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Brain Wave Sensors for Every Body

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Outliers in EEG powers on Android

Martin Poulsen
May 29, 2013 @ 07:58 AM

Hi,

I am experiencing giant outliers for all frequency bands on Android (TGDevice.MSG_EEG_POWER). Attached graphs show 1 minute of recorded lowAlpha (same data in both graphs with different "zoom" on y-axis).

Any ideas to what I might be doing wrong or how I solve this?

sdk_lalpha_power.pdf
23.9 KB

sdk_lalpha_power__y_limited_to_30000_.pdf

26.8 KB

2 Posted by **Martin Poulsen** on May 29, 2013 @ 08:29 AM

By the way, I am using the MindWave Mobile.

3 Posted by **David** on May 29, 2013 @ 03:16 PM SUPPORT STAFF

Hi Martin,
Thank you for sending the data.

There are 2 things that are likely to account for these outliers.
First it can be just environmental noise, in most cases it is best to disregard the values if the POOR SIGNAL value is anything but 0.

Second, they may be eye blinks (or other facial movement). because the sensor is in the region of the muscles used in a blink, muscle activity may overwhelm the EEG signals.

Does that help?
-David

Ashley Schultz **closed** this discussion on Jun 03, 2013 @ 09:41 PM.

Martin Poulsen **re-opened** this discussion on Jun 11, 2013 @ 10:05 AM

4 Posted by **Martin Poulsen** on Jun 11, 2013 @ 10:05 AM

Hi David,

Thanks for answering quickly! I have updated the code to disregard all data when POOR SIGNAL is not 0 (has only been the case for the first 2/3 seconds of the recording). I have also made recordings with different people with closed eyes doing their best to relax.

Neither seem to fix the outliers - but of cause the EMG/EOG could still be the source of the problem. Is it normal to see such outliers in my recording conditions (relaxed, closed eyes)?

When calculating the frequency bands from the raw data (Fast Fourier Transformation in Octave), I don't get such outliers, are the raw data cleaned/transformed in any way before frequency bands are calculated? -and how do you actually calculate the frequency bands?

5 Posted by **David** on Jun 11, 2013 @ 02:22 PM SUPPORT STAFF

Hi Martin,
Be advised I am not a signal processing expert nor a Neuroscientist.
NeuoSky treats the details of how those calculations are done as proprietary, so I can not say much about them.

But I can say a little about the Power Bands. 1st be aware that different researchers have different ideas of which frequencies to include in each band and they may redefine bands in order to identify the features they find significant.

After the FFT has done it's magic, then the FFT "buckets" are examined and the buckets that correspond to a band are used to get that band's power value. For those buckets that correspond to frequencies that are outside the bands of interest, their values are not considered. So when the "outliers" end up in buckets that are outside the

interesting frequencies they are just ignored.

I hope that helps a little.
-David

Ashley Schultz **closed** this discussion on Jun 20, 2013 @ 06:27 PM.

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