Situational Awareness During Mass-Casualty Events: Command and Control
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Abstract:
In existing Incident Command systems\(^1\), situational awareness is achieved manually through paper tracking systems. Such systems often produce high latencies and incomplete data, resulting in inefficient and ineffective resource deployment. The WIISARD\(^2\) system collects much more data than a paper-based system, dramatically reducing latency while increasing the kinds and quality of information available to Incident Commanders. The WIISARD Command Center solves the problem of data overload and uncertainty through the careful use of limited screen area and novel visualization techniques.

Currently, Incident Commanders make decisions using a paper-and-radio system. Triage, treatment, and transport officers fill out tallies and create written reports while also performing their primary duties. These reports are periodically hand-carried or called into the Incident Commander (IC), where they are manually reviewed, summarized, and posted. This labor intensive process creates variable latencies, and incomplete and low-resolution data.

The WIISARD system combines state-of-the-art data collection and display devices, database services, and 802.11 wireless communications to produce a consistent, real-time view of the disaster scene. It further improves on the paper system by automatically correlating and integrating data into map- and chart-based displays, giving IC insight for making better decisions with greater confidence.

WIISARD acquires data from field providers (using handheld computers), automatic patient tags, IC personnel, and external sources. It tracks patient and provider status, medication inventories, ambulance and hospital bed status, hot zone and plume locations, law enforcement zones, action plans, weather reports, network status, and device locations. This surfeit of continuously streamed data creates new technical challenges.

WIISARD’s Command Center overcomes the limitations of scarce physical drawing space by packaging role-tailored maps and charts in a tiled layout. IC can choose and arrange displays as the dynamics of the situation may require (See Figure).

Map displays are zoomable and scrollable, and off-map objects shown as “edge ghosts” to give geographical context. IC can select any of several overlays to both increase data density and reveal important correlations.

Chart displays show both summarized and correlated data in easy-to-read standard formats. Where information is uncertain (say, due to delayed reports from some field devices), charts are augmented to show the uncertainty’s nature and magnitude. Chart layout and coloring is optimized for use under harsh lighting conditions.

While the WIISARD system has been under development since 2003, the Command Center is new. Its design was strongly influenced by practicing emergency medical professionals and incident commanders. At its rollout at the Del Mar Fairgrounds Drill in November, 2005, IC expressed confidence that it could make unique contributions to safety, effective resource allocation, and the strategic planning process.

Future plans include views on newly defined WIISARD data; floor plans of sites; weather, plume; trends; and refinements on existing views to increase their data density and readability.

Acknowledgements: This work was supported by contract N01-LM-3-3511 from the National Library of Medicine.

REFERENCES: