A georeferenced digital 'comic' to improve emergency management

March 12 2012

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Spanish researchers at the Universidad Carlos III of Madrid have developed a computer application that allows georeferenced images that have been uploaded to social networks on the Internet to be recovered, located on maps and organized like a comic to create a visual perspective of a specific story, such as a crisis situation or an emergency.

The system the UC3M researchers have created, with the collaboration of La Sapienze University of Rome (Italy), facilitates the search for photographs related to a specific theme, time or place that internauts post on social networks like Flickr. Afterwards, the application allows those images to be placed on maps based on their geographic coordinates, and filtered to include only those that the user is most interested in. The result is a digital story that can be shared with other users and which creates a visual summary that can aid in the understanding or documentation of a certain situation. "This is a tool – explains one of its creators – for exploring and studying emergency situations during the mitigation phase, in order to learn from them and improve the contingency plans or to establish better preparation mechanisms for citizens", says Paloma Díaz, Full Professor in UC3M's Computer Science Department.

The application, baptized with the name eStorys, can help the professionals involved in emergency management to obtain data and images to understand how citizens perceive these situations or to detect flaws and areas that can be improved, according to the researchers. In addition, it allows information to be retrieved very quickly, since there is a tremendous amount of communication traffic in networks like Flickr, Twitter or Facebook during crisis situations. This has already been demonstrated in several cases, such in the aftermath of Hurricane Katrina or the terrorist attacks in London in 2005, when these systems proved to be very useful for contacting victims, updating alerts or following the course of the events.

The researchers present this system in a paper which was recently published in the *Journal of Visual Languages and Computing*, and in which they also analyze the system's efficiency and ease of use. To do this, they first compared the system to other tools that enable users to recover photographs published in social networks such as Panoramio and FlickrMaps by means of a use scenario. Then, several expert users

applied Nielsen's heuristics (which include principles of usability) to improve the interface design. Finally, an experimental evaluation with more than thirty participants was carried out in order to validate the usefulness of the proposal. According to the article's summary of conclusions, the system proved to be easy to use and exhibited good integration of its functional qualities.

Testing by emergency management professionals

This platform has also been evaluated through interviews with emergency management professionals in British Columbia (Canada) and the state of Washington (EEUU). "The results suggest that governmental agencies prefer to approach the social networks through more restricted communities, practice communities or special interest communities, so that the credibility of the information can guaranteed," comments Paloma Díaz. "The lack of reliability of the information found on the social networks continues to be one of the greatest impediments to their being incorporated into the process of emergency management," she concludes.

Nevertheless, the tool that the researchers have created can be used by anyone who wishes to compose the story of a specific crisis or emergency situation, such as a journalist, or by anyone who wishes to share their experience with others. This aim is in line with the objectives of a project financed by the Science and Innovation Ministry for a National Plan called urThey; the contribution to this project by these researchers from the Interactive Systems (DEI Lab) group at UC3M form part of this plan.

The DEI Lab boasts a very active line of research on Emergency Management Systems, which began more than ten years ago through a collaboration agreement with the Department of Civil Defense and Emergencies. The work carried out with this body helped identify a

problem that gave meaning and usefulness to the spatial and temporal filters used in eStorys. This application was developed in collaboration with a research group at La Sapienze University of Rome, lead by Professor Levialdi, who held a visiting Excellence Professorship at UC3M, co-financed by Banco de Santander, during which this project was completed. In short, this tool permits users to explore the concept of a disaster as a multidimensional event, which is lived and perceived in different ways by different people, depending on their roles in the disaster or how they are affected by it.

More information: eStorys: A visual storyboard system supporting back-channel communication for emergencies, Malizia, A. Bellucci, A. Díaz, P. Aedo, I. Levialdi, S. *Journal of Visual Languages and Computing*. Volume: 22. Issue: 2. Pages: 150-169. Published: APR 2011. ISSN: 1045-926X

Provided by Carlos III University of Madrid