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SalanderMaps: A rapid overview about felt earthquakes through data mining of web-accesses

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While seismological observatories detect and locate earthquakes based on measurements of the ground motion, they neither know a priori whether an earthquake has been felt by the public nor is it known, where it has been felt. Such information is usually gathered by evaluating feedback reported by the public through on-line forms on the web.
However, after a felt earthquake in Switzerland, many people visit the webpages of the Swiss Seismological Service (SED) at the ETH Zurich and each such visit leaves traces in the logfiles on our web-servers. Data mining techniques, applied to these logfiles and mining publicly available data bases on the internet open possibilities to obtain previously unknown information about our virtual visitors. In order to provide precise information to authorities and the media, it would be desirable to rapidly know from which locations these web-accesses origin.
The method 'Salander' (Seismic Activitiy Linked to Area codes - Nimble Detection of Earthquake Rumbles) will be introduced and it will be explained, how the IP-addresses (each computer or router directly connected to the internet has a unique IP-address; an example would be 129.132.53.5) of a sufficient amount of our virtual visitors were linked to their geographical area. This allows us to unprecedentedly quickly know whether and where an earthquake was felt in Switzerland. It will also be explained, why the method Salander is superior to commercial so-called geolocation products. The corresponding products of the Salander method, animated SalanderMaps, which are routinely generated after each earthquake with a magnitude of M>2 in Switzerland (http://www.seismo.ethz.ch/prod/salandermaps/, available after March 2013), demonstrate how the wavefield of earthquakes propagates through Switzerland and where it was felt. Often, such information is available within less than 60 seconds after origin time, and we always get a clear picture within already five minutes after origin time.
Furthermore, the method allows to detect earthquakes solely on the analysis of accesses to our web-servers. Analyzing more than 170 million web-accesses since 2003, all seismic events within or near Switzerland with magnitudes M>4 and most felt events with magnitudes between 3 and 4 were detected. The current system is very robust, as we only had one false alarm while re-processing the web-access logfiles of the past almost 10 years. We anticipate that this method will produce even faster results in the future as the number of both commercial and private internet users is - according to the statistics of our logfiles - still increasing.