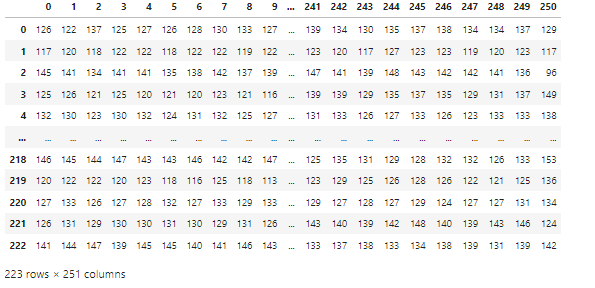
**EOG based simple game interface**

**Introduction:**

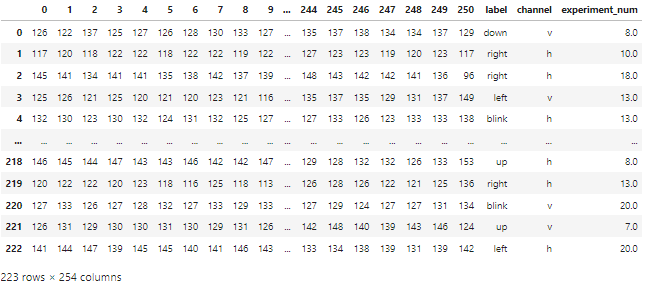
An EOG (Electrooculography) based simple game interface is a type of game that uses eye movements to control the gameplay. In this type of game, the player wears a device that tracks the movements of their eyes and converts them into in-game actions.

**Dataset:**

Converted txt file to dataframe each row represent one signal

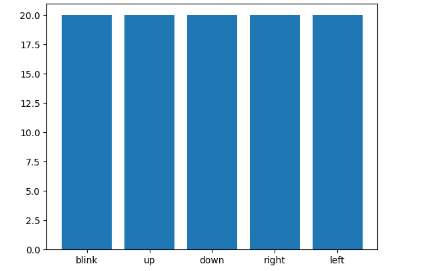


Add new column on original dataframe like (**experiment number** and **Channel** and **Label)**

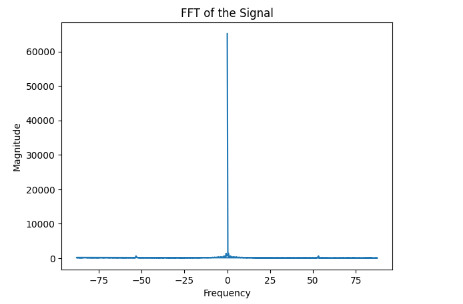


**Explore Dataset:**

* Data is balanced



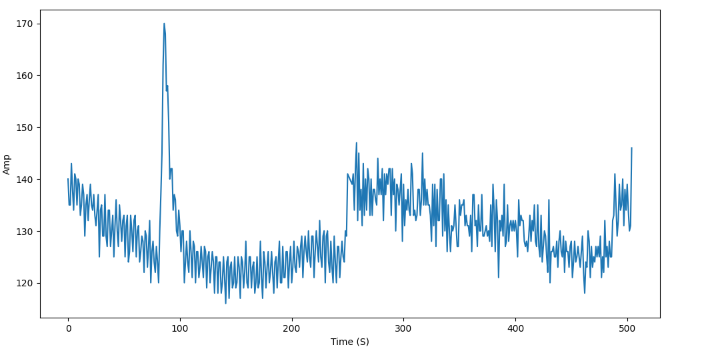
* Computed FFT of signals and plotting a sample signal of the data in frequency domain :

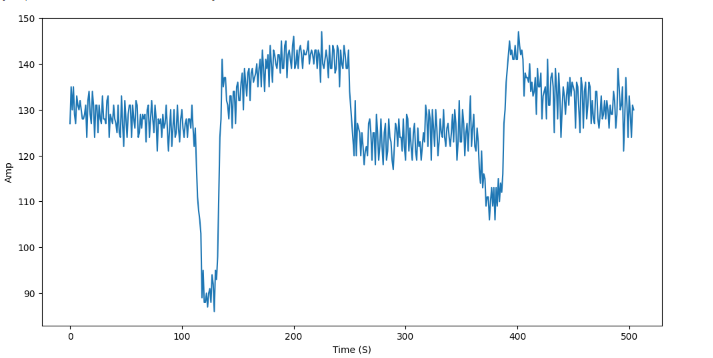


**Conclusion**: there is a **DC** component in some signals as f(0) has amplitude.

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There example of signals before preprocessing





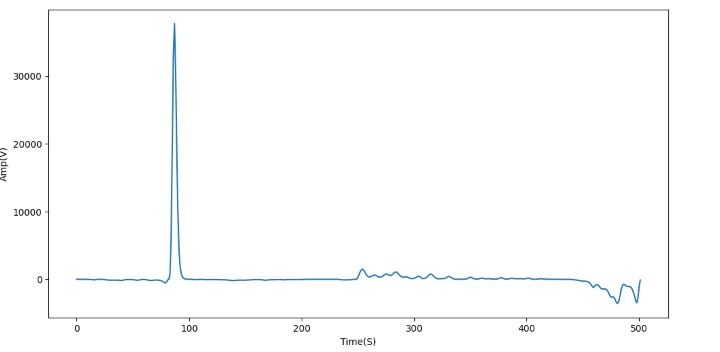
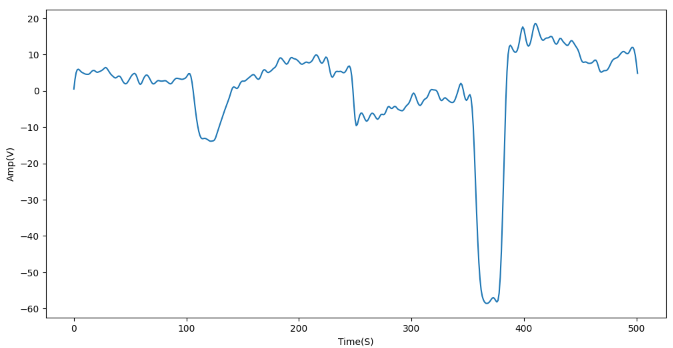
**Preprocessing:**

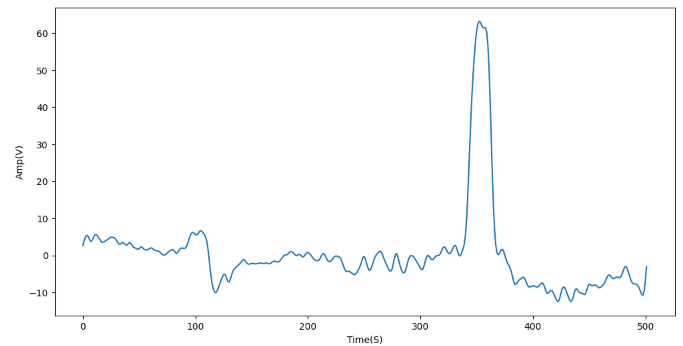
* **filtering using Band-pass filter**
* **resampling (down sampling) not required**
* **Removing dc component**
* **Normalization(StandardScaler)**

**Filtering using Band-paas filter:**

****

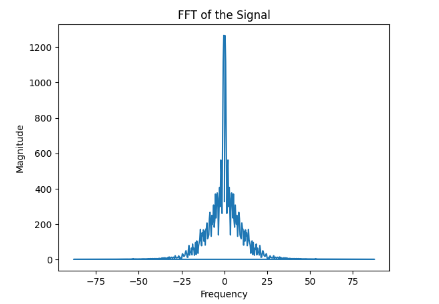
Some plots example after preprocessing



* **Remove DC**

Remove dc by subtract signal from mean



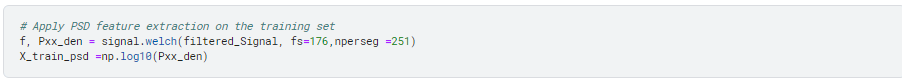
* Normalization

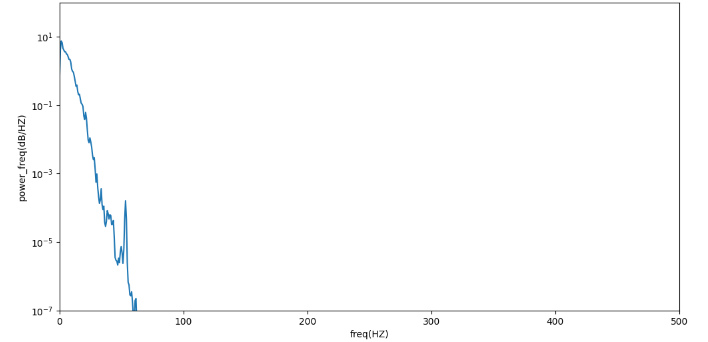
Normalize data using **standarscaler** (range -1 to 1)

**Feature Extraction**

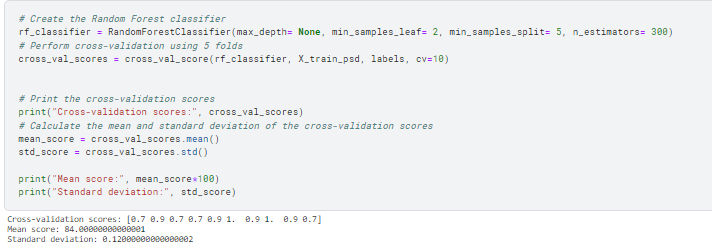
* Frequency Domain

**PSD**

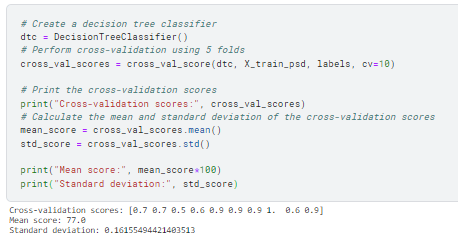
****

****

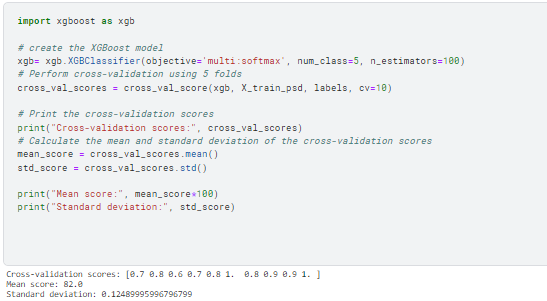
**Random Forest Classifier**

****

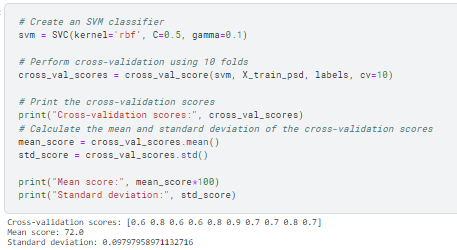
**Decision Tree Classifier**



**XGBClassifier**

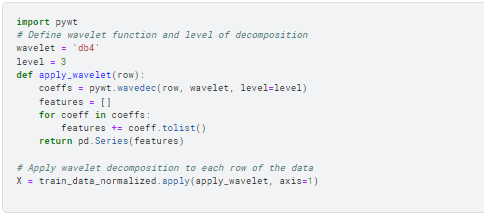
****

**SVC**

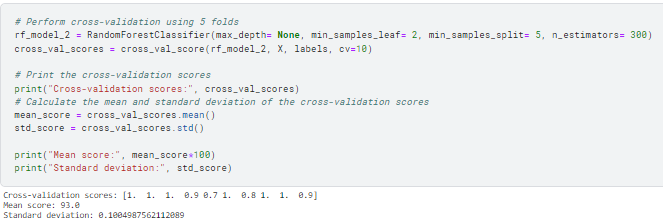
****

**---------------------------------------------------------------------------------------------------**

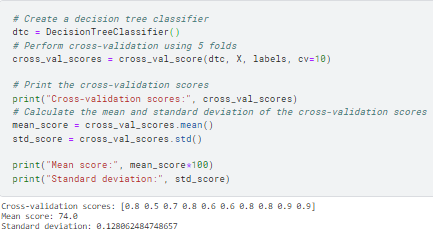
**Wavelet:**

****

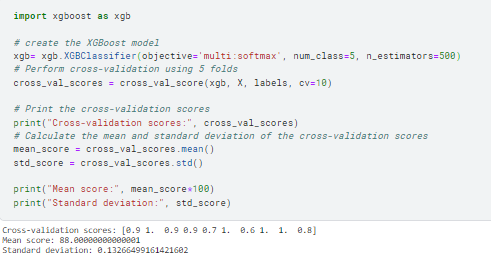
**Random Forest Classifier**



**Decision Tree Classifier**



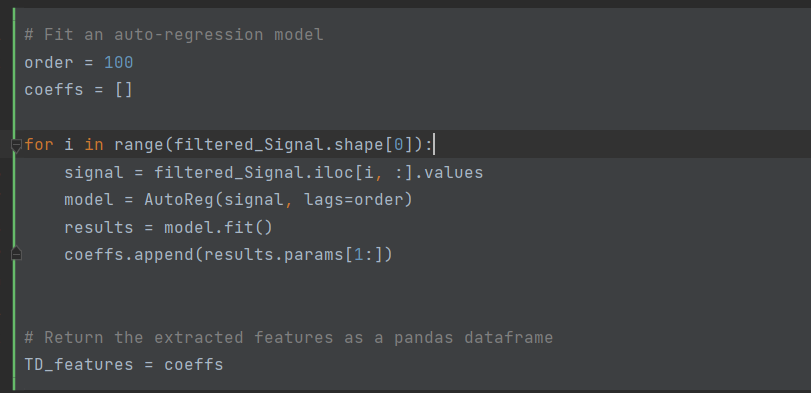
**XGBClassifier**



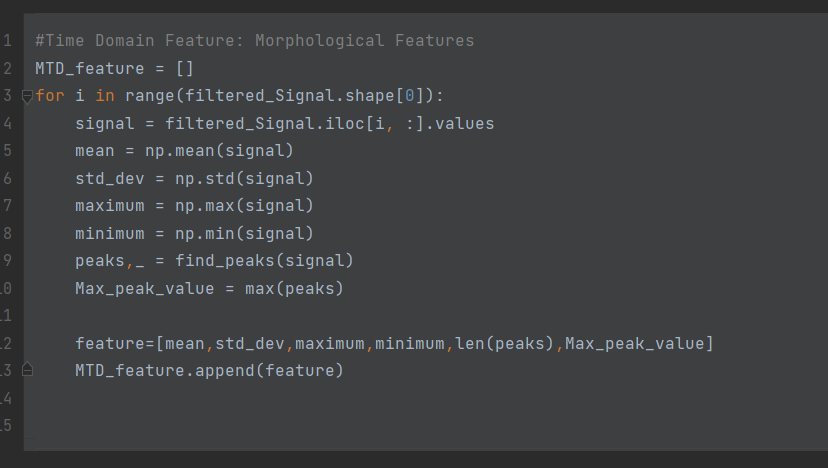
**---------------------------------------------------------------------------------------------------**

**Time domain:**

## Time Domain Feature Auto Regressive Features :

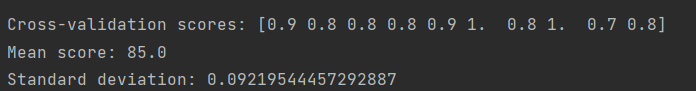


## Time Domain Feature Morphological Features :



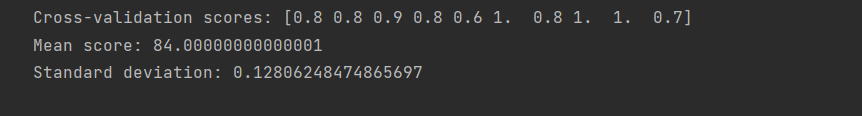
**Random Forest Classifier with Morphological Features**

A screen shot of a computer program

Description automatically generated with low confidence

**Decision Tree Classifier with Morphological Features**

**A screen shot of a computer program

Description automatically generated with medium confidence**

**Conclusion:**

## Wavelet feature extraction best from PSD

## the best model accuracy random forest with accuracy =100%

used grid search find best paramters of random forest

