Meeting 7

10/21/21

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Deliverables

- Apply welch function to all 64 electrodes in each epochs
- Aggregate into frequency bins into brainwaves bands
    - Delta, Theta, Alpha, Beta, Gamma

Methodology and Learnings

How did I do it?

- NumPy functions
- Dictionaries

What did I learn on the way?

- Finding EEG bands

Results

```python
# Read data
data = read_eeg("./2020_06_04_T05_U00T_EEG01.vhdr")

fs = 500                    # Sampling rate of 500 Hz
df = data.iloc[:, 0:64]     # create dataframe for 64 signals

data_column = data.loc[:, "F8"]
eeg_signal = data_column.values

# Apply welch function to EEG signal using sampling rate
freq_arr, psd_arr = signal.welch(eeg_signal, fs)

# Define EEG frequency bands
bands = {'Delta': (1, 3),
         'Theta': (4, 7),
         'Alpha': (8, 12),
         'Beta': (13, 25),
         'Gamma': (26, 45)}

# create dictionary holding Keys = EEG band and its value
band_values = dict()

# Traverse frequency array to find appropriate frequency that goes with EEG band
for i in bands:
    freq_ix = np.where((freq_arr >= bands[i][0]) & (freq_arr <= bands[i][1]))  # Find frequency match with EEG bands
    band_values[i] = np.mean(psd_arr[freq_ix])  # Calculate the mean of power spectrum value

print(band_values)
```

```
Delta :  8.999952794304755e-11
Theta :  2.1336512576322305e-12
Alpha :  1.9874017585852825e-12
Beta :  4.4813720978393075e-13
Gamma :  2.8244249957513727e-13
```