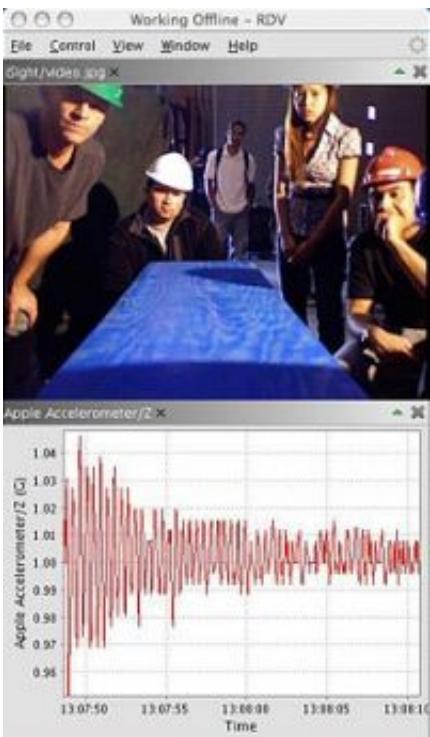


Would you like a large shake with that little Mac?

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Shake Per View – Participants in a project led by SDSC's Network for Earthquake Engineering Simulation Cyberinfrastructure Center (NEESit) demonstrate iSeismograph, a new software tool for students to study, store and share data using a widely available, cost-efficient and compact platform – a laptop computer. The video camera in all newer laptops shows a view of a shaking board (top) while the computer's sudden motion sensor records real-time motions on a graph (bottom). Credit: San DiegoSupercomputerCenter, UC San Diego

What began as a way to prevent damage to the hard drive from a dropped laptop has led to an innovative project that lets seismology and engineering students or researchers study, store and share data to better understand the science of structural dynamics — be it a gentle tap or a full blown tremor.

Researchers with the Network for Earthquake Engineering Simulation Cyberinfrastructure Center (NEESit) at the San Diego Supercomputer Center created a new application by writing dedicated, open source software programs that combine the tri-axis accelerometer, or sudden motion sensor built into every recent Apple laptop, with the iSight video camera that's used in newer Intel-based laptops for videoconferencing.

While free downloads of the SeisMac 2.0 software, developed under a separate grant from the National Science Foundation, are available to turn Apple's OS X application laptops into real-time seismographs, the SDSC's iSeismograph project was envisioned as providing researchers with a data acquisition system for acceleration measurement using a widely available, cost-efficient and compact platform — a laptop computer.

"We believe this initiative has strong potential as an educational and research tool to stimulate interest in engineering and science at the earliest levels, and to promote the development of future leaders, particularly in the field of earthquake research," said Lelli Van Den Einde, assistant director of the NEESit program based at SDSC, an organized research unit at the University of California, San Diego. "In addition, the combination of commercially available technology and open source software creates an ideal environment for worldwide collaboration and access at the university and post-graduate levels."

SDSC researchers have already conducted a pilot classroom project with about 90 UCSD students participating as part of an undergraduate

earthquake engineering course. The students, who had little or no experience in measuring structural dynamics, benefited from the visual and quantitative demonstrations, enabling researchers to suggest curriculums for future classroom demonstrations and study.

Specifically, SDSC researchers found a way to link the existing accelerometer and video sensor in all newer Macintosh laptops to its NEESit Real-time Data Viewer (RDV), which provides a graphical display of the movement. That, in turn, was linked to the Open Source Data Turbine, a streaming middleware system funded by the National Science Foundation used for sensor-based observing of a full range of environmental events, from structural analysis to weather data.

Once data from an event is captured in the Data Turbine server's archive, it is automatically transferred using the laptop's wireless network interface into the NEEScentral database repository, where students and researchers can collaborate on a global scale by analyzing, processing and sharing information. NEEScentral is a high-level data storage model that is universal to all earthquake engineering disciplines and contains information on how to archive and share data.

Software from the iSeismograph project can be downloaded for free by accessing it online at <http://it.nees.org/software/iSeismograph> for installation in any MacBook laptop. Data can be shared through the NEESit Data Repository (NEEScentral) after a user account is established by accessing <https://central.nees.org/acct/index.php>.

Researchers are scheduled to present full details of the iSeismograph project this October at the 38th annual ASEE/IEEE "Frontiers in Education" conference in Saratoga Springs, New York.

Source: University of California - San Diego

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