LAHVA: Linked Animal-Human Health Visual Analytics

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Project Scope: The role of public health surveillance is to collect, analyze and interpret data about biological agents, diseases, risk factors and other health events in order to provide timely dissemination of collected information to decision makers. In order to help investigators analyze their data, we have developed a suite of statistical and analytical tools that couple novel data sources with human health data. Our LAHVA application provides investigators with the ability to visually search the data for clusters in both a statistical model view and a spatio-temporal view. This system can also be used for detecting natural or human-induced chemical or biological incidents and disease spread.

Recent Progress: Several potential outbreaks have already been analyzed with the use of our system. In June of 2006, the hazardous chemical mercaptan was released into the air from a toxic waste processing plant in Fairburn, GA. The cat and dog populations of Fairburn were retrospectively analyzed based on visits to Banfield Pet Hospitals presenting syndromes consistent with exposure to mercaptan.

Future Plans: This will include allowing users to interactively select areas of the map to analyze for potential health issues. We also plan to add time ghosting for an approximated contagious period. This period will be based on the syndrome and interactively modifiable.

Relevance to Advanced Data Analysis and Visualization: This work directly relates to the advanced data analysis and visualization field as we are creating a suite of visual analytics tools dedicated to enhancing health care data exploration for discovery of adverse events.

Publications:

1) Ross Maciejewski, Nita Glickman, George E. Moore, Cheng Zheng, Benjamin Tyner, William S. Cleveland, David S. Ebert, Susan Lance, John Horan, Lawrence T. Glickman. Companion Animals as Sentinels for Community-Exposure to Industrial Chemicals: The Fairburn, GA Propyl Mercaptan Case-Study. Public Health Reports, 123(3), May/June 2008. To appear.
2) Ross Maciejewski, Benjamin Tyner, Yun Jang, Cheng Zheng, Rimma Nehme, David S. Ebert,William S. Cleveland, Mourad Ouzzani, Shaun J. Grannis, and Lawrence T. Glickman.LAHVA: Linked Animal-Human Health Visual Analytics.IEEE Symposium on Visual Analytics Science and Technology (VAST), pp. 27-34, 2007.
3) David E. Anderson, Cheng Zheng, Ross Maciejewski, Ryan Hafen, William S. Cleveland, David S. Ebert, Mourad Ouzzani, Shaun J. Grannis.STL and Local Regression for Modeling Disease Surveillance Counts.In the abstracts from the 2007 Conference of the International Society for Disease Surveillance: Evaluation and Performance, Vol 4, 2007.

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