Mining data from social media during times of natural or other disaster

March 28 2014

Computer technology that can mine data from social media during times of natural or other disaster could provide invaluable insights for rescue workers and decision makers, according to an international team writing in the International Journal of Emergency Management.

Adam Zagorecki of the Centre for Simulation and Analytics, at Cranfield University, Shrivenham, UK and David Johnson of Missouri State University, Springfield, USA and Jozef Ristvej of the University of Zilina, Zilina, Slovakia, explain that when disaster strikes the situation can change rapidly. Whether that is during flooding, landslide, earthquake or terrorist attack, understanding the complexities of the situation can mean the difference between saving human and animal lives, reducing environmental impact and preventing major economic loss.

The team points out that advances in information technology have had a profound impact on disaster management. First, these advances make unprecedented volumes of data available to decision makers. This, however, brings with it the problem of managing and using that data. The team has surveyed the state of the art in data mining and machine learning in this context. They have found that whereas earlier applications were focused on specific problems, such as modeling the dispersion by wind of plumes - whether from a chemical plant leak, fire or nuclear incident - and monitoring rescue robots, there are much broader applications, such as constructing situational awareness and real-time threat assessment.

Data mining during a disaster can pull in information from unstructured data from news reports, incident activity reports, and announcements, as well as structured textual data from emergency services, situational reports and damage assessment forms. In addition, it can utilize remote sensing data, as well as more frequently now, mobile phone images and video, and satellite and aerial images.

Critically, the team also reveals that the advent of social media is playing an important role in generating a real-time data stream that grows quickly whenever disaster strikes and those involved have access to wireless communications and or internet connectivity. In particular, data mining of social media can assist with the response phase of disaster management. This information can quickly provide data points for models that are not available in conventional simulations.

"Disasters often undergo rapid substantial evolution; therefore, disaster management is a non-uniform process characterized by phases, although these phases are not distinct in nature," the team reports, they have now highlighted the challenges and hinted at future trends that might improve disaster response through the use of modern data mining technology.

More information: "Data mining and machine learning in the context of disaster and crisis management", Adam T. Zagorecki, David E.A. Johnson, Jozef Ristvej - *Int. J. of Emergency Management* 2013 - Vol. 9, No.4 pp. 351 - 365, DOI: 10.1504/IJEM.2013.059879

Provided by Inderscience Publishers