

Social Media and Meta-Networks for Crisis Mapping: Collaboratively Building Spatial Data for Situation Awareness in Disaster Response and Recovery Management

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After a disaster strikes, answers to questions like, “Who is hurt?” and “Where is the hardest hit area?” may not be so easy to answer. Either while ongoing or after a disaster has occurred, too often the worst hit areas are not detected quickly enough. Due to a lack of awareness, this poses an even greater problem in rural or in the more isolated areas where communications have either failed, worked intermittently on a good day or are absent. No databases may exist providing geographic data on these more isolated or rural areas. The two earlier questions identify the problems this position paper tackles: (1) how do you identify impact zones and then once identified, (2) how do you populate a database with spatial data? Disaster assessment and situational awareness is required to support response and recovery efforts. Locals need to know where to go for help and responders need to know where to go to help those in need. A common site can be created for all stakeholders providing access to a map where anyone can use and access the map anytime and anyone can add information to the map anytime.

Searching for Signals

In AI there’s the concept of “active learning,” in which a supervised learning procedure requests samples from regions of the sample space where it has too little data. In monitoring some system (e.g., a network) for trouble, the absence of signals from some part of the system can indicate a failure there. Interspersed information will produce less data and may be a trigger indicating the system or someone to take a more in-depth look. So in a disaster, if messages are coming in from everywhere but some spots, maybe the damage is worse in those spots, and they merit investigation.

Crowd-sourcing and Crisis Mapping

In many rural areas and many underdeveloped areas there are not adequate databases on such things as vulnerable areas or locations adequate for temporary shelter. Only the locals may know this information. What one wants is a collaborative spatial data system such as Wikimapia where any participant can *pin* given symbols and text explanations along with other valuable information (videos, pics, links to sites) to a given site even if someone trained has to go around to locals who don’t have the use of the web to collect the locations and what characterizes them.

The recent rain and wind storms that nearly destroyed but also flooded the tent sites where large numbers of Haiti refugees were stranded after a year has gone by, is one example as there was no real data to even base the decisions of where to locate other camp sites.

Crisis mapping as such can be the result of technological support given *volunteerism* and the acquisition of spatial data through crowd-sourcing. Information can be added to the map anytime and by anybody. Hospitals and temporary shelters can be identified by those who know the area best, the locals while data integrity issues are handled by those dedicated to support the system itself. Trained personnel using social media along with mobile technology and other web based methods of communication can help fill the gaps in missing data whereby real time crisis mapping can create and provide geo-spatial information for time critical response needs.

The Power of Social Media

In a single Tweet, more information can be provided building a very informative crisis map. A picture, video or link to another document (or two) can be sent along with a Tweet. Additionally, if the geoLocation device is turned on, other information is stamped with the 140 character blog. The Twitter account name, time, source of technology (TweetDeck, Droid, etc), and the longitude and latitude is sent making it such that the information is immediately mapped and available for real time decision making. People can build the streets where locals can identify buildings and shelters and other information that is needed. This information can be recorded and added to the data layers.

Conclusion

Building the capability to gather geospatial intelligence anywhere, anytime using social media along with web 2.0 technologies in a real time environment can provide feasible solutions to real problems that exist not only locally (The Conference Center, Katrina, New Orleans, 2005) but also globally (Haiti Earthquake, Pakistan Floods and now preparing for the Cholera outbreak in Haiti). By utilizing methods such as what was described here, ad hoc information can be created to help manage the unexpected. Collaboration among stakeholders provides a visual interpretation of data, crisis mapping offering decision makers and victims a way building collective intelligence from a grassroots effort. By creating such a tool, responders can better take care of the needs of the vulnerable population and victims.