Medical Signal Processing Lab
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Prof. S. Hajipour
Lab 6

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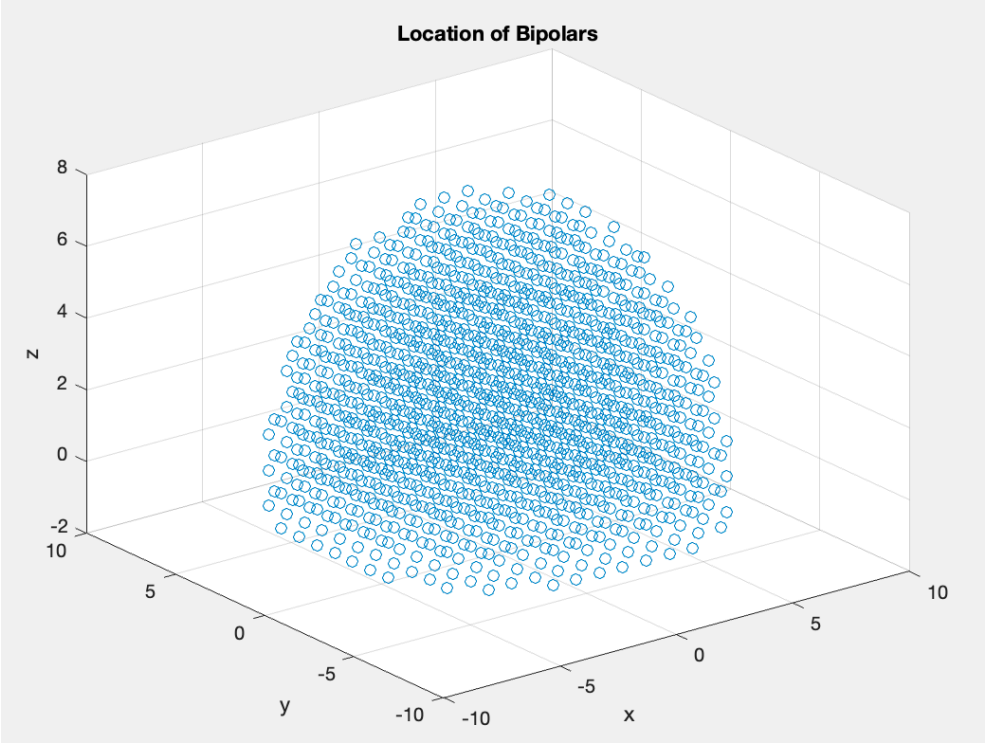
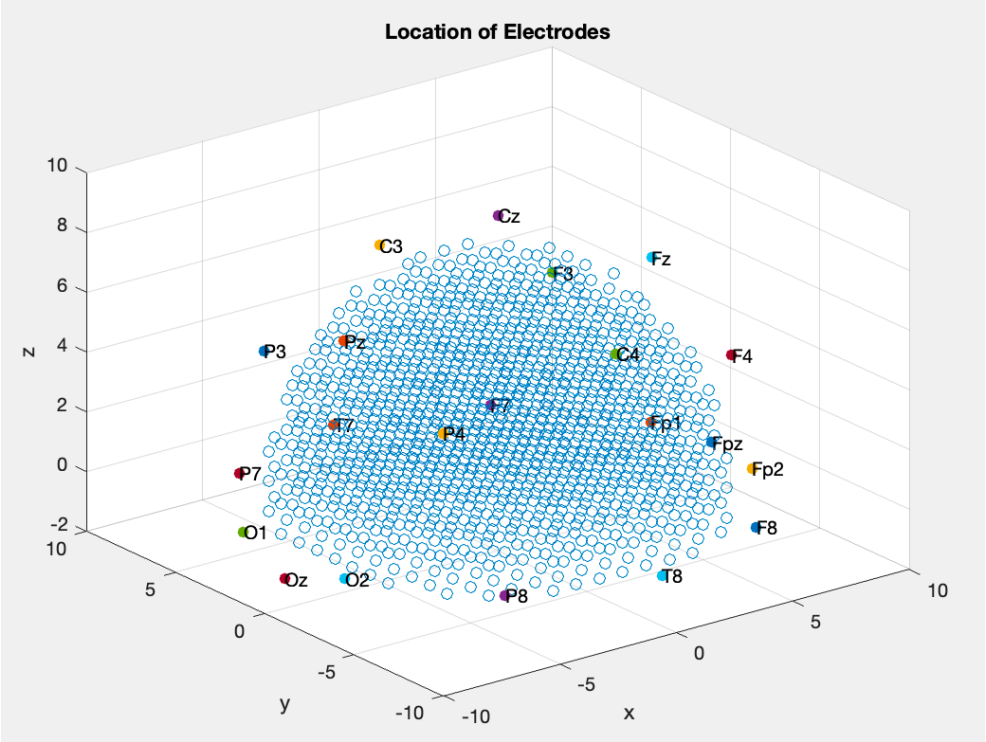
Part 1:

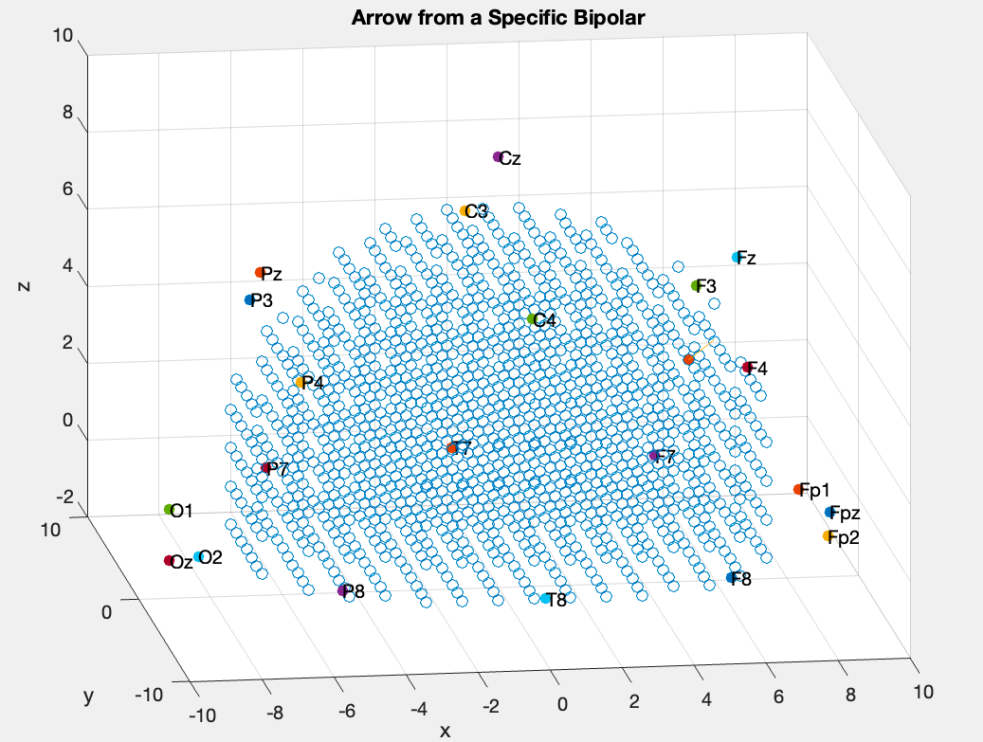

Location of Bipolars
z
y
x

Part 2:


Location of Electrodes
Cz
C3
Fz
F3
P3
Pz
C4
F4
F7
T7
P4
Fp1
Fpz
Fp2
P7
F8
O1
Oz
O2
T8
P8
z
y
x

Part 3:

We randomly choose a bipolar and calculate its direction. The direction of arrow is calculated by dividing each dimension to the total size.



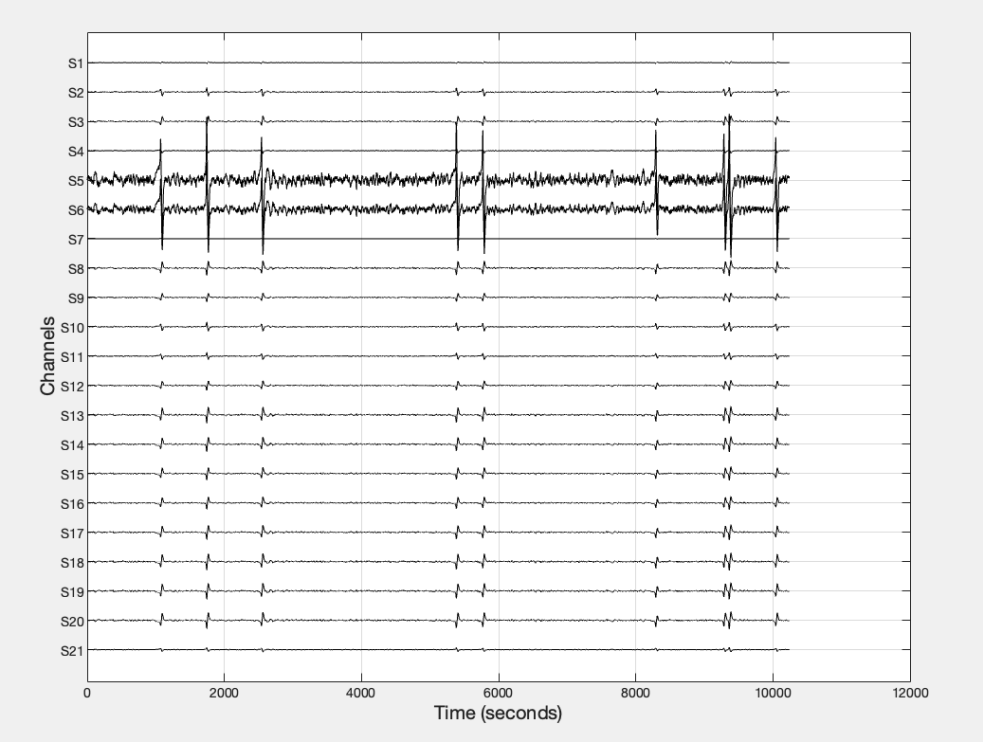
Part 4:

To calculate the potential of all electrodes we need to calculate M, which is:

$$M = GQ$$

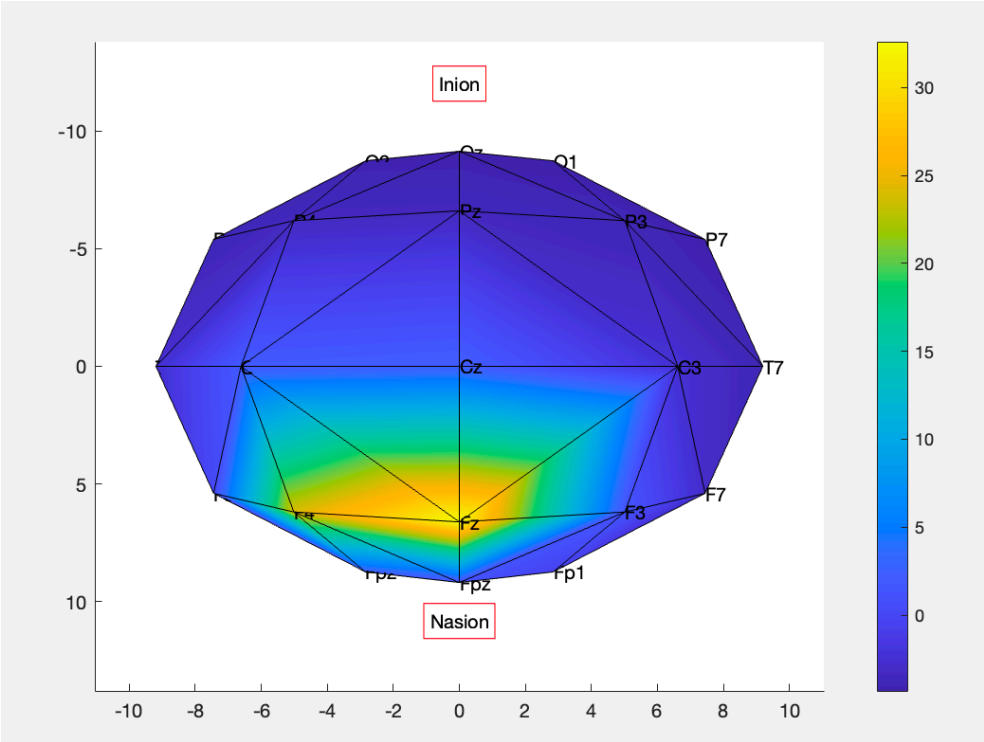
First choose one of the electrodes randomly.

```
Q = bipolar_size' * selected_interictal;
G = GainMat(:,[random_bipolar*3-2, random_bipolar*3-1, random_bipolar*3]);
m = G * Q;
```

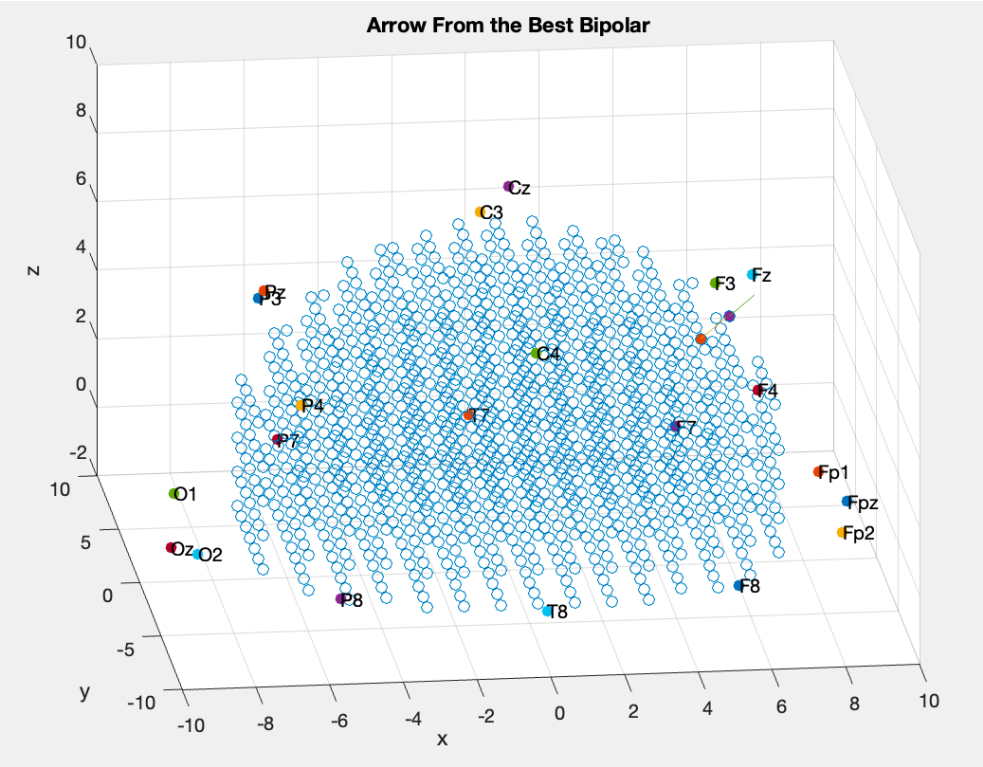


Part 5:

To get the time of each peak, we first get the index of maximum value in matrix ‘m’, then by using function ‘findpeaks’ we find times in matrix m, which their values are near the maximum peak.



Part 7:



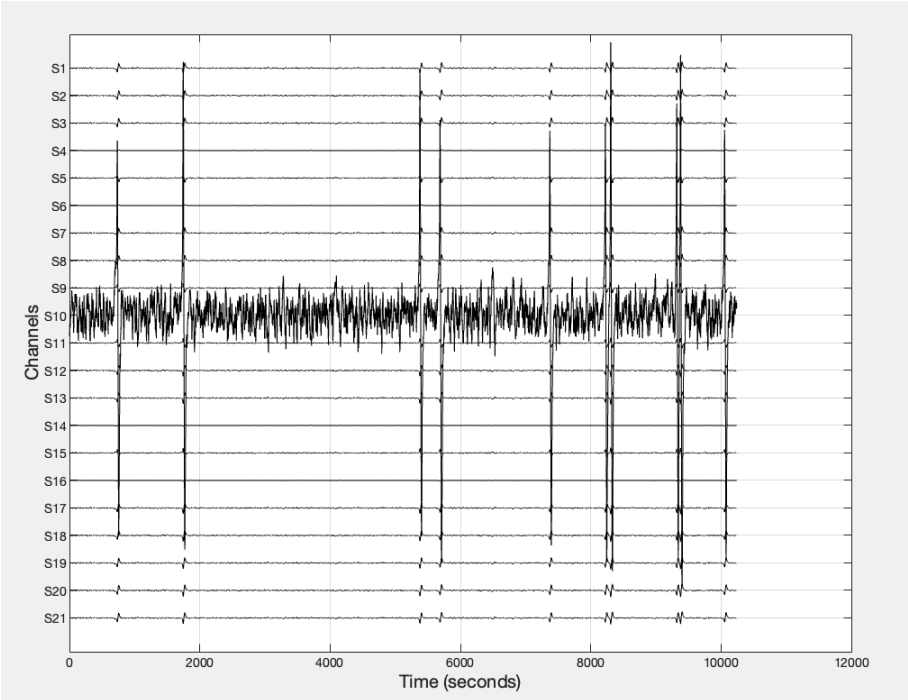
Red circle is our choosen biploar and the purple one is the estimated on.

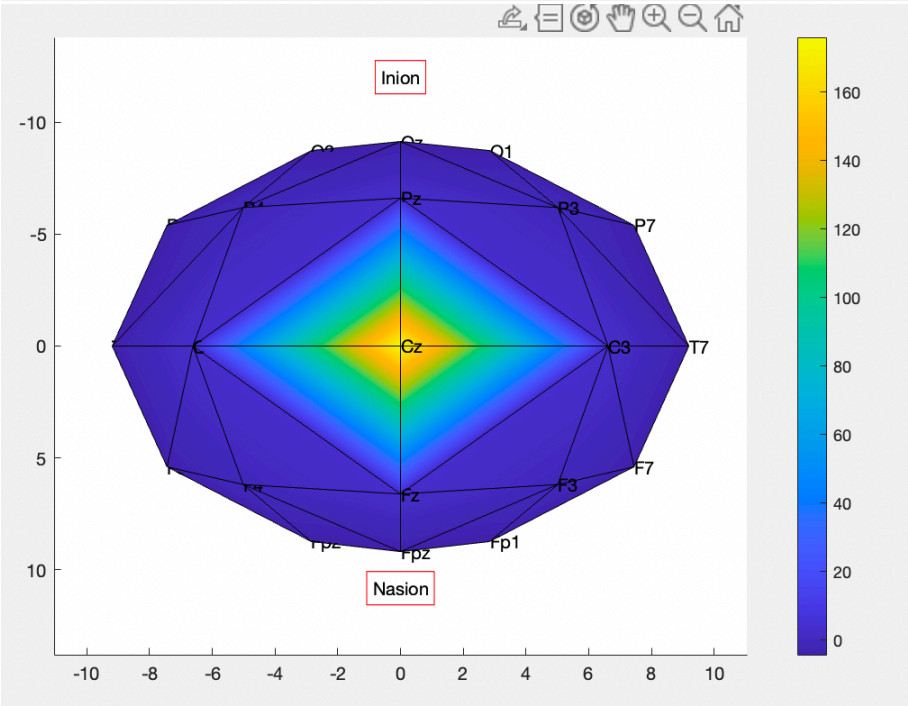
Part 8:

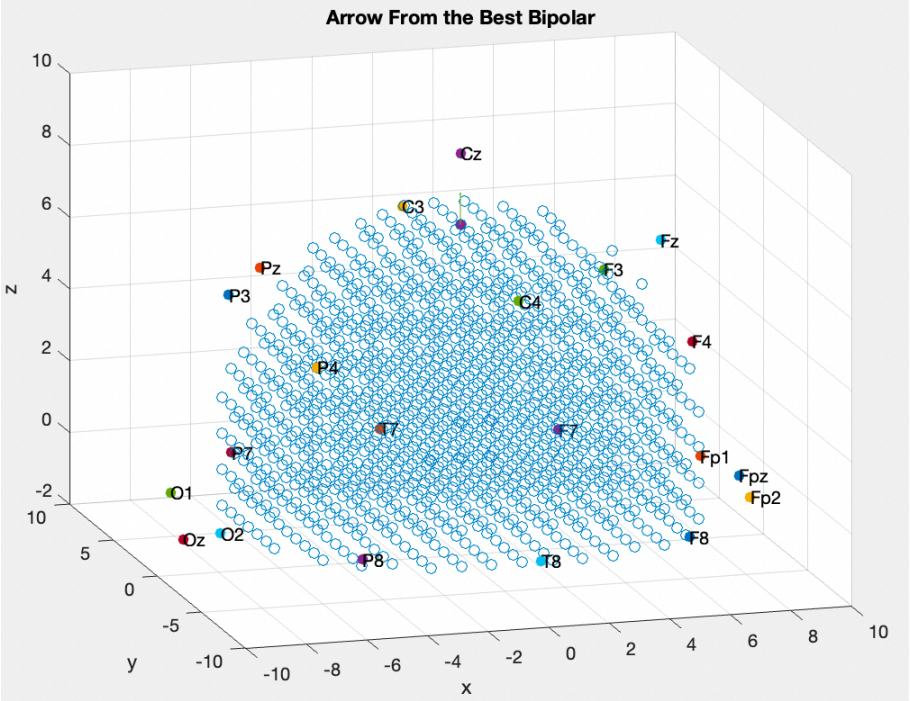
```
Location Error: 2.2361
Direction Error: 0.87928
```

Part 9:

1. Central Cortex:



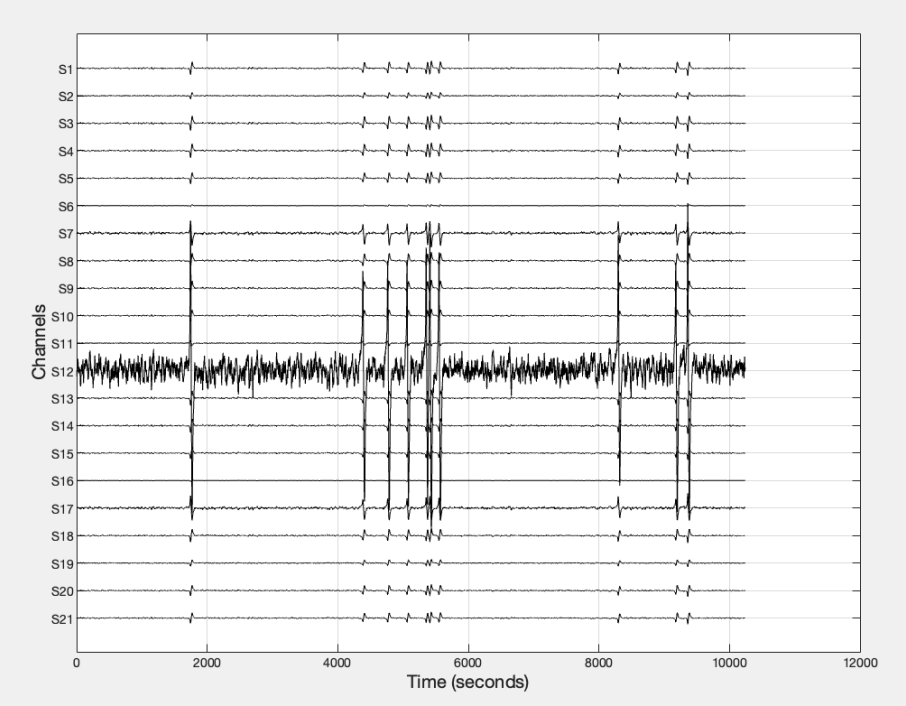


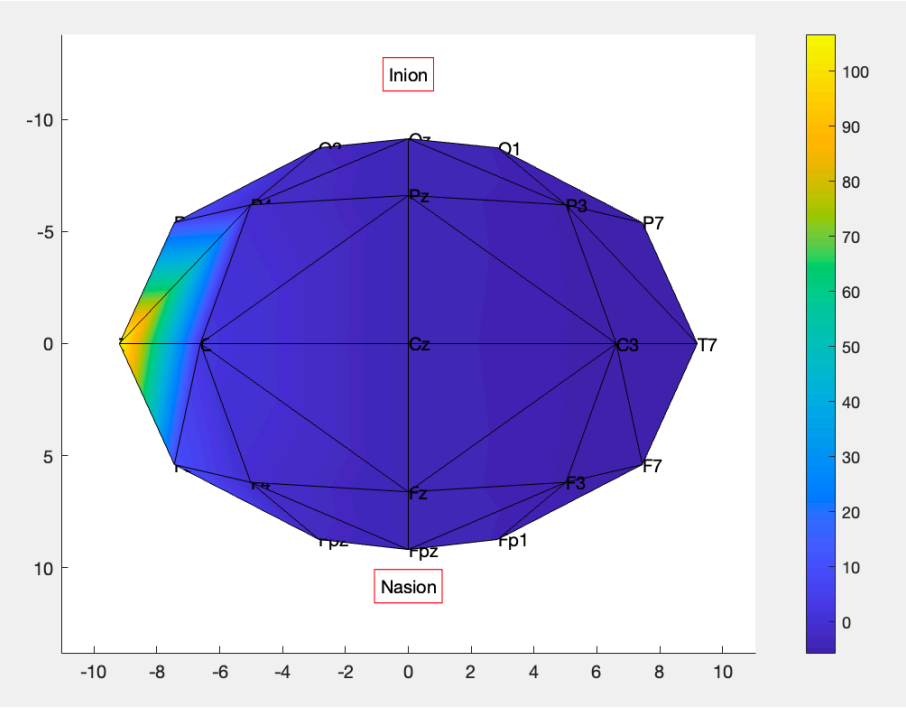


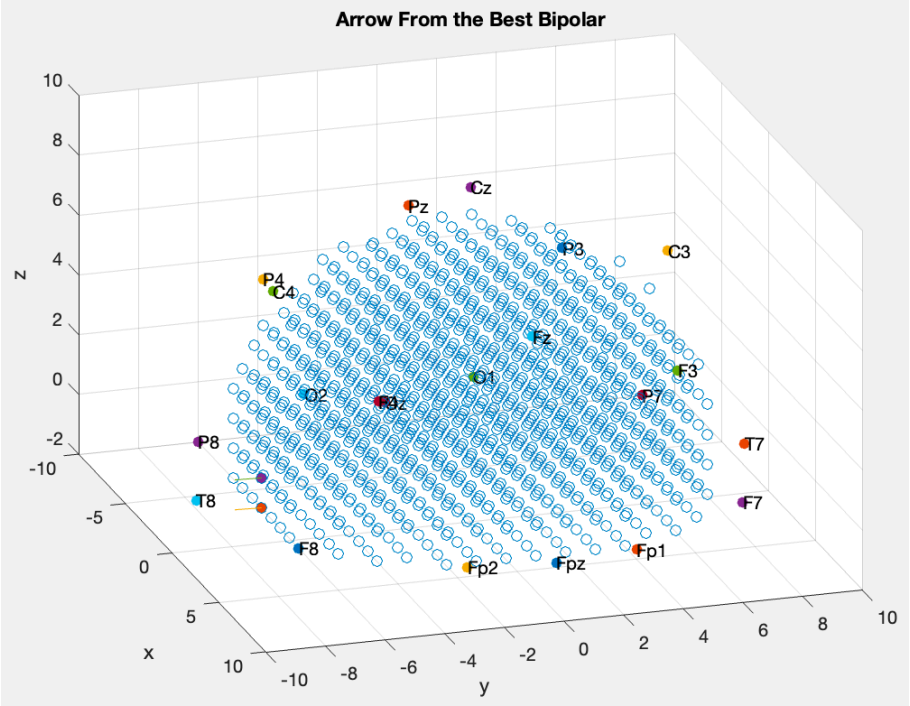

```
Location Error: 0
Direction Error: 0
```

Red and purple biploars are aligned. Also, the spikes are really strong.

2. Temporal Cortex:

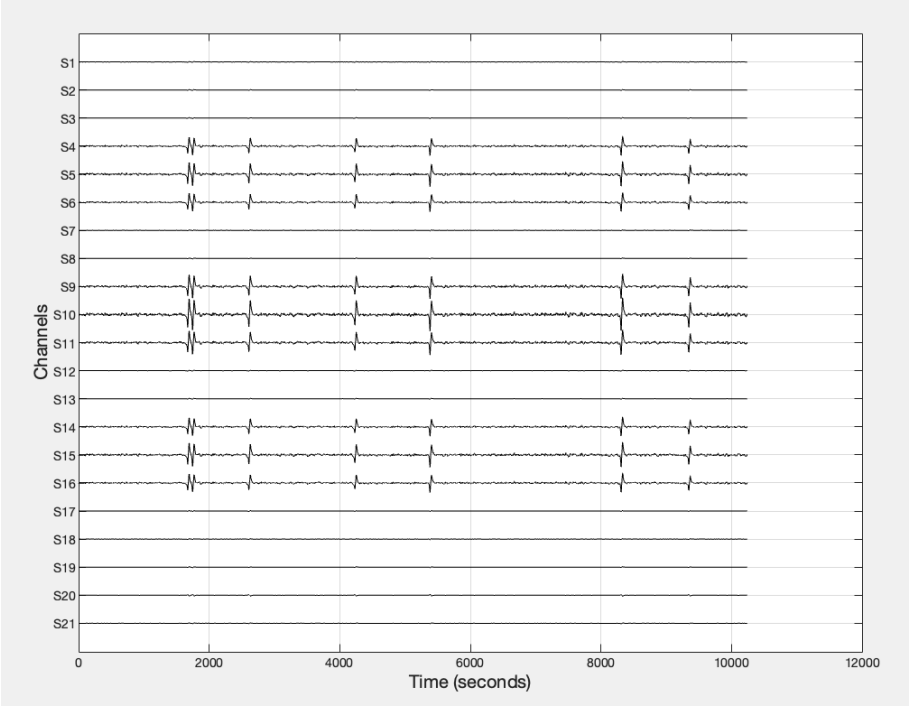


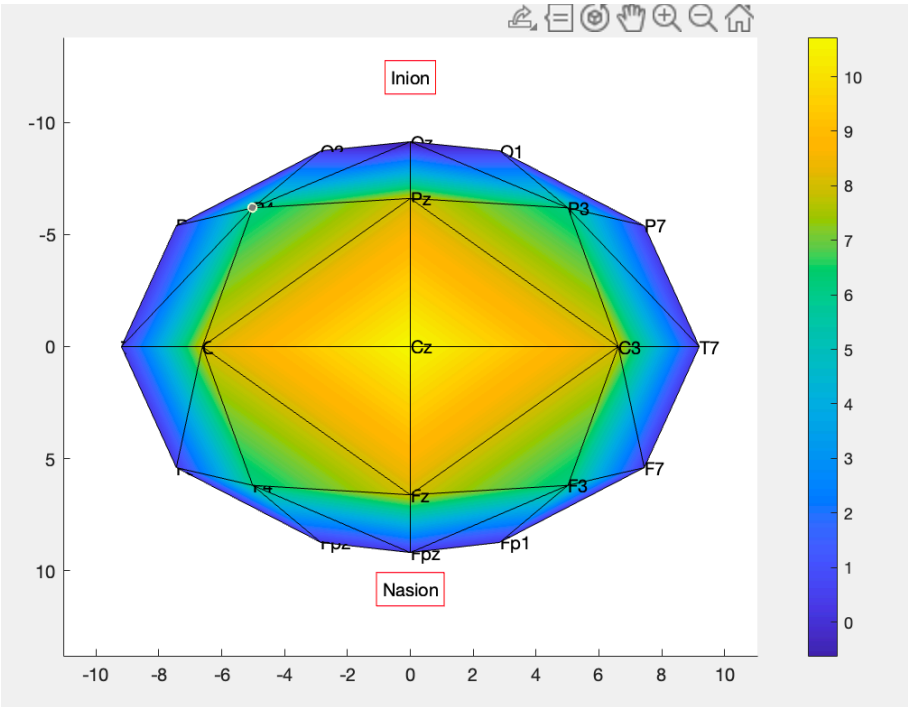


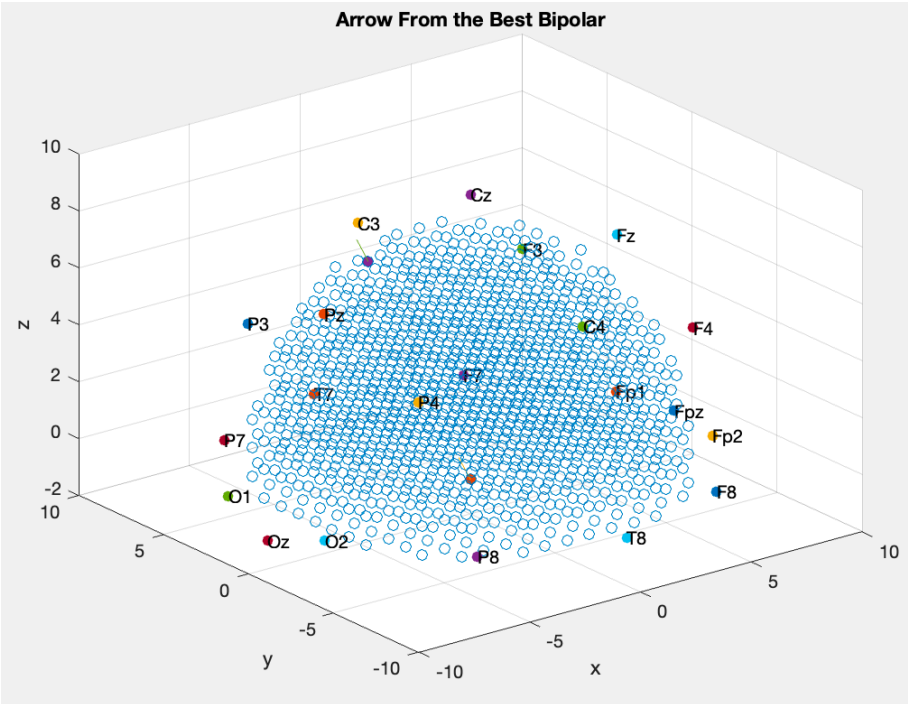



```
Location Error: 1
Direction Error: 0.59485
```

3. In depth bipolar:








```
Location Error: 8.4853
Direction Error: 0.025298
```

According to the results, spikes are stronger on the cortex and the more we go to the depth the more it gets decreased.