Brainwave Visualizer

Introduction

The ***Brainwave Visualizer*** is a colorful, interactive application controlled by your brain, that shows you a graphical representation of your brain's activity. The Brainwave Visualizer includes the Brainwave Visualization, Brainwave Power Spectrum Graph, and the eSense Attention and Meditation meters. The on-screen shapes morph and change color depending on your state of mind. Because each person has a unique brain wave profile, no two visualizations will ever be the same.

Minimum System Requirements

	PC	Mac
Operating system	Windows XP/Vista/7	Mac OS X 10.5 Leopard or Later
Processor	Intel Core 2 Duo or equivalent	
Video card	DirectX 9.0 + (ATI Radeon 8500 or higher) Intel GMA900 or higher	
RAM	1GB memory	
HDD	100MB hard disk space	
Bluetooth	Bundled USB dongle or built-in receiver	

Running Brainwave Visualizer

On Windows, BrainWave Visualizer can be run from the Windows start menu or run from App Central. On Mac, Brainwave Visualizer can be run from the MindWave application folder. Brainwave Visualizer will open and display a screen to select and change graphics settings and keyboard settings. After selecting your ideal settings, press "Play!" to launch the BrainWave Visualizer.

Connecting BrainWave Visualizer

After starting BrainWave Visualizer, it will automatically try to connect to your headset. Ensure that ThinkGear Connector is running in the background. If the connection is unsuccessful try the steps that will appear in the lower left corner of the screen and then press "Retry connection" under the Troubleshooting tab in ThinkGear connector. If a connection is still unsucessful, restart the ThinkGear connector and try to connect again.

If you enable demo mode and then press connect, then the BrainWave visualizer will display random BrainWave data.

If you are experiencing a poor connection/less than 4 bars , press disconnect in the top right of the screen and try the steps listed in the lower left corner. Press connect in the top right corner afterwards.

Configuring the Brainwave Visualizer

To configure BV, click on the ESC key on the keyboard and the configuration panel will be displayed. You will have the option of:

Label	Description
Display Output Data	This option displays all the brainwave data in numerical form.
Show axes	This option enables or disables the display of the radial axes shown in the dynamic visualizer.
Enable full screen mode	This option turns on full-screen mode, which causes the Visualizer to occupy your entire screen.

You can also change the language in the configuration panel.

Figure 1: Configuration Menu

Interface

The Visualizer contains several interface elements that are common to the different views built in.

Figure 2: Interface overview

	Name	Description
1	View selector	This lets you select between the available views. The selector only appears when you move the mouse cursor. It disappears if the keyboard and mouse have been idle for long enough.
2	Signal status	This tells you the quality of the brainwave signal coming from the headset. A red **X** means that the headset is disconnected. The more bars there are, the better the signal quality. Generally, a status with four or five signal bars indicates a good signal.

Views

The functions of the different views are explained in the sections below.

Chart View

The first view you see when you start up the Visualizer is the **Chart View**, which consists of the Dynamic Brainwave Visualization, the iTunes Media Bar, the Brainwave Power Spectrum Graph, and the eSense™ Attention and Meditation meters. The Chart View provides a comprehensive display of all the data coming from your headset.

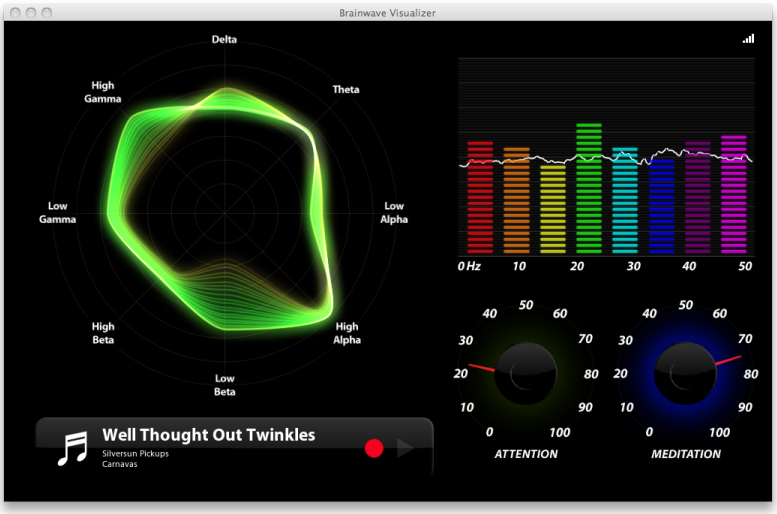

Figure 3: Chart view

Note: The Chart View contains an ***interactive help feature***. Click on each of the various components to bring up an informative description of that component, along with voice narration.

Dynamic View

The **Dynamic View** of the Visualizer emphasizes the gently flowing shape of the dynamic visualizer component. You can use the **left** and **right arrow keys** to change the look and characteristic of this shape.

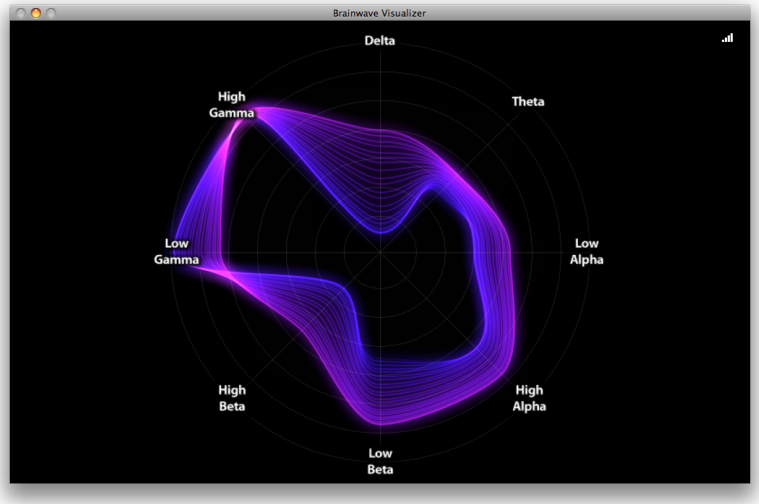

Figure 4: Dynamic view

Note: Try playing some music while running the Visualizer in this mode. You may see some unique shapes and colors that are generated by actively listening to a particular track!

Game View

The **Game View** of the Visualizer lets you play two simple telekinetic games that utilize eSense™ values from the headset. You can hold down and drag the **right mouse button** to change the perspective of the camera. Buttons on the left side of the screen will let you choose a game, either float or burn.

In burn, there is a barrel that will burn based on your eSense™ attention level. The more attentive you are, the quicker it will burn. See how fast you can burn the barrel!

In float, you will attempt to float a ball based on your eSense™ meditation level. The more meditative you are, the higher and longer the ball will float.

Statistics for each of these games are displayed in the top left area of the screen in game view. A meter at the bottom of the screen will show your current eSense™ levels.

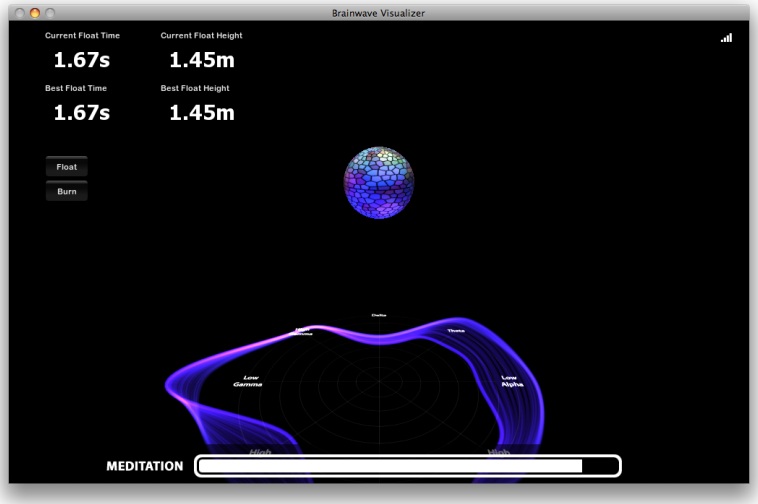

Figure 5: Game view

Brainwave Recording and Playback

Important: This feature requires iTunes 9 or newer. You can download it here.

The Brainwave Visualizer contains functionality to perform recording and playback of brainwave data that is associated with music in your iTunes library.

Interface

There are three primary elements that are associated with brainwave recording and playback.

Figure 6: Brainwave recording and playback interface elements

	Name	Description
1	Status notification	Shows the current state of the playback and recording functionality.
2	Popup message window	Shows brief notifications and error messages.
3	Media Bar	Shows song information, and controls playback and recording functionality.

Recording

To record brainwave data for a song, start playing a song in iTunes, then click on the red "record" button in the Media Bar. iTunes will automatically skip to the beginning of the track, and the Brainwave Visualizer will start recording data. The status notification will also indicate that recording is in progress.

Important: The raw output line is hidden while recording is in progress. This is because raw data is not recorded.

When the song finishes playing, the brainwave data will be automatically saved. You can now play back the recorded brainwave data.

Note: If recording is stopped by the user in the middle of a song by clicking the red "stop" button, the brainwave data will not be saved.

Playback

To play back recorded brainwave data, start playing a song in iTunes and click on the "play" button in the Media Bar. iTunes will automatically skip to the beginning of the track, and the Brainwave Visualizer will start playing back the recorded brainwave data. The status notification will indicate that playback is in progress.

Note: If no recorded brainwave data is available for a particular track, the "play" button will be dimmed and unclickable.

Troubleshooting

Where is the recorded brainwave data stored?
The storage location depends on your platform:

Platform	Location
Windows XP	`C:\Documents and Settings\<your username>\Local Settings\Application Data\NeuroSky\Brainwave Visualizer`
Windows Vista / 7	`C:\Users\<your username>\AppData\NeuroSky\Brainwave Visualizer`
OS X	`/Users/<your username>/Library/Application Support/NeuroSky/Brainwave Visualizer`

The data is stored in an XML format, making it easy to read and parse the saved data.

The application doesn't connect to the headset.
Make sure your headset is turned on and paired to the computer. If you are on Windows, make sure that the **Port scan** option is enabled when connecting to the headset. On the Mac, be sure that you have the correct serial port name by following the instructions in Appendix A: Mac Serial Port Name. If the headset still refuses to connect, un-pair the device, restart the computer, then re-pair the device before attempting to run the application.

The signal quality status is consistently poor (fewer than three bars).
The ear contacts should be resting directly on your ear and the forehead sensor should be on your forehead. Also, check that the sensors and contacts are making good contact with the skin. Make sure to remove all obstructions including hair and jewelry.

It usually takes three or four seconds for the headset to validate the signal after holding still. Also make certain to keep the sensor and contacts clean

I don't seem to be able to control the eSense™ meters.
Like exercising an unfamiliar muscle, it may take some time to gain full proficiency with the eSense™ meters. First, be sure you understand how the eSense meters work and what they are measuring. Generally, we recommend engaging Attention by concentrating and Meditation by relaxing. Most importantly, be sure you have read the detailed explanation of eSense previously described in the eSense™ sections.

I have a problem that is not covered by this troubleshooting section.
Read the MindSet Manual for troubleshooting tips. If the manual doesn't address your question, register on the NeuroSky Support Forums at http://support.neurosky.com to access additional information.

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