Poster: Enhancing Text-Based Chat With Visuals For Hazardous Weather Decision Making

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Abstract

We created a visual chat application for use during hazardous weather events. The application, NWSChat2, allows National Weather Service forecasters, media members, and storm trackers to communicate with each other, basing their conversation on a common shared radar map of the storm. Users can additionally annotate the map with 'pins' or draw notes with a stylus. These annotations are automatically shared with all other users. The collaborative nature of NWSChat2 makes it well-suited for disseminating information to all users during weather emergencies.

Keywords: Collaboration, coordinated multiple views, instant messaging, emergency response, hazardous weather.

Index Terms: H.5.3 [Collaborative computing]

1 Introduction

During the last five years, the National Weather Service (NWS), in collaboration with the University of Iowa, has developed an instant messaging application. This tool, National Weather Service Chat (NWSChat), allows NWS forecasters, broadcast meteorologists, emergency management officials (EMs), and other stakeholders to discuss upcoming weather-related events. For example, broadcast meteorologists can ask NWS questions about new storm warnings, while EMs provide the status of tornado sirens in their area. In addition, storm trackers can notify everyone if a tornado is spotted.

Before NWSChat, this community used many older technologies, such as the National Warning System (NAWAS), a system designed in the 1950s to notify and prepare for a nuclear attack. Telephone was another common way to communicate during events. While not replacing such interpersonal communication technologies, anecdotal evidence suggests that NWSChat is becoming increasingly popular. At an Integrated Warning Team (IWT) workshop, EMs unaware of NWSChat were lining up to register, whereas those already registered were raving about its success. The application was thought to allow key weather enterprise communities, NWS forecasters, broadcasters, and EMs, to communicate faster and more efficiently.

As NWSChat has become more popular, and more users are providing feedback, its limitations have started to emerge. This poster presents the current tool and its limitations, outlines stakeholders’ ideas on a new tool, and describes our extended chat system with visualization and annotation capabilities, NWSChat2.

2 Background

When NWSChat went operational in 2008, it did so with the following purpose:

NWSChat provides NWS operational personnel with a quick, efficient means of exchanging hydrometeorological information with media partners, emergency management officials, and other members of the hazard response community. NWSChat fosters an effective two-way flow of time-sensitive information between the NWS and its partners during periods of hazardous weather, as well as during other significant natural and human-induced events. [1]

The current version of NWSChat (figure 1) generally meets their set out objectives. The chat system is quick, as it allows users to send instant messages, and it also creates a two-way flow of information. Although a success from these standpoints, recent criticisms have arisen during several NWS workshops, alluding to the efficiency and effective aspect of the above goal. Discussions with the stakeholders identified several major themes: the desire for spatial grounding of weather events, ease-of-use, and the ability to merge multiple information sources in a single view.

Placing the current NWSChat against these themes, it meets some of them, but falls far short of the visual, spatial, and geographic components. For this reason, we created NWSChat2, a version of NWSChat having an interactive visual, spatial interface alongside the chat. We designed NWSChat2 based on an iterative stakeholder process informed by past related efforts [2-4].

3 NWSCChat2

We implemented our tool, NWSChat2, to address the three major issues brought up by the stakeholders.

3.1 Chat rooms

Each weather service office has the ability to create an unlimited number of chat rooms. Additionally, each chat room can be limited to certain users, or users of certain type. For
example, a chat room may be configured to be open only to emergency managers and NWS forecasters.

NWSChat2 provides tabs across the top of the window to separate individual weather offices. On each tab, a dropdown box is used to select between chat rooms within the weather office. The main view is split into three sections. The left side contains the list of users currently in the selected chat room. The list is categorized by user role (media member, emergency manager, NWS personnel, etc.). An icon representing the user’s status also appears next to each item in the list. A button at the bottom of the list allows the user to invite others into the chat room.

3.2 Chatting within a room

The chat room messages appear in the middle section. We combined the idea of a chat room with a message board. This allows users to add messages to the room but also add annotations to any posted message. This organizes the structure of multiple conversations occurring within the chat room. This is especially useful when there are multiple simultaneous weather events. The chat room/message board also displays automated weather alerts that are issued by NWS.

3.3 The map viewer

The map allows users to zoom, pan, and select items placed on the map. Users can add pins to the map to indicate a geographic point of interest. When the user adds a pin to the map, a “pin added” message also appears on the chat room message board (figure 2E). This lets users add annotations to the pin. The map displays several overlay layers: continually updated radar imagery, live GPS locations of storm spotters, NWS weather warning polygons, and user-added pins.

As an example, a forecaster can add a pin to the map so that a storm spotter in the vicinity could investigate hail damage at that location. The storm spotter could then further annotate the pin with photos, video, and text about the hail damage.

4 CONCLUSION

NWSChat2 was designed based on iterative feedback from the existing users of NWSChat. While NWSChat has engaged interaction between forecasters, emergency managers, media and other stakeholders during hazardous weather events, users expressed several limitations of the existing tool. We developed NWSChat2 to address these limitations, mainly adding an interactive, geographic map-based interface as a visual component to the tool. We met with NWS meteorologist, Rick Smith, and a panel of 10 colleagues to evaluate our tool. The evaluation process saw strengths of NWSChat2, suggesting that it leads to better functionality and user satisfaction. One major limitation of this study, and a future step, is to conduct a real-time evaluation in a hazardous weather event to provide valuable insight to the overall functionality of the tool. It is difficult to foresee the challenges of group interactivity without a real-time analysis. Although there are still many other design features as well as analytic functions that can be incorporated into the tool, NWSChat2 makes significant progress in enhancing text-based chat with visuals for hazardous weather decision making.

REFERENCES