Using Social Media to Communicate During Crises: An Analytic Methodology

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Abstract

The Department of the Navy Office of Information has recently released its Social Media Handbook designed to provide information needed to safely and effectively use social media. This paper discusses the use of the Handbook for crisis communication and points out the need for a methodology that will help to find appropriate people with whom to share information for particular aspects of a crisis during Humanitarian Assistance missions. We argue that this methodology would establish a common construct for exchanging messages with civilian organizations. The next generation of military analysts will want to prepare for the challenges created by the increasing coordination of military operations with the activities of non-military postures. This methodology improves the Navy's ability to use social media to do this.

Introduction

The Emerging Media Integration Team at the Department of the Navy Office of Information (CHINFO) has recently put together a Navy Command Social Media Handbook designed to provide information needed to safely and effectively use social media. While not intended to be a comprehensive guide on command use of social media or to take the place of official policy, the Handbook provides a useful guide for navigating a dynamic communications environment.

Social media are changing the way information is diffused and decisions are made, especially for Humanitarian Assistance missions when there is increased emphasis on Navy commands to share critical information with other Navy command sites, government, and official

NGO (non-governmental organization) sites like the American Red Cross. In order to effectively use social media to support such missions, the Handbook suggests creating a centralized location to funnel information. This suggests that as the community of interest (COI) grows during a crisis, it will be important to ensure that information is shared with appropriate organizations for different aspects of the mission such as evacuation procedures, hospital sites, location of seaports and airports, and other topics relevant to the mission. For example, in the first 14 days of the U.S. Southern Command's Haiti HA/DR (Humanitarian Assistance/Disaster Relief) mission, the COI grew to over 1,900 users.

However, operational conditions vary considerably among incidents, and coordination between different groups is often set up in an ad hoc manner. What is needed is a methodology that will help to find appropriate people with whom to share information for particular aspects of a mission during a wide range of events related to the mission. CNA has developed such a methodology and we would like to test it in a small scale lab experiment.

Approach

We will mimic the famous experiments of social psychologist Stanley Milgram, who provided the first empirical evidence of "six degrees of separation" when constructing paths through social networks to distant targets. The model has been used subsequently for other applications including the identification of flows of information within organizations and the spread of information through large populations. However, the approach has never been applied to determine patterns of communication when the military coordinates its activities with non-military partners.

Using a unique message addressing rule, we will take an "emergent intelligence" approach that constructs paths through social networks as events occur. Emergent intelligence is a relatively new approach to intelligent agent-based computations that builds on behavioral models of animal colonies.

These animal models show how colonies can detect and respond to unanticipated environmental changes, including predator presence, resources changes, and other adverse conditions without a centralized communication and control system.

For example, the ant routing algorithm tells us that when an ant forages for food, it lays pheromones on a trail from source to destination. When it arrives at its destination, it returns to the source following the same path it came from. If other ants have travelled the same path, pheromone value is higher. Similarly, if other ants have not travelled along the path, the pheromone level is lower. If every ant tries to choose the trail that has higher pheromone concentration, eventually the pheromones accumulate when multiple ants use the same path and evaporate when no ant passes.

Just as an ant leaves a chemical trace of its movement along a path, our simulated agent will attach traces of its previous contacts by means of "digital pheromones" to each message that it sends. We will do this by ensuring that all communicators along the path are kept informed of all previous communicators in the path. Suppose, for example, that "A", "B", and "C" are three communicators (nodes) in a social network. "A" starts a path on a particular topic by sending a message to "B". "B", in turn, decides to send a message to "C" on the same topic. Thus far, this is similar to the Milgram experiment, in which a "path" was created as a letter was forwarded from friend to friend until it reached a designated "target" in the network. However, in this case, the target "emerges" from the interaction of A, B, and C. Another major difference is that we will apply a simple message-addressing rule that asks each communicator to "copy" (say, on a "cc" line in an e-mail message) all previous communicators on a topic when it chooses to send a message on that topic. This message-addressing rule achieves two major objectives:

- It guarantees that all nodes along the path are **automatically** kept informed of all previous communicators in the path on the topic. This provides the important feedback that socio-technologists have shown to be very important in the control of large-scale coordination during evolving operations.

- It avoids key words by **defining** a topic through communication that represents a path in a social network. This provides a way to deal with changing topics and an uncertain organizational structure in an evolving crisis.

Other benefits

Perhaps the greatest advantage of our approach is that it allows us to analyze the resulting networks for lessons learned over the course of an operation. We are able to perform both **structural** analyses to determine "who talks to whom" as well as **content** analyses of "who talks about what" for specific events as a social network evolves. It can be used as a planning tool to help commands identify ways in which social media can provide information in interesting ways to enhance situational awareness during crises.

There will also likely be a need in the future for models to show how the increasing reliance on social media will impact conventional military command and control and the technologies used to coordinate activities, especially as the military continues to see greater use of non-hierarchical communications for complex interactions. Although the Handbook is not intended to take the place of official policy, collaboration with partners external to the DoD is expected to grow when conducting stability, security, transition, reconstruction and humanitarian missions. Commanders will want to know how social medial can be used to plan and execute their own programs, especially in future complex, dispersed environments. Ultimately, an approach to decision making that relies on local interactions to produce complex, emerging behaviors in "larger" systems of systems is expected to result in increased speed of command, self-synchronization of forces, and higher situational awareness.

Recommendation

The application of "emergent intelligence" with a message-addressing rule created by CNA could be used to enhance sharing of information via social media during a crisis. A small-scale experiment will provide an opportunity to test its ability to:

- Establish a common construct for exchanging messages with civilian organizations
- Provide feedback
- Gain an understanding of how social media are used for evolving events
- Help to determine patterns of communication when the military coordinates its activities with non-military partners
- Pave the way for the development of technologies that can automate the process.

Potential tasks

Task 1: Design a small scale experiment

We will design an experiment in which participants send messages to each other to coordinate their response to simulated events in a scenario. The team will represent the military, government agencies, NGOs, and private voluntary organizations and will be asked to resolve complex coordination problems during an evolving military mission.

Task 2: Perform the experiment

Using a unique message addressing rule, messages relating to the experiment will be isolated from the larger social network of all messages sent and received during the experiment.

Task 3: Construct a structural and content analysis

We will analyze how the structure of the network evolved over the course of the experiment. A content analysis will be performed of the resulting chain of messages.

Task 4: Document findings

The experiment will determine the capabilities and liabilities of using an emergent behavior approach toward the control of large-scale coordination during evolving operations. It will illustrate how a simple message addressing rule can be used to create links between

commanders suing social media to improve speed of command, self-synchronization of forces, and higher situational awareness. The next step would be to automate the process. This technology could then be used by any organization seeking to resolve complex coordination problems with other organizations when responding to an evolving event.

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