initial_eda

March 13, 2024

[1]:
```
import pandas as pd
import seaborn as sbn
import matplotlib.pyplot as plt

import matplotlib as mpl
```

[2]:
```
mpl.rcParams['figure.dpi'] = 300
```

[3]:
```
base = pd.read_csv("./emg_hand_raw_data/Sem eletrodos/tek0000ALL.csv",␣
↪skiprows=20)
base.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 100000 entries, 0 to 99999
Data columns (total 5 columns):
 #   Column                                Non-Null Count   Dtype
---  ------                                --------------   -----
 0   TIME                                  100000 non-null  float64
 1   CH1                                   100000 non-null  float64
 2   Unnamed: 2                            0 non-null       float64
 3   FREQUENCY                             100000 non-null  float64
 4   MATH<FFT(CH1, HANNING, LINEARRMS)>    100000 non-null  float64
dtypes: float64(5)
memory usage: 3.8 MB
```

[4]:
```
base.head()
```

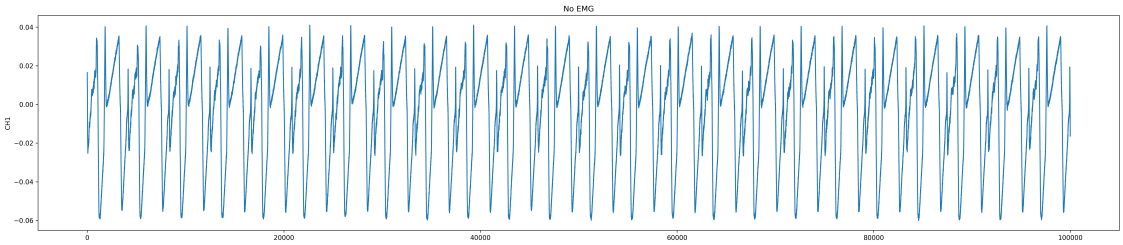
[4]:

	TIME	CH1	Unnamed: 2	FREQUENCY	MATH<FFT(CH1, HANNING, LINEARRMS)>
0	-0.200000	0.016484	NaN	0.00	0.004020
1	-0.199996	0.015859	NaN	1.25	0.003449
2	-0.199992	0.016016	NaN	2.50	0.002880
3	-0.199988	0.016016	NaN	3.75	
4	-0.199984	0.015234	NaN	5.00	

```
3                               0.001475
4                               0.000071
```

[5]:
```
plt.figure(figsize=(30,6))
plt.title("No EMG")
sbn.lineplot(base.CH1)
```

[5]:
```
<Axes: title={'center': 'No EMG'}, ylabel='CH1'>
```

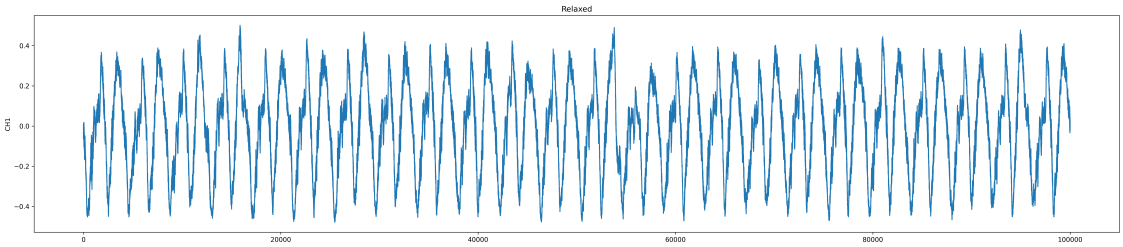


[6]:
```
relaxed = pd.read_csv("./emg_hand_raw_data/ponto 1a/relaxado/tek0000ALL.csv",␣
  ↪skiprows=20)
relaxed.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 100000 entries, 0 to 99999
Data columns (total 5 columns):
 #   Column                                Non-Null Count   Dtype
---  ------                                --------------   -----
 0   TIME                                  100000 non-null  float64
 1   CH1                                   100000 non-null  float64
 2   Unnamed: 2                            0 non-null       float64
 3   FREQUENCY                             100000 non-null  float64
 4   MATH<FFT(CH1, HANNING, LINEARRMS)>    100000 non-null  float64
dtypes: float64(5)
memory usage: 3.8 MB
```

[7]:
```
plt.figure(figsize=(30,6))
plt.title("Relaxed")
sbn.lineplot(relaxed.CH1)
```

[7]:
```
<Axes: title={'center': 'Relaxed'}, ylabel='CH1'>
```

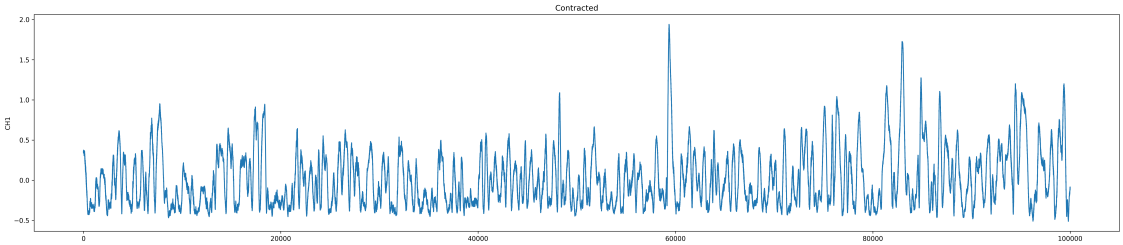


[8]:
```
contracted = pd.read_csv("./emg_hand_raw_data/ponto 1a/tek0001ALL.csv",␣
 ↪skiprows=20)
contracted.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 100000 entries, 0 to 99999
Data columns (total 5 columns):
 #   Column                                Non-Null Count   Dtype
---  ------                                --------------   -----
 0   TIME                                  100000 non-null  float64
 1   CH1                                   100000 non-null  float64
 2   Unnamed: 2                            0 non-null       float64
 3   FREQUENCY                             100000 non-null  float64
 4   MATH<FFT(CH1, HANNING, LINEARRMS)>  100000 non-null  float64
dtypes: float64(5)
memory usage: 3.8 MB
```

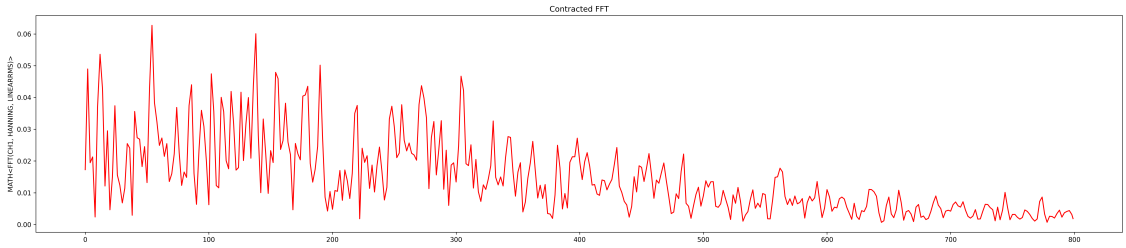
[9]:
```
plt.figure(figsize=(30,6))
plt.title("Contracted")
sbn.lineplot(contracted.CH1)
```

[9]:
```
<Axes: title={'center': 'Contracted'}, ylabel='CH1'>
```



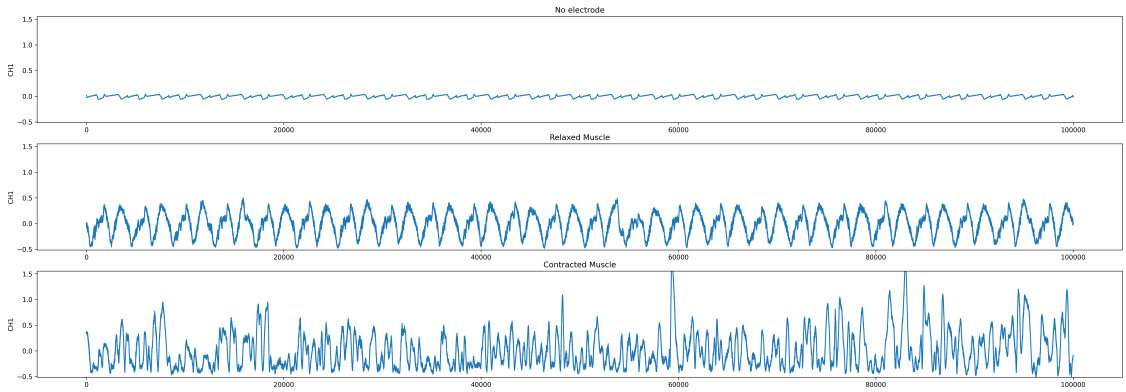
[10]:
```
plt.figure(figsize=(30,6))
plt.title("Contracted FFT")
sbn.lineplot(contracted["MATH<FFT(CH1, HANNING, LINEARRMS)>"][:800],␣
 ↪color='red')
```

[10]: <Axes: title={'center': 'Contracted FFT'}, ylabel='MATH<FFT(CH1, HANNING, LINEARRMS)>'>



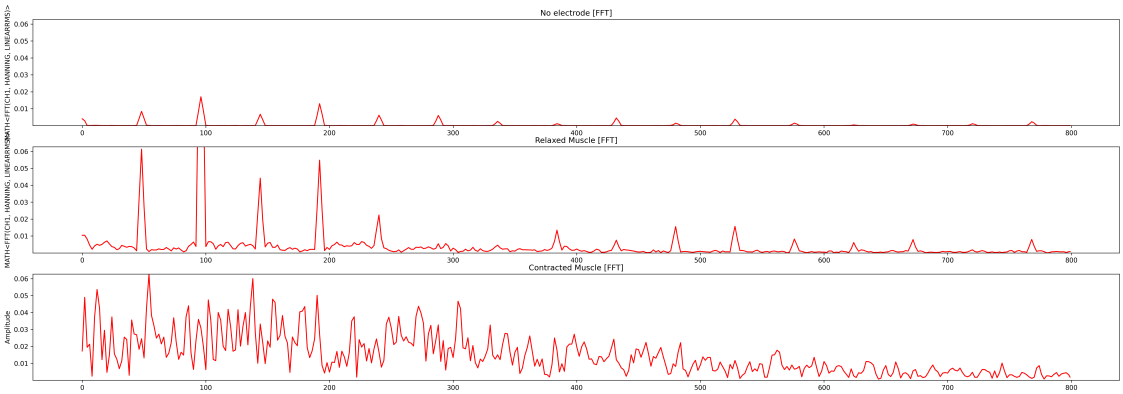
[11]:
```
fig, (ax0, ax1, ax2) = plt.subplots(3, 1)
fig.set_size_inches((30,10))

max_amp = max(contracted.CH1)
min_amp = min(contracted.CH1)

limits = (min_amp, max_amp*.8)

ax0.set_title("No electrode")
ax0.set_ylim(limits)
sbn.lineplot(base.CH1, ax=ax0)

ax1.set_title("Relaxed Muscle")
ax1.set_ylim(limits)
sbn.lineplot(relaxed.CH1, ax=ax1)


ax2.set_title("Contracted Muscle")
ax2.set_ylim(limits)
sbn.lineplot(contracted.CH1, ax=ax2)
```

[11]: <Axes: title={'center': 'Contracted Muscle'}, ylabel='CH1'>



[12]:
```
fig, (ax0, ax1, ax2) = plt.subplots(3, 1)
fig.set_size_inches((30,10))

fft_name = "MATH<FFT(CH1, HANNING, LINEARRMS)>"

max_amp = max(contracted[fft_name])
min_amp = min(contracted[fft_name])

limits = (min_amp, max_amp)

ax0.set_title("No electrode [FFT]")
ax0.set_ylim(limits)
sbn.lineplot(base[fft_name][:800], color='red', ax=ax0)

ax1.set_title("Relaxed Muscle [FFT]")
ax1.set_ylim(limits)
sbn.lineplot(relaxed[fft_name][:800], color='red', ax=ax1)


ax2.set_title("Contracted Muscle [FFT]")
ax2.set_ylim(limits)
ax2.set_ylabel("Amplitude")
sbn.lineplot(contracted[fft_name][:800], color='red', ax=ax2)
```

[12]:
```
<Axes: title={'center': 'Contracted Muscle [FFT]'}, ylabel='Amplitude'>
```



[13]:
```
# https://docs.scipy.org/doc/scipy/tutorial/fft.html
```