BE 521 - Homework 0

Spring 2015

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March 22, 2015
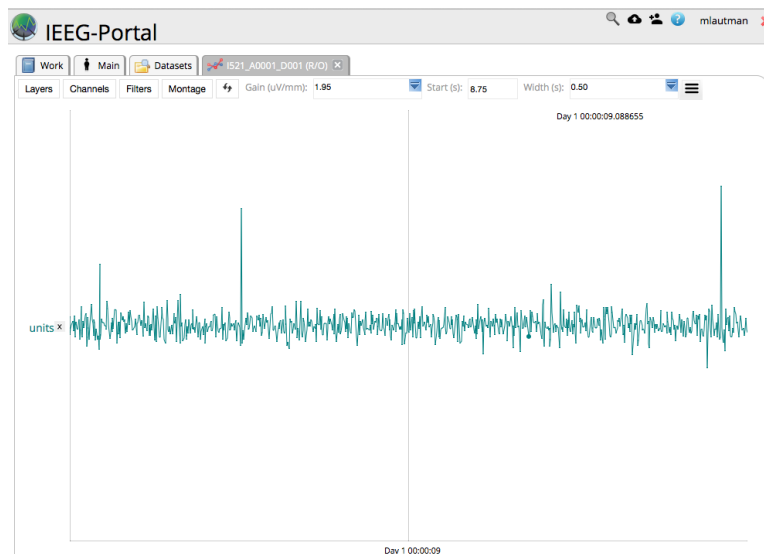
1. Unit Activity

1.1 IEEG portal spikes

Figure 1. IEEG portal screenshot

1.2 Grab data from IEEG

```
clear; clc; clf; close all;
dataset = 'I521_A0001_D001';
me = 'mlautman';
pass_file = 'mla_ieeglogin.bin';
[T,session] = evalc('IEEGSession(dataset, me, pass_file)');

session
```

```
session =

  <a href="matlab:help('IEEGSession')">IEEGSession</a>:

      server: 'ieeg.org'
```

```
    userName: 'mlautman'
        data: [1x1 IEEGDataset]

  <a href="matlab:methods(IEEGSession)">Methods</a>, <a href="matlab:IEEGObject.openPortalSite()">main.ieeg.org</
```

1.3 sample rate

```
data=session.data;
sample_rate = data.sampleRate
```

```
sample_rate =

      32051
```

1.4 recording length

```
recording_length= data.channels(1).getNrSamples;
recording_length_s = recording_length/sample_rate
```

```
recording_length_s =

    10
```

1.5a same window

```
s_s = 8.75;
e_s = s_s + .5;
s = max(round(s_s*sample_rate), 1);
e = min(round(e_s*sample_rate), recording_length);
vals = data.getvalues(s:e,1);
figure(1);

plot((s:e)./data.sampleRate, vals, 'color', 'b');

xlim([s_s, e_s]);
ylabel('Voltage (mV)', 'FontSize',10,'FontWeight','bold');
xlabel('Time (S)', 'FontSize',10,'FontWeight','bold');
title('Three spikes from IEEG dataset I521\_A0001\_D001', 'FontSize',12,'FontWeight','bold');
```

Three spikes from IEEG dataset I521_A0001_D001
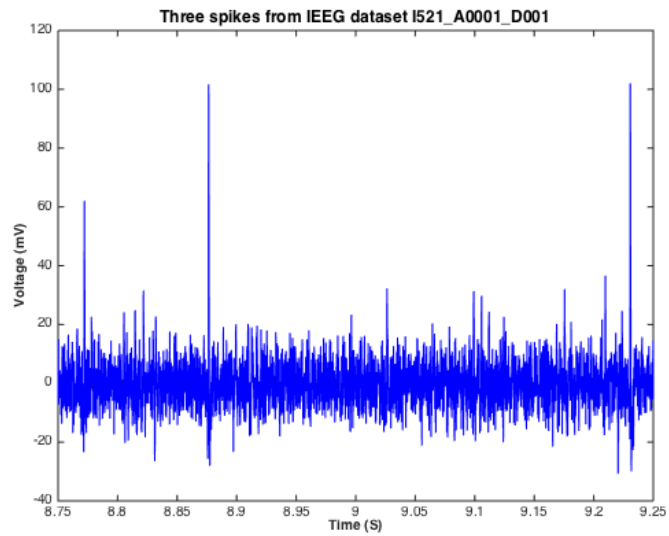
1.5b Spikes

```matlab
% NOTE: We define a spike as a locally convex region where the
% local maxima is greater than 5*std from the mean.

figure(2)
v_ave = mean(vals);
v_std = std(vals);
vals_spikes = (vals - v_ave > 5 * v_std) .* vals;
[pks,locs] = findpeaks(vals_spikes);
hold on


plot((s:e)./data.sampleRate, vals,'color', 'b' );
plot((s + locs)/sample_rate,pks, 'x', 'color','r');

xlim([s_s, e_s]);
ylabel('Voltage (mV)', 'FontSize',10,'FontWeight','bold');
xlabel('Time (S)', 'FontSize',10,'FontWeight','bold');
title('Three peaks from IEEG dataset I521\_A0001\_D001', 'FontSize',12,'FontWeight','bold');
```

Three peaks from IEEG dataset I521_A0001_D001
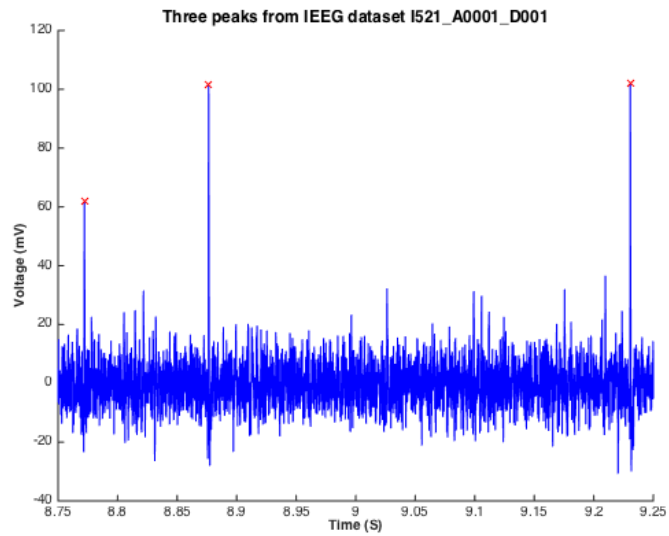
1.5c Total Spikes in Recording

```
vals_all = data.getvalues(1:recording_length,1);
v_all_ave = mean(vals_all);
v_all_std = std(vals_all);
vals_all_spikes = (vals_all - v_all_ave > 5 * v_all_std) .* vals_all;
[pks_all,locs_all] = findpeaks(vals_all_spikes);
length(pks_all)

close all; clc;
```

```
ans =

    42
```