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ShakeMapple : tapping laptop motion sensors to map the felt extents of an earthquake

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There is a significant pool of untapped sensor resources available in portable computer embedded motion sensors. Included primarily to detect sudden strong motion in order to park the disk heads to prevent damage to the disks in the event of a fall or other severe motion, these sensors may also be tapped for other uses as well. We have developed a system that takes advantage of the Apple Macintosh laptops' embedded Sudden Motion Sensors to record earthquake strong motion data to rapidly build maps of where and to what extent an earthquake has been felt. After an earthquake, it is vital to understand the damage caused especially in urban environments as this is often the scene for large amounts of damage caused by earthquakes. Gathering as much information from these impacts to determine where the areas that are likely to be most effected, can aid in distributing emergency services effectively.

The ShakeMapple system operates in the background, continuously saving the most recent data from the motion sensors. After an earthquake has occurred, the ShakeMapple system calculates the peak acceleration within a time window around the expected arrival and sends that to servers at the EMSC. A map plotting the felt responses is then generated and presented on the web.

Because large-scale testing of such an application is inherently difficult, we propose to organize a broadly distributed "simulated event" test. The software will be available for download in April, after which we plan to organize a large-scale test by the summer. At a specified time, participating testers will be asked to create their own strong motion to be registered and submitted by the ShakeMapple client. From these responses, a felt map will be produced representing the broadly-felt effects of the simulated event.