Track 2 Day 2 Summary

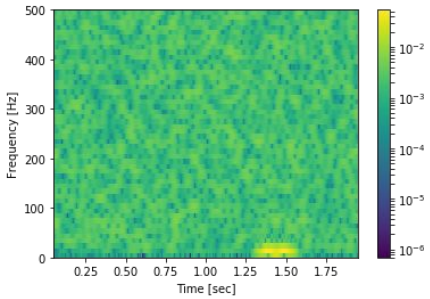
RTA Workshop, Orsay

Gravitational Wave Tutorial

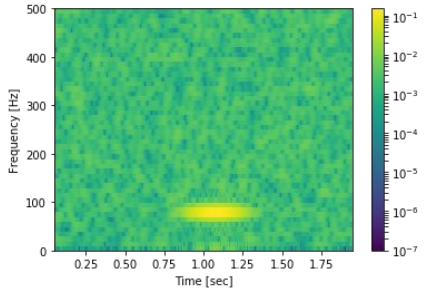
https://gitlab.com/g2net-open/rta-workshop/tree/master
For people with CERN accounts, we could run this in Swan with Python3: http://swan.cern.ch/

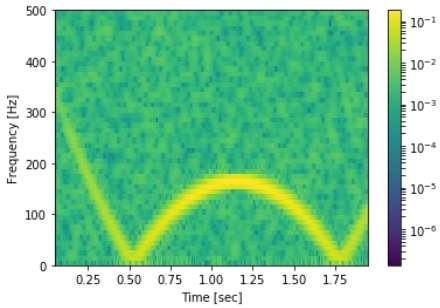
- Generated some noise simulations
  - Gaussian signals (label=0)
  - Sine-gaussian signals (label=1)
  - Scattered light signals (label=2)
  - Random background noise (label=3)
- These were then mixed in 3000 events saved to an h5 file for later
- The noise file can then be used to play with different ML architectures for classification
- Example was done with Keras using a 1D Conv. NN.

Gaussian

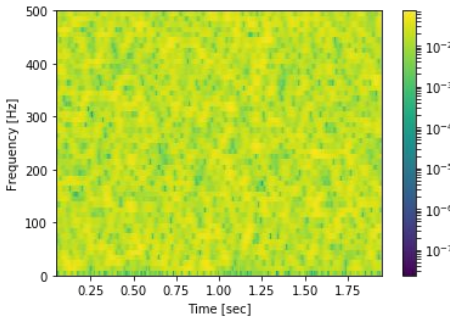


Sine-Gaussian





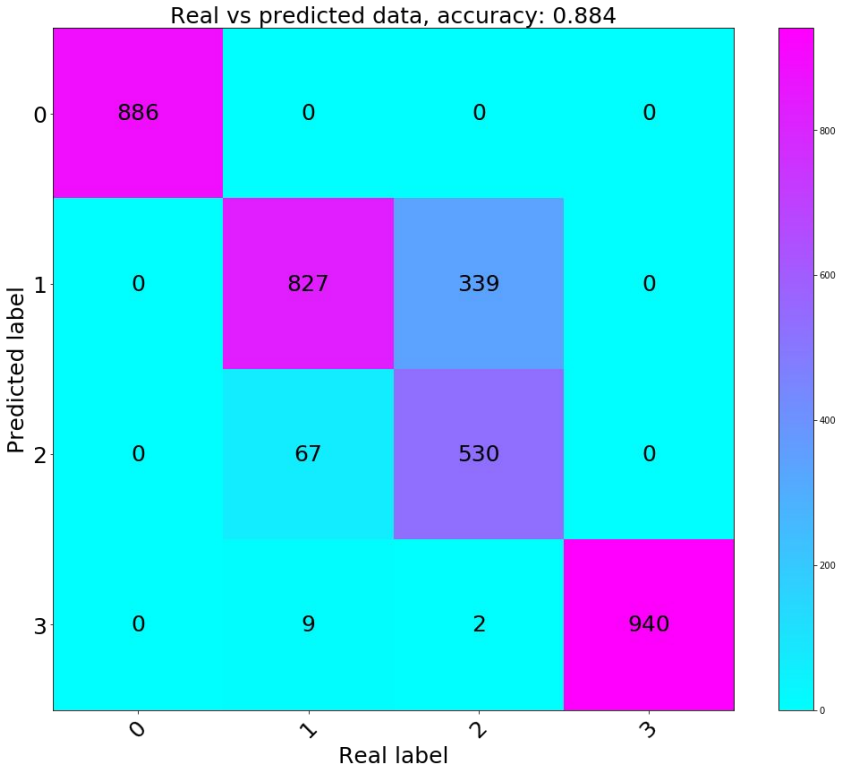
Scattered Light



Random Noise

Gravitational Wave Tutorial

- Got some ~90% accuracy with simple 2-layer Conv1D + 1 dense layer
- Humans can do much better
- There was some discussion of trying RNNs instead of Conv1D
  - RNNs tend to be slower to train
  - Not clear how much of an advantage is gained with variable length sequences
- After tutorial we discussed the possibility of trying anomaly detection here
  - Tomorrow's autoencoder tutorials may touch on this?



Gravitational Wave Tutorial

- Other topics of discussion?
- How do we deal with the fact that the detector changes over time?
  - Retrain our model periodically with new noise data?
- Types of noise currently labeled by humans
  - Can we find better ways of tagging noise automatically?