

QCNLive User Manual

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URL: <http://qcn.stanford.edu>

Description:

QCNLive is interactive software developed at Stanford University for hands-on education about Earthquake Seismology. There are several modules within QCNLive for learning about earthquake vibrations and where earthquakes occur. The software measures and plots real-time motions acquired from several types of internal and/or external Micro-Electro-Mechanical System (MEMS) sensors. For a list of types, please see below.

Computer Specifications:

QCNLive is compatible with OSX and Windows (XP and Vista). Some features are limited to computers with internal or external MEMS accelerometers. The currently included accelerometers come standard on:

Apple Laptops: MacBook (All)
MacBook Pro (All)
MacBook Air (All)
iBook (2006 or later)
PowerBook (2006 or later)

IBM Laptops: Thinkpad (2003 or Later)

Lenovo Laptops: ThinkPad (All)

The software currently works with peripheral sensors connected through the USB port. Compatible sensors include:

Code Mercenaries: JoyWarrior24F8 (Modified with Cable)

Many new laptops and other technologies include accelerometers. Many of these will soon be included in QCNLive:

Laptops:
Acer Laptops: ????
HP Laptops: ????
Fujitsu Laptops: ????

Sony Laptops:	Vaio
Cellular Phones:	
Apple:	iPhone
Nokia:	N95
USB Accelerometers:	
MotionNode:	MotionNode Accel
Game Consoles:	
Nintendo:	WiiMote

Disclaimer:

The developers of this software, and Stanford University are not responsible for any harm that may result from the use of *QCNLive* or the behavior of individuals using *QCNLive*. Even though the software is capable of measuring strong motions and forces, we do NOT recommend applying strong motions or forces directly to or near any computer!

Download QCNLive:

To download *QCNLive* go online to <http://qcn.stanford.edu/QCNLive/>

Installing QCNLive:

Installation of *QCNLive* is different on OSX and Windows operating systems. After downloading *QCNLive* from the website, follow these operating system specific directions.

OS X Operating System:

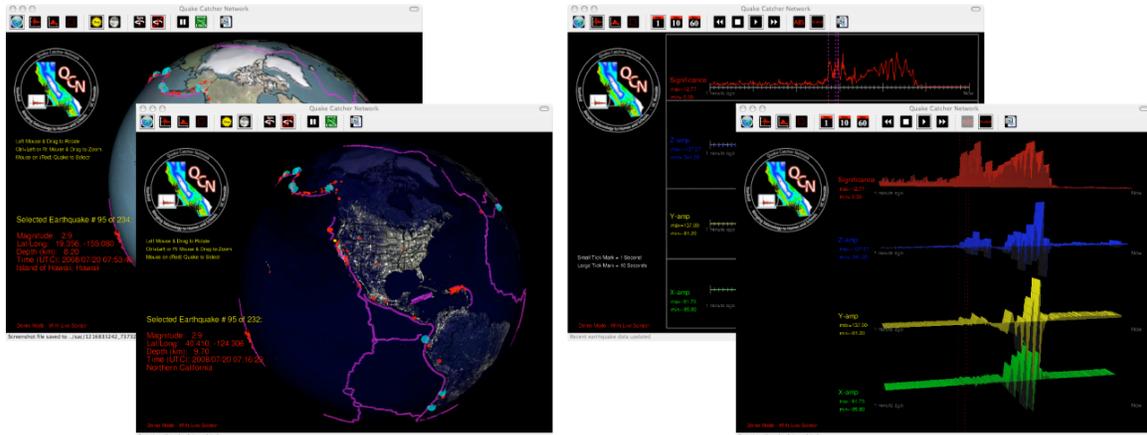
Unzip the downloaded archive. OS X typically has a bundled unzip program (e.g., BomaArchiveHelper). To unarchive the file one typically double clicks on the file with the arrow cursor. If you do not have a program to unzip, Stuffit Expander is very helpful (<http://shop.smithmicro.com>). Move the folder “*QCNLive*” into either your Applications folder or your Documents Folder.

Windows Operating System:

Unzip the downloaded compressed file.

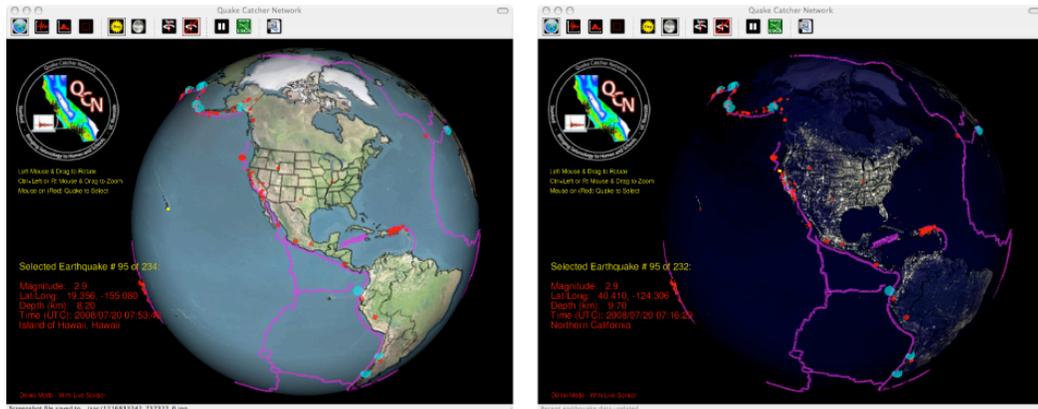
Running QCNLive:

To run the program, double click on QCNLive. This should bring up the graphical interface. There are several modules for QCNLive: Earthquake Viewing & Sensor Viewing.



Earthquake Viewing Mode:

This is the first screen displayed when QCNLive starts. You should see 1) the globe, 2) red spheres at the surface of the Earth, 3) blue spheres at the surface of the Earth, 4) pink lines at the surface of the Earth, 5) a menu bar at the top, and 6) text along the left side of the window.



Each red sphere represents an earthquake that occurred within the last week (if the computer has Internet access), or within the last week of when the software was last run with Internet access. The size of the sphere increases with the magnitude of the Earthquake. The transparency of the sphere represents increases with the age of the earthquake (solid red is most recent). You can click on each red sphere with the left mouse button, and it will change colors to yellow. When yellow, information about the Earthquake will be displayed at the bottom left (location, magnitude, and when it happened). If you click anywhere on the globe or on a

sphere the Earth will stop spinning. If many spheres overlap, you may have to click several times. With each click *QCNLive* cycles through the earthquakes, from the most recent to the oldest.

Each blue sphere is a historic earthquake with magnitude greater than 7.9 that occurred in the past 100 years. You can click on each blue sphere with the left mouse button, and it will change colors to yellow. When yellow, information about the Earthquake will be displayed at the bottom left (location, magnitude, and when it happened).

The pink lines at the surface of the globe are plate boundaries. This is where the continental and oceanic plates separate, converge, or slide by each other. Notice that most, earthquakes (red or blue spheres) occur near the plate boundaries.

You can rotate the globe in any direction by clicking on the globe with the left mouse button and moving the cursor before releasing the left mouse button.

You can zoom in on the globe by clicking it with the right mouse button, and dragging the cursor up or down before releasing the button. For Mac users without a right button, hold the “ctrl” button and then click and hold the mouse button while dragging. Up zooms out. Down zooms in.

There are “Day” and “Night” views that can be toggled back and forth with the “Day” and “Night” buttons at the top of the screen in the menu bar. The day view is the first view displayed when *QCNLive* is started. The day view shows where the continents and oceans are. The night view shows where modern cities are (humans create light at night time). Where humans and earthquakes overlap, there is the greatest seismic hazard.

The program has an auto-spin and a no-spin mode, which can be change with the “spin” and “no-spin” buttons.

The || button retrieves the latest list of earthquakes from the USGS website.

The www USGS button jumps to the USGS website for the currently selected (yellow) earthquake.

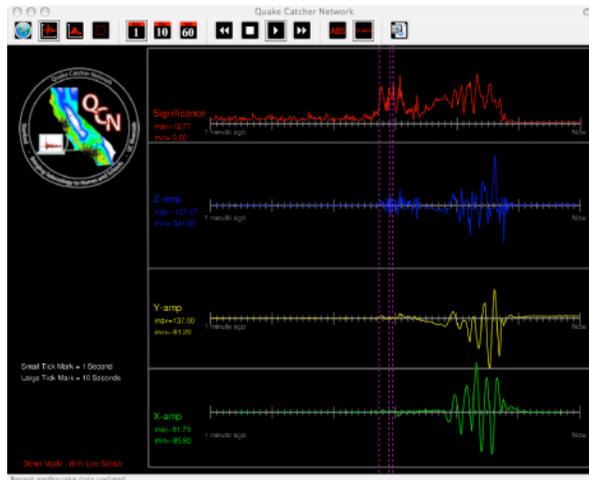
The camera button creates a digital snapshot of the current view. The file is saved to the “Snapshots” directory in the *QCNLive* directory.

Sensor-Viewing Mode:

The sensor-viewing mode displays the current or past motions of a sensor on the screen. There are several options for viewing the sensor readings.

Option 1:

The screen displays x (left-to-right), y (front-to-back), and z (up-and-down) acceleration from bottom to top. At the top of the screen is the significance of the current vibration relative to the past minute of vibrations. The significance is not displayed until 60 seconds has lapsed.



If a strong new motion occurs, a vertical purple line will be displayed at the time when the motion was measured. In QCNLive, a segment of data is saved to disk every time one of these lines appears. The data are compressed and saved to the QCNLive/sac/ directory. In the distributed computing program, these times are used by the Quake-Catcher Network to monitor for strong new earthquake vibrations. If an earthquake were to occur, the data would be uploaded to the server automatically. Note: you may want to delete data in the sac directory after using QCNLive.

Menu bar buttons at the top of the screen allow the user to view 1 minute, 10 minutes, or 60 minutes of sensor readings. Note: if you just started recording, you will not have 60 minutes.

The sensor viewing automatically starts at the present time. To view past segments of time, click the << button. To scroll forward in time click the >> button. To return to the current view, click the > button. The stop button pauses at the current time.

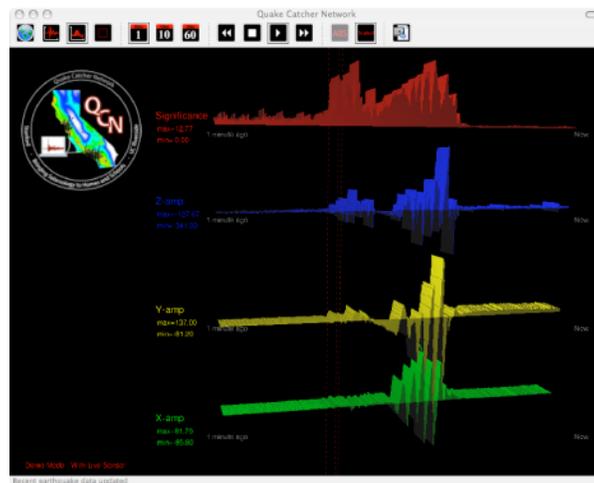
The sensor viewing automatically starts in absolute scale, showing the acceleration, compared to the sensors full range. To change to a relative view,

click on “Scaled”. This will scale the amplitudes relative to the largest amplitude in the time window.

The camera button creates a digital snapshot of the current view. The file is saved to the “Snapshots” directory in the QCNLive directory.

Option 2:

Same as option 1, but in 2D form. This is a fun view that is graphically stunning, but less useful for actual science. This view can be rotated left and right and up and down in 360 degrees.



Option 3:

This view is not fully functional yet. This view shows a box that rotates with the computer’s acceleration, and expands with the magnitude of the current vibration. This is a fun way to describe magnitude as the combined amplitude of vibration.

