burdensome and time intensive, interactive data exploration tools can provide a way to examine large quantities of data quickly and offer a means to reduce the burden of examining surveillance data.

METHODS

We designed several interactive data exploration tools to quickly and intuitively provide access to an amount of data that is equivalent to what could be displayed on two 17x11 sheets printout. Design criteria included near instantaneous reaction to interactions, visual simplicity, intuitiveness and a minimum screen size of 1024x768. The tools were also required to be client based.

We used a combination of client side scripting and Scalable Vector Graphics (SVG) to implement the designs [1].

RESULTS

We designed 5 innovative data exploration tools: paired expandable tables (figure 1), paired linked graph arrays (figure 2), animating map with linked graphs (figure 3), expandable table with linked graphs and a tabbed summary grid display.

Client side scripting has limitations on the amount of data it can handle while maintaining crisp interactions, with significant variation between browser engines (Mozilla and IE). For example expanding tables with hundreds of rows had a noticeable lag when expanding rows in IE but not in Firefox, The current implementation of the SVG graphics has performance limitations for large maps.

DISCUSSION

Further work includes formal assessment of the usefulness and efficiency of the tools, investigation of whether implementing the tools in an AJAX environment can increase the capabilities of the tools, and comparison of the SVG implementation with implantation in Flash, which is also a vector graphics engine available to most web browsers.

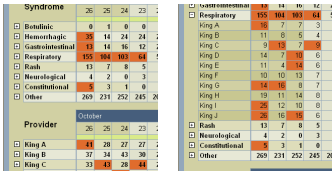

Figure 1. Paired drilldown expanding tables. Collapsed rows show the total counts for a category. Expanding a row in a table reveals the breakdown of the counts for that row into the categories of the other table.

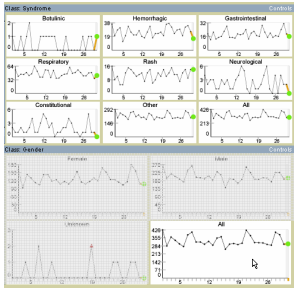

Figure 2. Paired linked graph arrays. The graphs are linked to the mouse-over event, moving the mouse into a graph in one of the graph arrays will cause the other graph array to display the corresponding 'drill down' results . For example, moving the mouse from the 'all' class for gender to the 'female' class will cause the top graph array will show syndrome counts for female only.

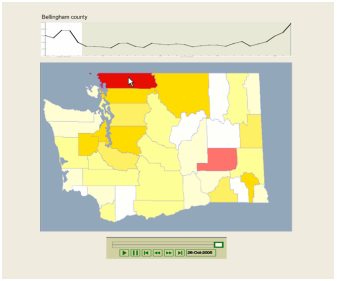

Figure 3. Animating map with linked graph. The graph is linked to the mouseover event, moving the mouse into a region will cause the map to show the counts for that region.

REFERENCES

[1] World Wide Web Consortium. Scalable Vector Graphic (SVG). http://www.w3.org/Graphics/SVG/

[2] NPD group. Macromedia Flash and Shockwave Players. Online survey, conducted April 2006. http://www.adobe.com/products/player_census/npd/

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