

Web-based geovisualization and geovisual analytics to support crime analysis

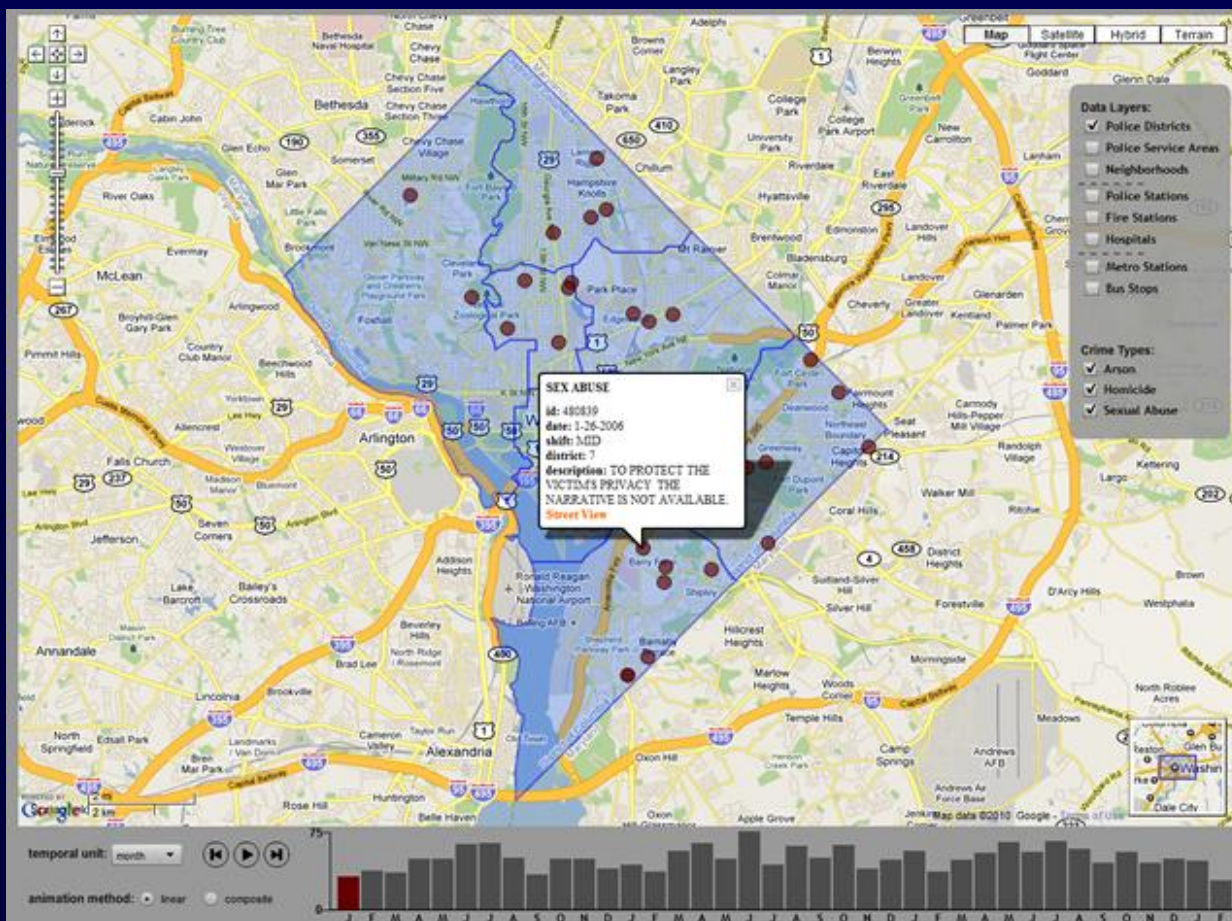
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GeoVISTA Center

Penn State University

Original Prototype



Code Library & Tutorial

```
1  import com.animation.CSVArray;
2  import com.animation.Bin;
3  import com.animation.AnimatedMap;
4
5  var fileName:String = "crimes.csv";
6  var latName:String = "latitude";
7  var longName:String = "longitude";
8  var myCSVArray:CSVArray = new CSVArray (fileName, latName, longName);
9
10 var dataColumns:Array = new Array ("temporalWeek");
11 var labelColumns:Array = new Array ("labelWeek");
12     var binArray:Array = new Array();
13     for (var i:int = 0; i < dataColumns.length; i++) {
14         var bin:Bin = new Bin (myCSVArray,dataColumns[i],labelColumns[i]);
15         binArray.push(bin);
16     }
17
18 var key:String = "ABQIAAAAhjVwPC33U9Ph_NTg2AtD4RQs019z176na-d-7NF3sS6ek8haumCyfqzEBA";
19     var lat:Number = 38.895;
20     var long:Number = -77.000;
21     var scale:Number = 12;
22     var myMap:AnimatedMap = new AnimatedMap(key,lat,long,scale,stage,binArray,dataColumns);
```

Cartographic Perspectives - Fall 2009 - Special Digital Issue

Roth RE and KS Ross. 2009. Extending the Google Maps API for Flash for Event Animation Mashups. Cartographic Perspectives 64: 21-40.

Usability Study

Talk Aloud Discount Usability Study

Who: 5 participants (2 undergraduates, 1 graduate, 2 faculty)

Where: Human Factors Lab, 229A Walker Building

When: 11-13 November 2009

How: one administrator, two note takers recording critical incidents

Talk Aloud Protocol (60 minutes)

- Introduction (5 minutes)
- Opening (5 minutes)
- Tasks (35-40 minutes)
- Cognitive interview (10-15 minutes)

Talk Aloud: Method

Cognitive Interview

- C1.** What did you particularly like or thought worked well about the application?
- C2.** Can you remember specific incidents when the interface was confusing or difficult to use?
- C3.** Do you have any suggestions for improving components of the existing interface?
- C4.** What additional visualization or spatial analysis functionality should be included in the application?
- C5.** Do you have any general comments or concerns about the application that we have yet to discuss?

Talk Aloud: Results

Data Layers Panel (WHAT) & Data Issues

	P1	P2	P3	P4	P5	Fre q	Fix ?
Application breaks when viewing 'Bus Stops' data layer	x	x	x	x	x	5	Yes
Sexual abuse cases after 2006 not mapped	x	x	x	x	x	5	Yes
Loading screen does not provide feedback	x			x		2	Yes
Add a data layer with metro lines as well as stations			x			1	No
Data Layers panel overlaps the Google Maps inset	x					1	No
Add a layer reset feature			x			1	Yes
Crime layer check boxes low on the visual hierarchy				x		1	Yes
One misregistered data point		x				1	Yes

Temporal Controls (WHEN) & Histogram Issues

	P1	P2	P3	P4	P5	Freq	Fix?
Ambiguity in the meaning of linear and composite aggregation	x	x	x	x	x	5	Yes
Add ability to select multiple histogram bars for persistent highlighting in the map	x	x	x	x	x	5	No
Lag in the animation and in histogram brushing when there are a small number of bins	x	x	x	x	x	5	No
Ambiguity in the meaning of temporal unit when composite is applied	x	x		x	x	4	No
Data filtering not reflected in the histogram tool tip		x	x		x	3	Yes
Add a clear division by year for the linear-month histogram	x		x			2	Yes
Add a scroll feature to the histogram so that the bins could be wider				x	x	2	No
Animations continued to play or stopped in unexpected ways when interacting with the histogram or map		x	x			2	Yes
Unclear labels on temporal legend	x				x	2	Yes
Unable to discriminate the different types of crime in the histogram without brushing				x		1	Yes
Add ability to customize the bin widths					x	1	No
Add a reset animation feature		x				1	No
Ambiguity in interpreting composite-month because of extra Jan and Feb from 2009		x				1	Yes

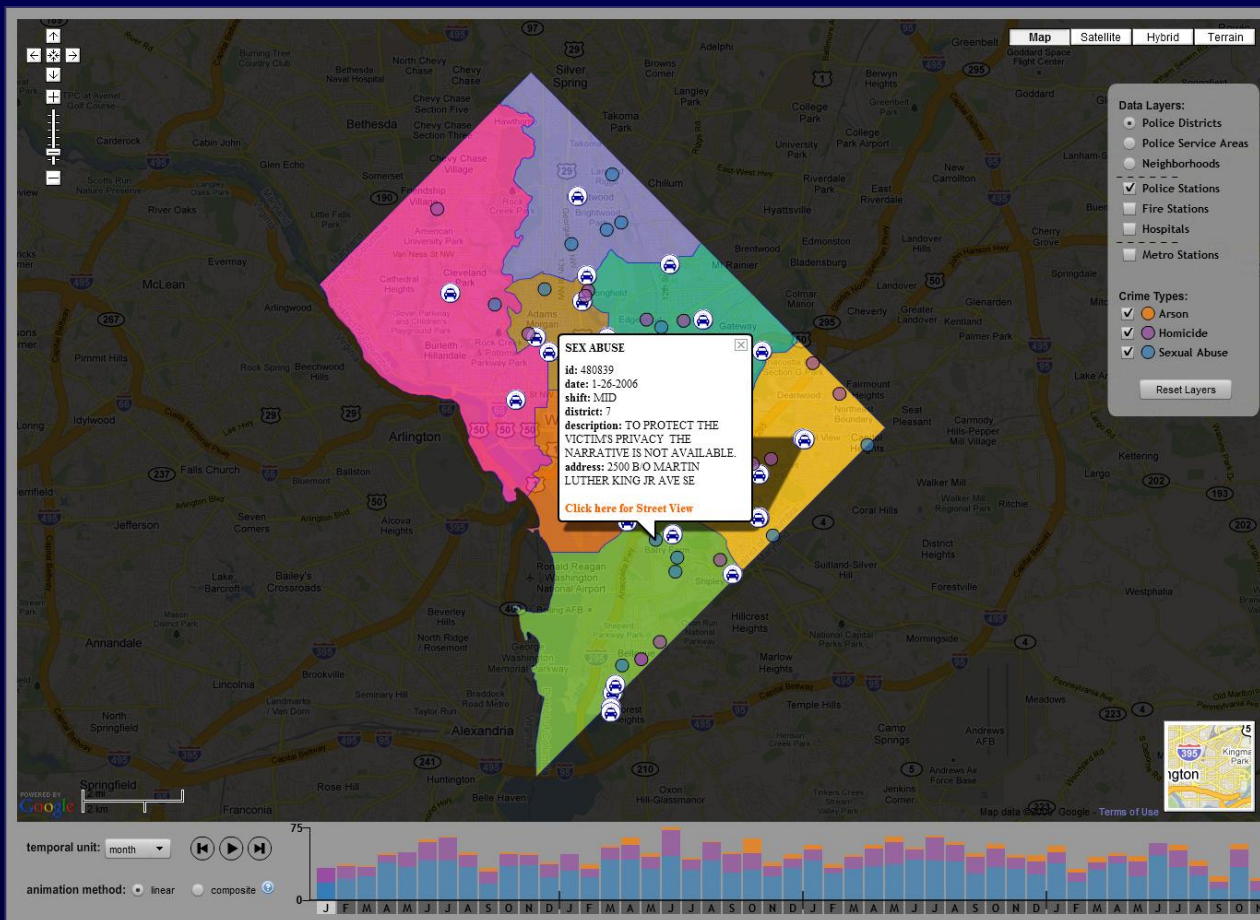
Spatial Controls (WHERE) & Map Issues

	P1	P2	P3	P4	P5	Fre q	Fix ?
Add a search feature by police record number	x	x	x	x	x	5	No
Add a search feature by address	x	x	x	x	x	5	No
Unable to discriminate the different areal boundary layers because they are the same color	x	x	x	x	x	5	Yes
Unable to retrieve information about districts (both IDs, population, and incidents) and POIs	x	x	x	x	x	5	Yes
Overlapping incident symbols / Too much data on the map / Add data aggregation option	x	x	x	x	x	5	No
Unable to discriminate the different types of crime without filtering/brushing them		x	x	x	x	4	Yes
Add scroll zooming using the mouse wheel	x	x			x	3	Yes
Add ability to zoom into a feature	x	x			x	3	Yes
Add a spatial extent reset feature		x	x	x		3	Yes
Add a measurement tool (linear) or distance query tool (circular from point)	x	x			x	3	No
Unable to discriminate the different Points of Interest		x		x	x	3	Yes
Add cluster analysis feature		x		x	x	3	No

Spatial Controls (WHERE) & Map Issues

	P1	P2	P3	P4	P5	Fre q	Fix ?
Lag in panning and zooming when numerous points are shown	x					1	No
Add a search feature by Point of Interest					x	1	No
Add rubberband zoom using Shift+Drag		x				1	No
Unclear that Street View is available	x					1	Yes
Selection of 'fullscreen' instead of 'close' in Street View					x	1	No
Street View does not work in Internet Explorer					x	1	Yes
Information window should close when clicking outside of it		x				1	No
Information window should include the address		x				1	Yes
Add ability to show the case ID on mouse over of the point symbol					x	1	No
Add buffer feature				x		1	No

Talk Aloud: Results



revised DC CrimeViz prototype

VACCINE

Future Directions

Continue development on the DC CrimeViz prototype

- this includes needs that are currently met by existing software and those that are not currently met, specifically focusing on features that support analytical reasoning

Implement the CrimeViz concept for the Harrisburg, PA Police Department.

- hope to include follow-up study to learn about the insights generated by the tool

Thanks!

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Check out the application at:

<http://www.geovista.psu.edu/DCCrimeViz/>

For Further Information

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about **GeoVISTA**
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VACCINE

VACCINE
Visual Analytics for Command, Control, and Interoperability Environments
A U.S. Department of Homeland Security Center of Excellence

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Purdue University
Simon Fraser University, Canada
Stanford University
University of British Columbia, Canada
University of Houston, Downtown
University of North Carolina at Charlotte
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Visual Analytics for Command, Control, and Interoperability Environments

Healthcare Analytics Tool
Visual analytics for healthcare illustrates a region of interest concerning types of disease over a period of time.

About VACCINE
VACCINE's goal is to help this nation's 2.3 million extended homeland security personnel, including first-responders, perform their jobs more effectively by turning mass amounts of data into manageable information.

Featured Project
Pandemic Visualization (PanViz)
PanViz technology provides public health officials with a suite of visual analytic tools that allows analysis of various decision points (school closure, media reports and Strategic National Stockpile release) and their impact on the spread of influenza.

VACCINE News
Purdue to kick off national center to visualize homeland security data
Nov 05, 2009