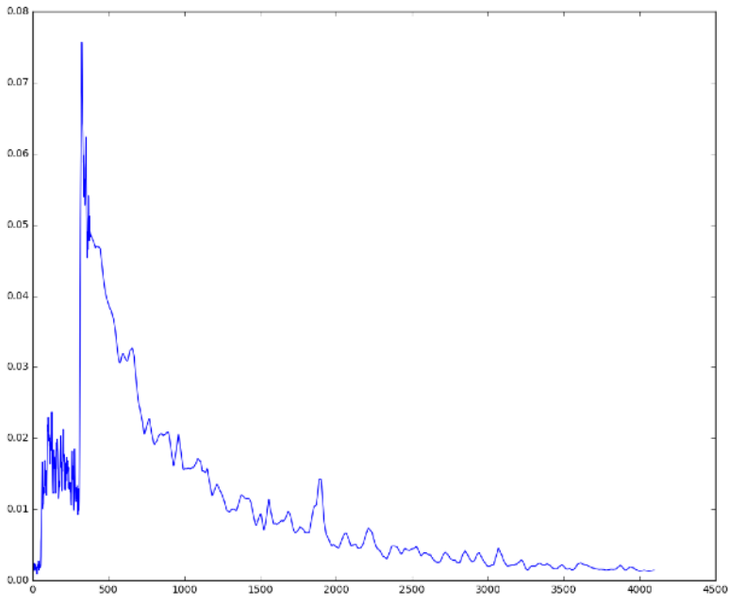
Exploratory Studies: using Machine Learning to classify waveforms

Ken 29th Jan 2018

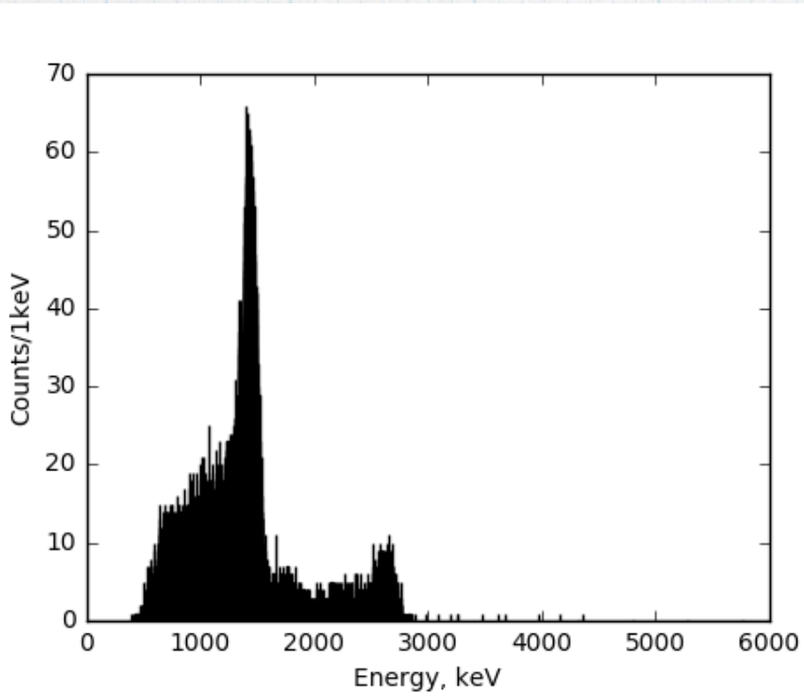
NAP meeting



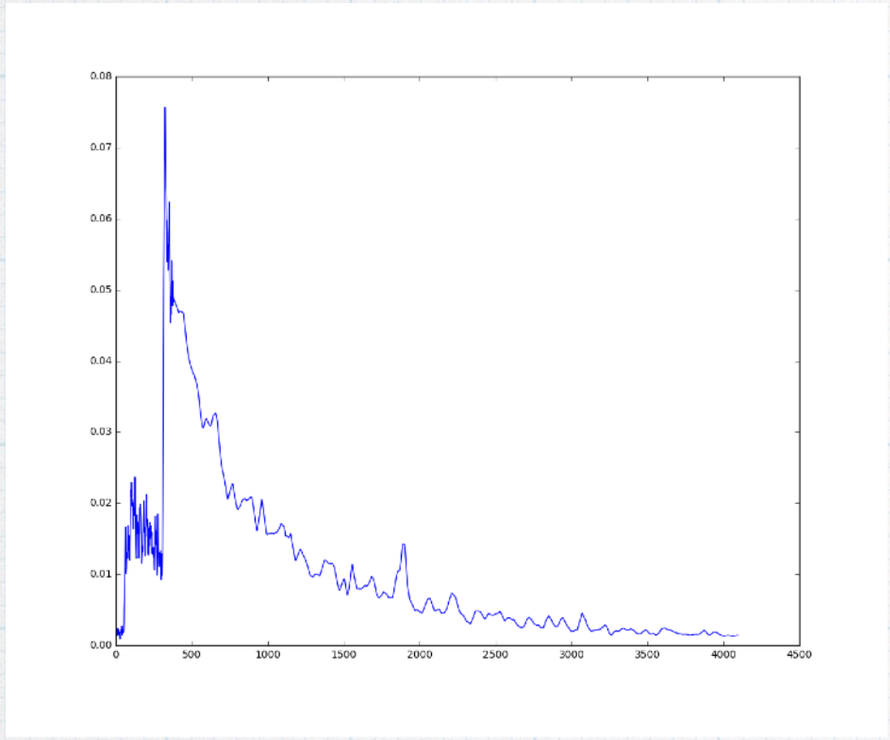
Waveform

Energy,
time ratio,
chi-squared,
.....

Using different and specific cut conditions to obtain the type of waveform we want.



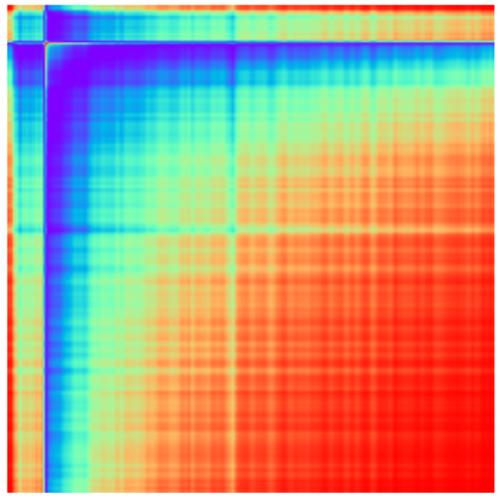
PSDPara[1]<1.5



Waveform

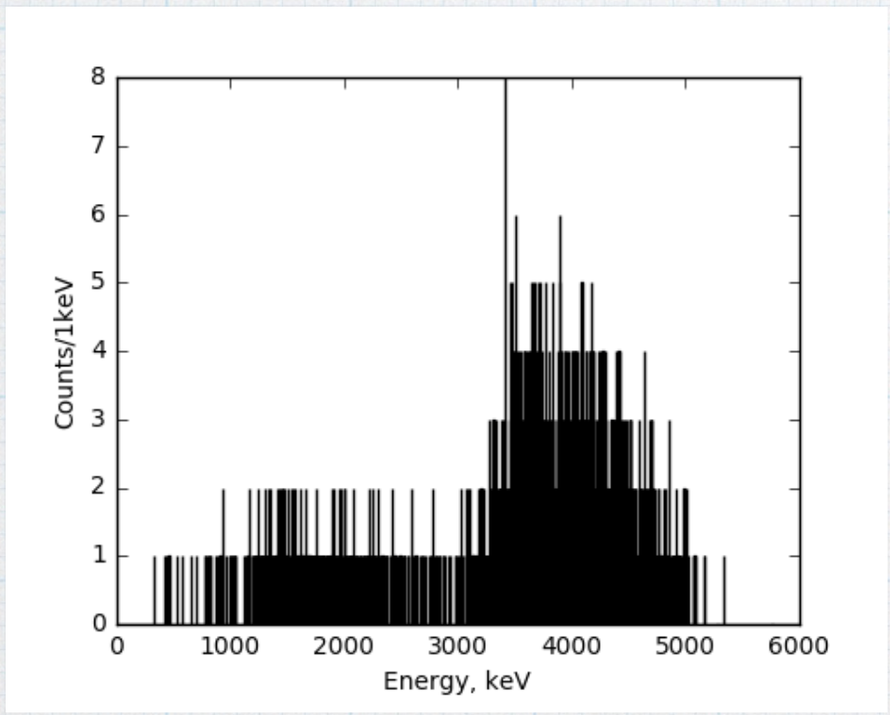
OR

Grammian Angular Summation Field



rather than simplifying the waveform down to few parameters. Using the image above or whole the waveform itself and classify it directly via a CNN.

Convolution Neural Network

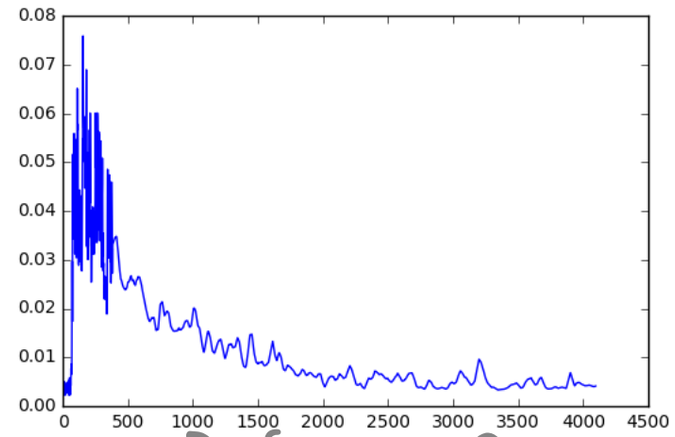


Piled-up events

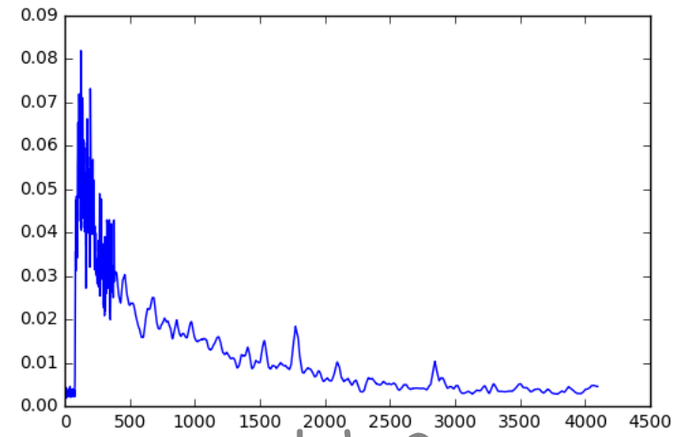
- For example:-
  - Using this method, I was able to extract about 2256 “piled up” events from SubRun69 to 79 in Run009(ploted each waveform of all 2256 events, checked almost all are “piled up”). I suspect there more, as I “cheated” my way to here(On a much smaller filtered dataset).
- However, there is still more work/test to be sorted out, “Hyper-parameterisation”, data cleaning, different ML methods…..

Example: Classifying waveform into groups

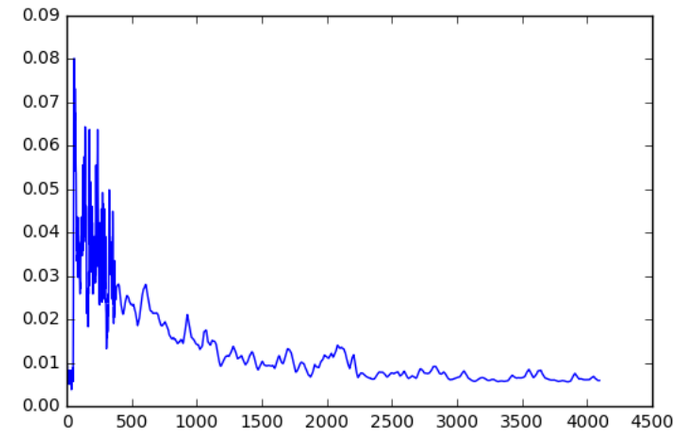
*From a test dataset of a single subsubrun(psdpara[1]<1.5)



Reference?

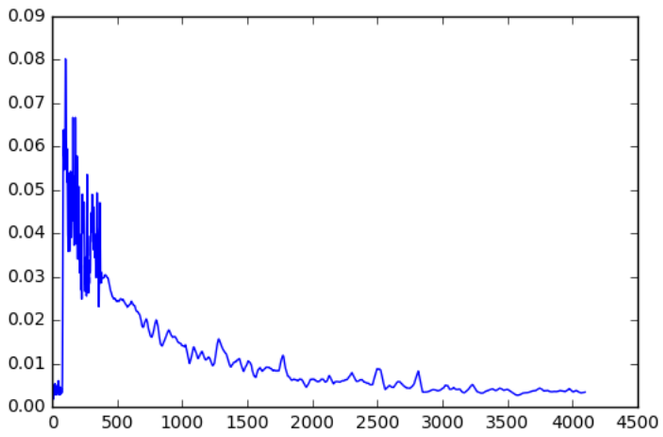


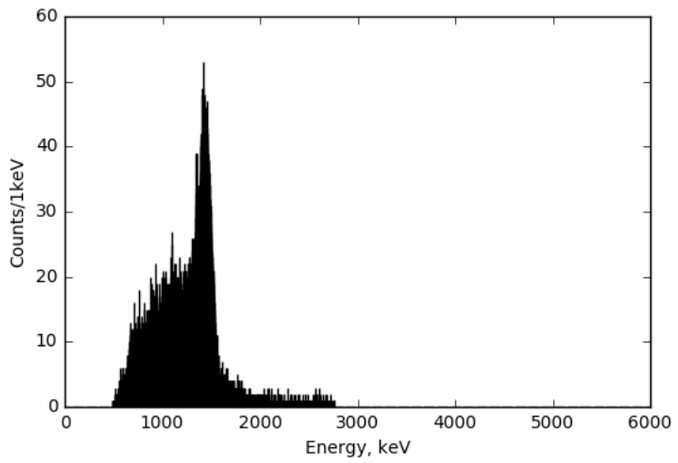
alpha?



Bad?

LS/LS+ref?





There are instance where the output was not according to my expectation. I still looking into the cause. (My suspicion is the standard dataset is "dirty")