An introduction to oephys2nev

Oephys2nev is a function that helps convert .continuous format open ephys files into a .nev format that can be opened by spike sorting programs like plexon offline sorter, spike2, or plexon offline sorter.

From the function description
Script Name: oephys2nev.m
Script Description: Goal: write nev file from open ephys data

This relies on a subsidiary function, open_ephys_filt_to_mat.m
which opens open enphys files, filters them a bit, writes data out

Then it writes a NEV file using the output of this initial function.

Based on plx2nev by Matt Smith (http://www.smithlab.net)

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Post issues to: https://github.com/rtraghavan/oephys2nev/issues


INSTRUCTIONS FOR USE

Step 1:
The first thing to do is to make sure you have the prerequisites installed. You'll need the following:
1. Matlab (I have tested 2013a and 2016b). If you need help porting to older or newer versions, post to the github issues page.
2. Matlab's signal processing toolbox
3. Analysis tools from the open ephys github page (clone or download repository and add to matlab's search path)

Next either clone or download the oephys2nev repository from github. And also add it to matlab's search path
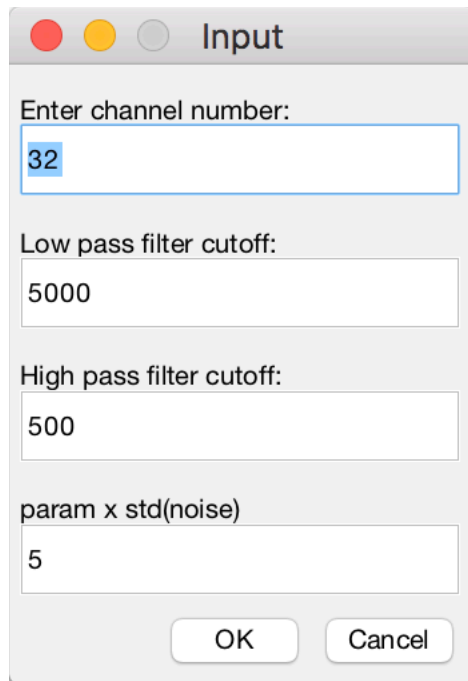

Step 2:
Open matlab and launch oephys2nev from the command window. It will open a dialogue box asking you to select where a given set of files from a recording is stored. Here's what this looks like on a computer running Mac OS X
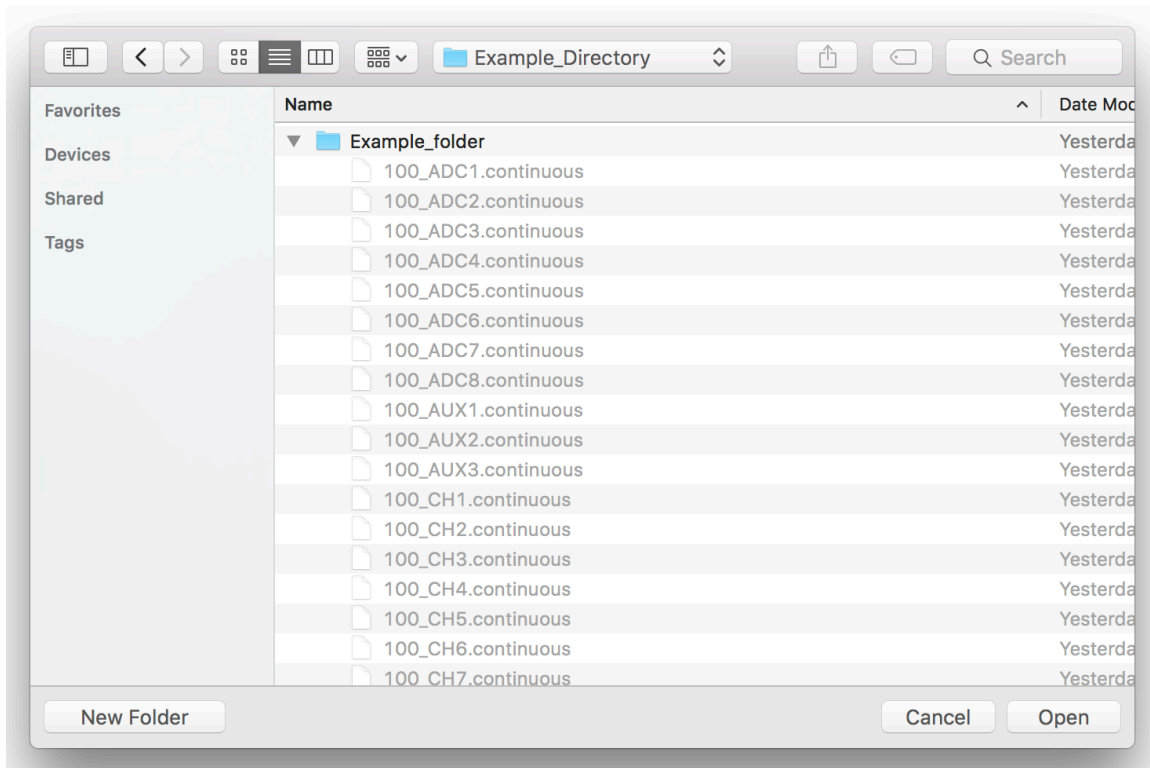
Box 1: *This is a dialog box similar to what you would see if you launched oephys2nev on a mac (will also work on windows but will look different). You select whatever example folder holds your open ephys files, and click open*

Step 3:
Oephys2nev will next open a small box that allows you to enter some parameters used in the threshold crossing detection program. It will allow you to select the number of channels you have recorded, cutoff frequencies for the low and high pass butterworth filters used to filter extracellular voltage signals before threshold detection, and a parameter that is multiplied by the standard deviation of the noise on each channel (estimated using the method of Quiroga et al. 2004) to set the threshold. I use a default of 5. You will need to experiment to see what works best for you. A larger parameter value means you are stricter in what you count as single or multiunit activity.

Box 2: Dialog box that determines number of channels you are detecting units on, low and high pass filter settings, and parameter that determines threshold detection level.

Step 4:

The script will now proceed to filter the data and detect thresholds. Progress will be displayed in matlab's command window as follows.

```
>> oephys2nev
20% filtered ...
40% filtered ...
60% filtered ...
80% filtered ...
```

Box 3: Updates on how much of the data matlab has filtered and done threshold detection for.

Step 5:

A save dialog box will pop up, asking you where to save the .nev file and where it should be stored. The default name for the file is taken from the directory in which the data was stored.
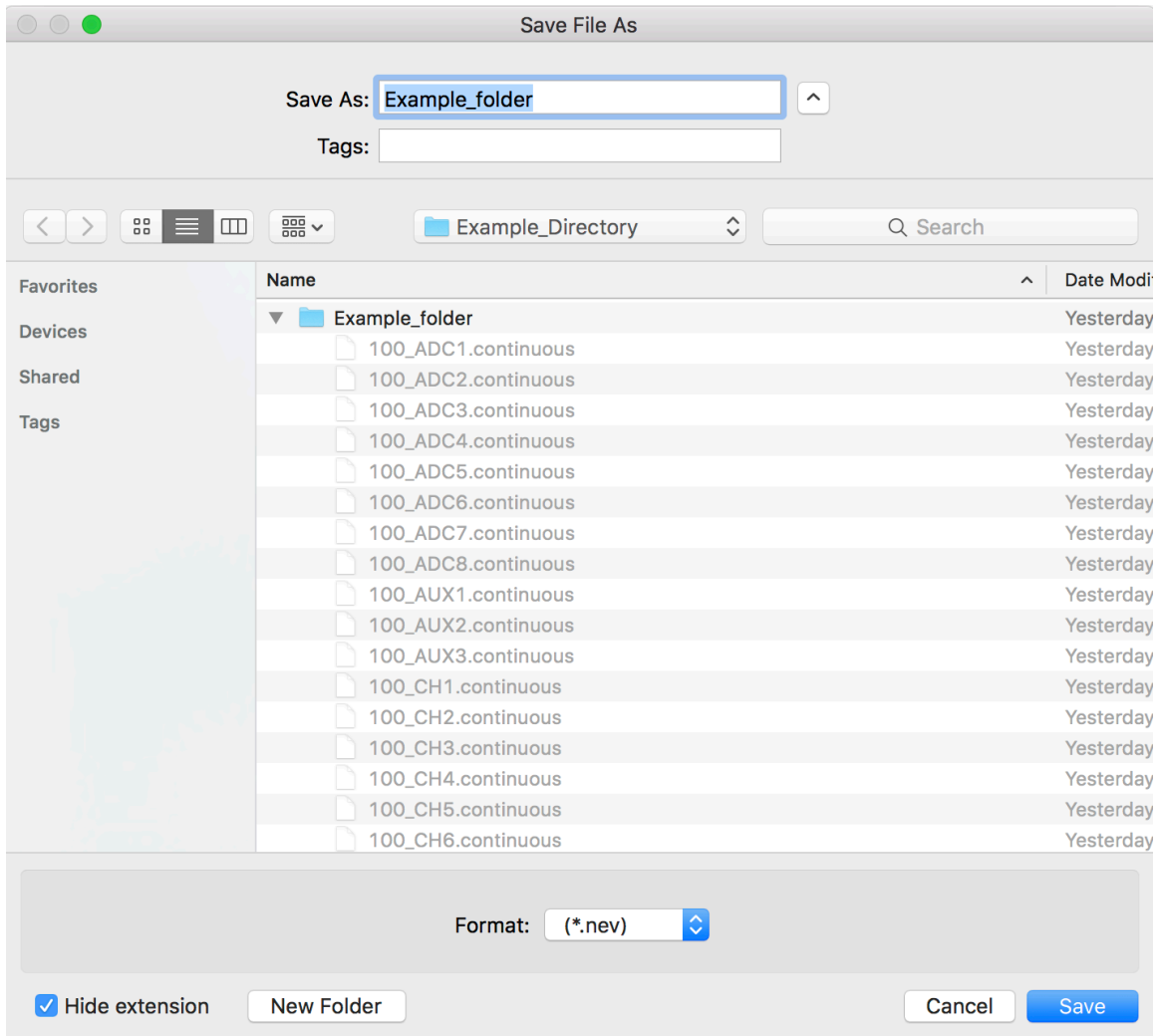
Box 4: Save dialog box you should see that asks you where to save your .nev file and what it should be called.

Step 6:
Using your entered name and location the script will write detected waveforms and spiketimes to that file. This is what that looks like.

```
oephys2nev: Writing spikes into NEV ... 20% ... 40% ... 60% ... 80% ... >>
```

After writing file
After writing the file you can open it in a number of programs, including plexon offline sorter, spike2, or spikesort. There are two known issues with opening files in plexon offline sorter and spike2. In offline sorter, for whatever reason, it thinks there are way more channels in the .nev file. So you wind up with however many channels you sorted, plus a number of channels that are empty atop this up to 128 channels. It is not a big deal, you just sort and subselect the channels you want for export. With spike2, you wind up shifting the channel

numbers by 1. So if you have 8 channels of data, it winds up importing data as channels 2-9. Also not a huge deal.

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