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

# TRIP: Travel Response Investigative Profiler

Mission Need

As individuals' movements could have correlations with social and/or geo-temporal factors, it is critical to understand the movement behaviors and spatio-temporal patterns of individuals. Moreover, needs for integrated visualization and analysis of the spatio-temporal movement history motivated the development of our tool. TRIP enables spatio-temporal visualization, exploration and analysis among individual movements as well as individual movement and infrastructures. Given individual movement history, various geo-spatial and temporal cues are visualized. As geo-spatial cues, locations markers including newest/oldest indicators, driving routes, reachable areas along the routes and county boundary are overlayed on the map. The routes and reachable areas are also used to present possible relationships and shared areas among individuals' movement as well as individuals and infrastructures. As temporal cues, each location is numbered in temporal order. Route connecting locations changes its thickness to show that an individual moved towards the direction increasing the thickness. Furthermore, the duration of stay at each location is highlighted using ring shaped glyphs.

Benefit: TRIP is an ongoing project initiated to provide the prediction of individuals' movement through an integrated spatio-temporal visualization, exploration and analysis of multiple individuals' movement history. Various geo-spatial and temporal cues are incorporated onto the map without using separate views. In the future, correlation analysis among individual movements and infrastructures would provide users with tools of modeling individual's movement patterns.

Functionality:
- *Geocoding through secure socket layer*
- *Driving route among movement locations*
- *Reachable areas along driving routes*
- *Visualization of temporal cues*
- *Temporal filtering*
- *Linked table and map views*
- *Various visualization items*
- *Correlation between infrastructure and individual movements (working on)*
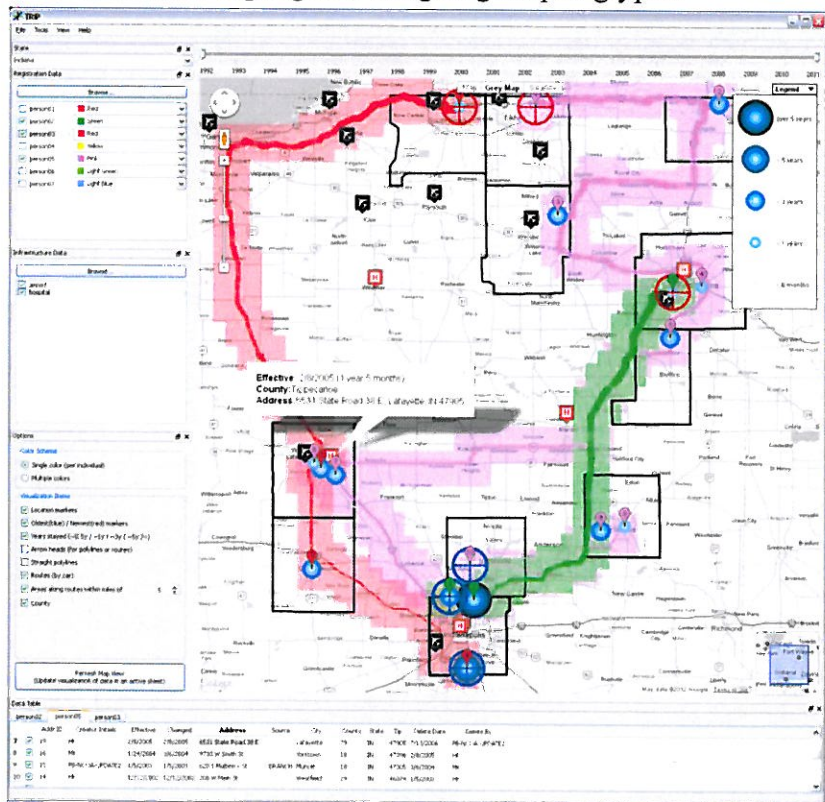
Multiple individuals' movement history visualized on the map with various spatial and temporal cues.

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- *US Department of Homeland Security*

Early Development   Lab Prototype   Commercial Product