Training on High Energy (6-10 keV)

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Energy Separation

- I separated my data set into 5 energy ranges.
  - 0-1, 1-2, 2-3, 3-6, 6-10 keV
- For the first try, I tried to classify signal / background in the highest energy range, 6-10 keV.

Adjusting Network

- Andrew Ng advises to start your network with small neurons, and adjust it.
- If your network is underfitted, make the network bigger.
- If your network is overfitted, make the network smaller, or apply normalization.

Deep-Narrow Network

- According to Ng, I tried from very small network.
- Each layer is a dense layer having 64 neurons with ReLU activation function, batch normalization layer applied.
- If the network is underfitted, make it deeper.
- If the network starts to be overfitted, apply additional dropout layer.
- For the stable performance, I used learning rate 1.e-4 in adam optimizer.

Best Network

- 8 hidden layers with dropout ratio 0.33 gave the best result.
    - Total params: 553,610
    - Trainable params: 552,582

Best Result

- Background Accuracy: 0.8861499364675984

- Signal Accuracy: 0.639871382636656

- Overall Accuracy: 0.7226302305721606
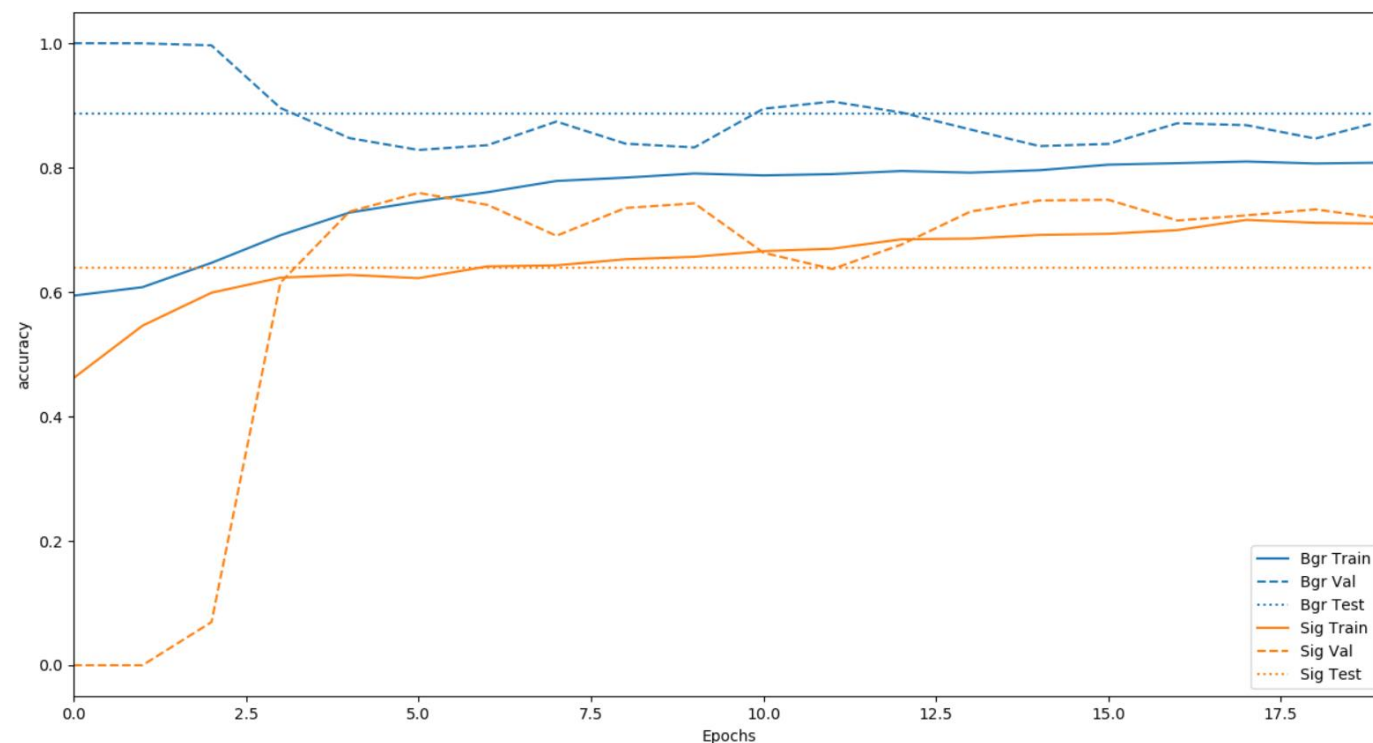
Same Structure to Other Energy

- Same structure did not make good result to lower energy range, 3~6 keV.

- Background Accuracy
  - 0.482805762961405

- Signal Accuracy
  - 0.889589905362776