

GeoSocial: ‘Social Sensing’ within the applied natural geohazard sciences

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ABSTRACT

Information and knowledge about a natural hazard event as it unfolds are vital to all four stages of emergency management: preparedness; response; recovery and mitigation. Those working within a 24/7 operational environment (such as the UK Met Office), remote from the hazard event, will want to know as much as they can about what the situation is and how it is unfolding. Information about natural hazards have traditionally come from scientific instrumentation, models and the media. However, information generated through social media, particularly when used alongside these traditional information sources, offers potential to enhance or verify risk-based models, real-time monitoring of vulnerability and hazard-related impacts, and provide insights into local resilience, all of which can improve situational awareness and inform the scientific response, helping disaster management.

Many uses of social media during hazard events focus on community driven uses and largely utilise volunteered (geographic) information, where it is actively being consented to, rather than the more ‘passive’ or ‘listening’ side of mining of information from social media. A growing number of scientists, however, are using different data analytic techniques (such as statistics or machine learning algorithms), computing platforms (such as GPUS, HPC clusters or Cloud systems), and data analytics tools (such as data-pipeline frameworks or scientific workflows) to capture data (both structured and unstructured) in novel ways, perform complex data analysis, find patterns, and scale data-driven applications. In response to the increasing need to gain better situational awareness of different geohazards around the world, the British Geological Survey (BGS) is exploring such novel data science analytical techniques and technologies through its ‘GeoSocial project’. GeoSocial is a ‘social sensor’ aiming to passively retrieve relevant information about geohazards from Twitter to use alongside other more traditional scientific instrumentation in order to gain a fuller understanding of a hazard as it unfolds. It uses similar text algorithms to retrieve potentially relevant tweets for the last 7 days about earthquakes, aurora borealis, landslides, flooding and volcanic eruptions.

Whilst there are many opportunities to obtain knowledge from social media, there are also many challenges. Obtaining reliable content that is accurately geo-located is just one concern. Ensuring that the information is not skewed by the sample demographic or language is another. Whilst these provide interesting research problems to solve, there are also important ethical principles that need to be considered when using such data. This presentation explores the value of passive social media mining (social sensing) in the applied natural geosciences and discusses the opportunities and challenges, including any ethical challenges, faced in using these data.