

Introduction

The exploration of criminal, traffic and civil (CTC) incident reports for detecting trends, discovering anomalies and evaluating resource usage is an ever-expanding issue for law enforcement agencies. As such, tools need to be developed that assist law enforcement officials in their analysis in order to take preventive measures and judiciously allocate available resources.

We have developed a comprehensive visual analytics system on the iPhone platform called MobileVALET that provides police officials with the ability to analyze CTC data on the fly for in-field improved situational awareness.

Data

Our system has been developed using actual data from the law enforcement agencies in the VACCINE Public Safety Coalition. These include the Purdue Police, Lafayette Police, West Lafayette Police, and the Tippecanoe County Sheriff's Departments.

iPhone app

The MobileVALET system has been built upon our existing desktop version of the Visual Analytics Law Enforcement Toolkit (VALET) [1] and inherits some of its features. We have created an iPhone application for this system that runs as a client for visualizing the CTC data. A server-side system will provide this app with data via internet connection either through wifi or cellular data connection such as EDGE or 3G.

Spatial data, temporal data

There are two view modes in this application when visualizing CTC data:

- Map view for visualizing spatial data
 - A kernel density estimation heatmap is displayed on the map which helps users to identify hotspots.
- Graph view for visualizing temporal data
 - Users may interact with the graph on the device's touch screen to get the value on the graph. Also, users may get a time difference between two points which are valuable data when doing time series analyses.

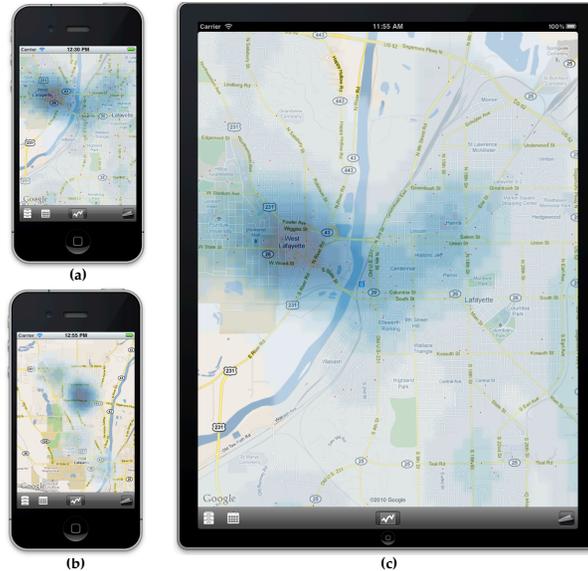


Figure 1: The MobileVALET client application showing crime locations on a map with the heatmap feature on the iPhone (a and b) and the iPad (c).

Filtering data

The MobileVALET system provides means of filtering data by time to aid users in identifying temporal patterns of crime offenses and its correlation with time, and filtering data by crime type to focus on specific crimes.



Figure 2: The crime type from CTC data can be determined when the user taps on an incident location on the map.



Figure 3: The graph view enables users to perform a time series analysis on crime data.

Figure 4: Data may be filtered by type of offense (a) or time (b).



Conclusion

These set of tools enable the users to analyze data more efficiently and accurately on a mobile device and at the same time, have the ability to receive an immediate feed of events. This is especially beneficial to first responders and allows them to respond more effectively to any situation and to better deal with day-to-day operations, strategic initiatives, and catastrophic events.

References

- [1] Abish Malik, Ross Maciejewski, Timothy F. Collins and David S. Ebert. *Visual Analytics Law Enforcement Toolkit*. IEEE International Conference on Technologies for Homeland Security, 2010.

Acknowledgments

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