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Avatar EEG Desktop Software User Guide

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Program Summary

Avatar EEG Developed Software

- **avatareeg.py** - Receives data via Bluetooth from one or more Avatar EEG recorders
- **rec2csv.py** - Converts an Avatar EEG recorder native binary file to comma separated format (CSV)
- **rec2edf.py** - Converts an Avatar EEG recorder native binary file to European Data Format (EDF)
- **rec2bdf.py** - Converts an Avatar EEG recorder native binary file to BDF+ format, the 24 bit version of a European Data Format (EDF+) file

Optional Open Source Software

- **EDFbrowser** - Displays previously recorded biosignals and can also display in real-time
- **Brainbay** - Displays and processes signals in real-time
- **neuroserver** - Open source program for TCP networking of biosignals

avatareeg.py

This Python program can be run from the command line or by double clicking the file. Status information is displayed in the main window and informational messages are logged to a console window. By default the program tries to discover Avatar EEG recorders. If a recorder is detected, it will connect to it and begin receiving data. Depending on the check box selections made in the main window, data will record to a CSV file, to a BDF+ file, to both, or neither. If the open source program neuroserver is detected when avatareeg.py is started data will also be sent to neuroserver.

EDFbrowser

This open source program can be run from the Start/Application menu or from the command line. It can be run in two main modes, offline and online viewing. (1) For viewing previously recorded files choose *File->Open* from the main menu. (2) For viewing data in real-time, the avatareeg.py program must be running and writing to a BDF+ file. In this case, choose *File->Open stream* from the main menu and open the file that is currently being written to.

BrainBay

This open source program can be run from the start/application menu. Neuroserver must be running before avatareeg.py is started if you want to use BrainBay. BrainBay is limited to 16 bit processing, reducing the effective range of the Avatar EEG signals to +/- 12500uV. Also please ensure you have *Options->Applications Settings->Communication->Sampling-Rate* set to 500Hz (or whatever sampling rate you are employing) for use with Avatar EEG. To receive data from the Avatar EEG recorder, use *Insert Element->Source->TCP receiver*. For a sample BrainBay configuration file please contact Avatar EEG Solutions Inc.

rec2csv.py

This Python program can be run from the command line or (on a Windows operating system) by dragging and dropping a file onto it. To run rec2csv.py, first an Avatar EEG recorder native binary file must be transferred from the removable microSDHC card to a PC. Then use that file as an input to the program. The output will be a CSV file suitable for import into Matlab or other programs. The output filename will be the same except with the .rec extension replaced by .csv.

rec2edf.py / rec2bdf.py

Either of these Python programs can be run from the command line or (on a Windows operating system) by dragging and dropping a file onto the program file. To run rec2edf.py, first an Avatar EEG recorder native binary file must be transferred from the removable microSDHC card to a PC. Then use that file as an input to the program. The output filename will be the same except with the .rec extension replaced by .edf. Note that EDF supports 16 bit data values only. Thus both the resolution and range are compromised when fitting Avatar's 24-bit data values into an EDF file. BDF+ is a standard very similar to EDF except that it supports 24-bit data values. BDF+ files can be created from an Avatar EEG recorder native binary file by following the instructions previously outlined for creating an EDF file, but substituting the program rec2bdf.py for rec2edf.py. Output files will have the extension .bdf.

Troubleshooting avatareeg.py

| Error Message | Mitigation |
|---|--|
| Could not connect: BluetoothError: (13, 'Permission denied') | Using OS Bluetooth tools pair with the Avatar EEG recorder before attempting to run avatareeg.py. Avatar EEG supports both Simple Secure Pairing (SSP) and Legacy Pairing. If your Bluetooth adapter only supports Legacy Pairing the pin is 0000 for the Avatar EEG recorder. |
| Discover thread: BluetoothError: error accessing bluetooth device | If you are using a Bluetooth USB adapter, try removing and then reinserting the adapter in the USB port; then rerun avatareeg.py. |
| Could not connect: | If you are using a Windows 7 operating system in tandem with a Bluetooth USB adapter, an additional executable file may be needed for avatareeg.py to run smoothly. Please contact Avatar EEG Solutions Inc. for the executable and further instructions. |

Links for more information

EDF+: Open format for storing biosignals: <http://www.edfplus.info/specs/edfplus.html>

BDF+: Open format for storing biosignals: http://www.biosemi.com/faq/file_format.htm

EDFbrowser: <http://www.teuniz.net/edfbrowser/>

BrainBay: <http://www.shifz.org/brainbay/>

neuroserver: http://openeeg.sourceforge.net/neuroserver_doku/