Leveraging Partner's Insights for Distributed Collaborative Sensemaking

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Abstract

SAVANT is a web-based tool that enables information and knowledge sharing between remote partners through explicit and implicit communication to help them collaboratively analyze and make sense of distributed data. SAVANT's implicit sharing provides an opportunity to leverage partners' insights and reduce cognitive tunneling, and explicit sharing facilitates discussion. Both techniques assist collaborative sensemaking processes.

Author Keywords

Sensemaking; analytics; collaborative analysis; implicit sharing

ACM Classification Keywords

H5.2. User interfaces, H.5.m. Miscellaneous

General Terms

Design, experimentation, human factors

Introduction

Successful distributed collaborative sensemaking requires partners to forage information [4], share knowledge, consider multiple alternatives [1], and reach common ground. However, collaborators often do not have access to the same datasets, hindering the process and outcomes of collaborative sensemaking.
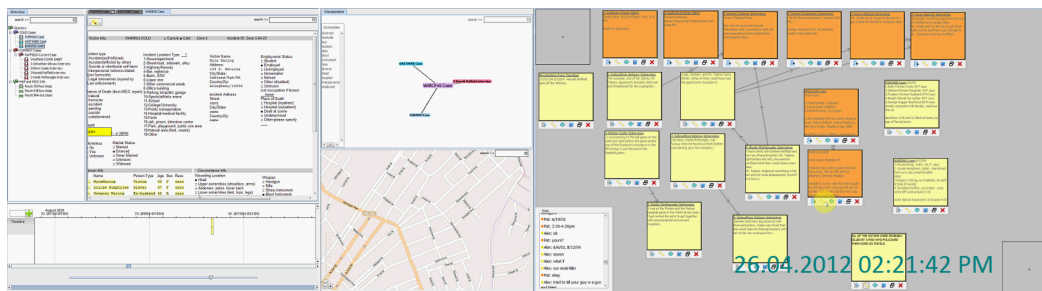

Figure 1. SAVANT set up as a collaborative crime analytics tool spanning two screens: Document Space (left) that includes data about crime cases and Analysis Space (right) for organizing notes and communicating implicitly and explicitly for collaborative sensemaking. The Document Space and the Analysis Space are enlarged in Figure 2 and Figure 3.
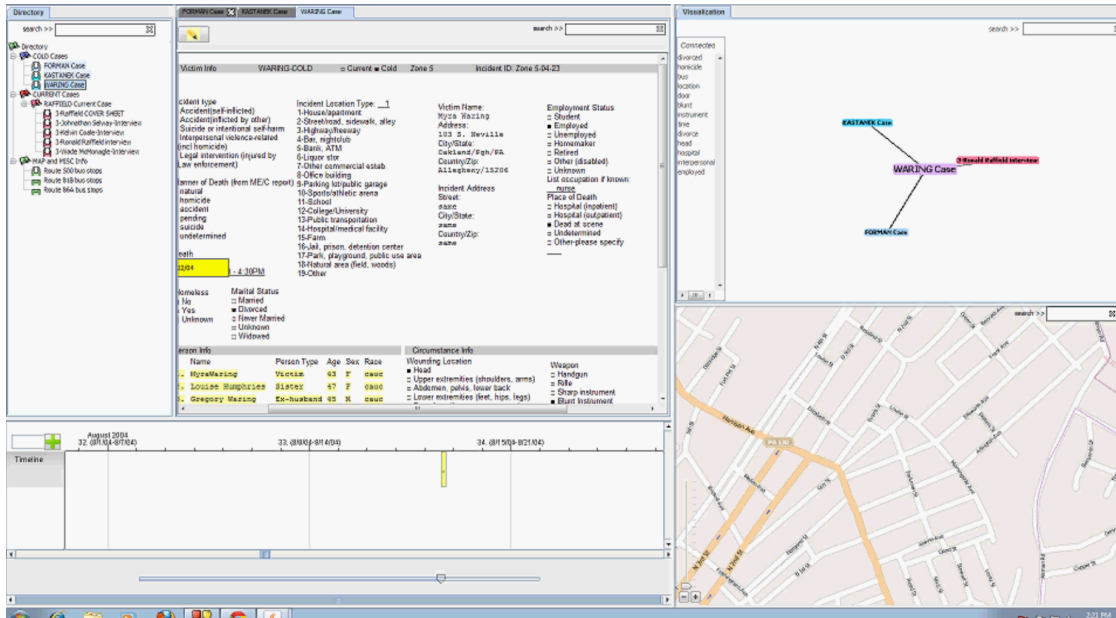
Figure 2. Left screen of SAVANT includes the Document Space with a directory to locate the data; a multi-tabbed view of this data in the form of documents; a visualization to observe and analyze the entity-based connections between the documents; a map to give geo-spatial location of the data entities; and a timeline to understand temporal patterns.

mentation makes its components easily replaceable with other modules, the current version of SAVANT has data and modules laid out for investigative and crime analysts. The current data used for testing SAVANT consists of crime-reports and cases.

The Document Space (Figure 2) is the space to access private data and view it. It provides a directory to locate the data; a multi-tabbed view of this data in the form of documents; a visualization to observe and analyze the entity-based connections between the documents; a map to give geo-spatial location of the data entities; and a timeline to understand temporal patterns. The Document Space also allows in-situ annotations of the data. Our ongoing work shows the strengths and weaknesses of the different elements of the Document Space for the sensemaking process [2].

The Analysis Space (Figure 3) is where the analyst may choose to externalize and reflect upon findings and information extracted from the data. The Analysis Space is connected to the Document Space through annotations made in the latter – by selecting data (e.g., text or figures) in documents, locations on the map, and events in the timeline. These annotations, made in the Document Space, appear automatically as digital post-it notes in the Analysis Space. As such, post-it notes provide new ways to archive knowledge, construct hypotheses about the data, and preserve links to the documents, map locations, and events in Document Space. The Analysis Space also supports creating new annotations in the form of digital notes without being connected to the Document Space.

To support knowledge sharing in a collaborative analysis task, SAVANT shares the digital post-it notes posted

SAVANT overcomes this difficulty by creating a space for collaborators to explicitly and implicitly share knowledge, information, and insights into data that would otherwise be hidden/inaccessible to their partners.

System Design
SAVANT has been designed based on existing research ([1],[2],[3],[4]) and input from pilot-testing of the tool with university students. SAVANT consists of two spaces (spanning two screens, Figure 1): Document Space and Analysis Space. While SAVANT's modular imple-
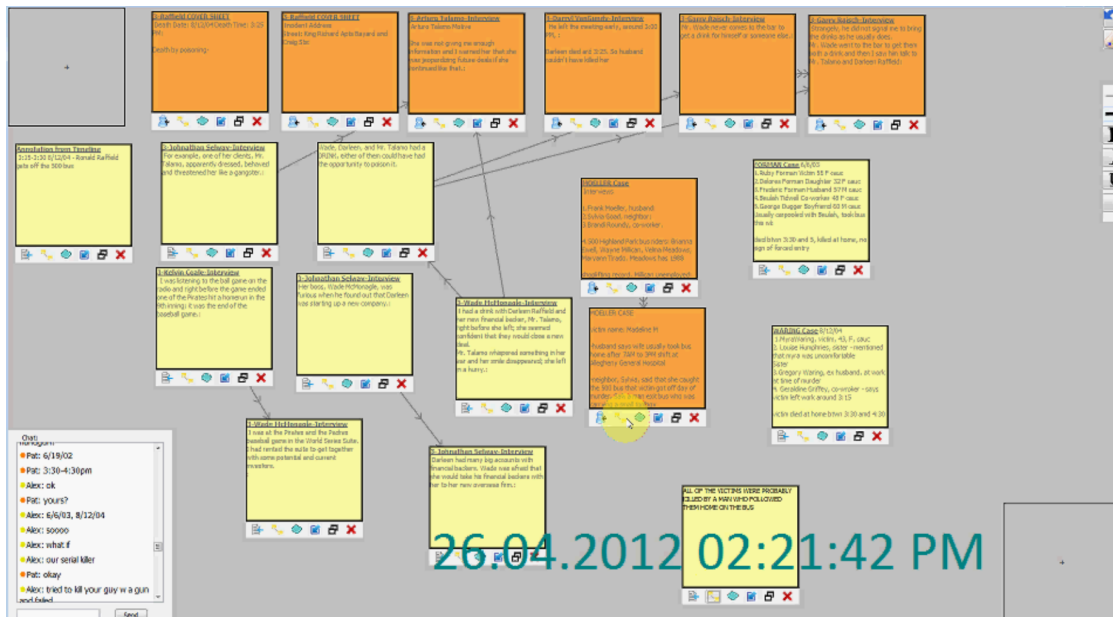
Figure 3. Right screen of SAVANT includes the Analysis Space, in which the analyst can create digital post-it notes, organize them in the space, and connect to other post-it notes through directed lines. Post-it notes are color coded by the collaborator who generated them – here orange and yellow. The bottom-left of the Analysis Space is a chat for direct communication among collaborators.

The Analysis Space fosters collaborative analysis and sensemaking by supporting inferential hypothesis generation in two ways: 1) users can draw connections between post-it notes via directed lines to create a story, and 2) they can visually organize notes in different ways in the Analysis Space (similar to card sorting or affinity diagrams). Hence, in a collaborative situation, one user may choose to create connections between one's notes and their partner's notes (shown in Figure 3 as lines between yellow and orange notes). The automatic sharing of post-it notes therefore serves to implicitly deliver peripheral artifacts between collaborators.

SAVANT supports the iterative foraging loop [4] by making partners' insights available for active gathering/filtering over passively shared post-it notes. SAVANT indirectly supports the sensemaking loop for alternative hypothesis generation [1] by facilitating user-generated connections or piles of post-it notes that explain and interpret the data. Additionally, while the original data may still follow privacy policies (collaborators may not have access to shared databases due to organizational constraints and policies), SAVANT still enables implicit sharing and knowledge synthesis.

SAVANT was tested with 34 pairs of university students acting as analysts to understand the effects of implicit sharing in a collaborative crime analysis scenario. Using a hidden-profile paradigm, each remotely connected collaborator received half of the documents required to solve a crime detection task and used SAVANT for one hour together to find a common pattern. Initial results show that implicit sharing benefitted collaborative sensemaking. SAVANT's modules may also be generalized beyond crime analysis into tools for collaborative

on the Analysis Space to create a virtually shared wall. That is, every post-it note created by one analyst can be seen by their partners on their Analysis Space. These notes are color-coded by creator, so that collaborators know who created each note. Because annotations are created and organized primarily for personal purposes of analysis or sensemaking and not for sharing purposes [3], we call this form of sharing *implicit*. At the same time, we provide an *explicit* way to share information among collaborators through direct communication in a built-in chat that is part of the Analysis Space.

learning by students in education or scholarly research. Further design directions are being considered.

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