Assignment 3: Dr. Cook II

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Part 1) Load the data

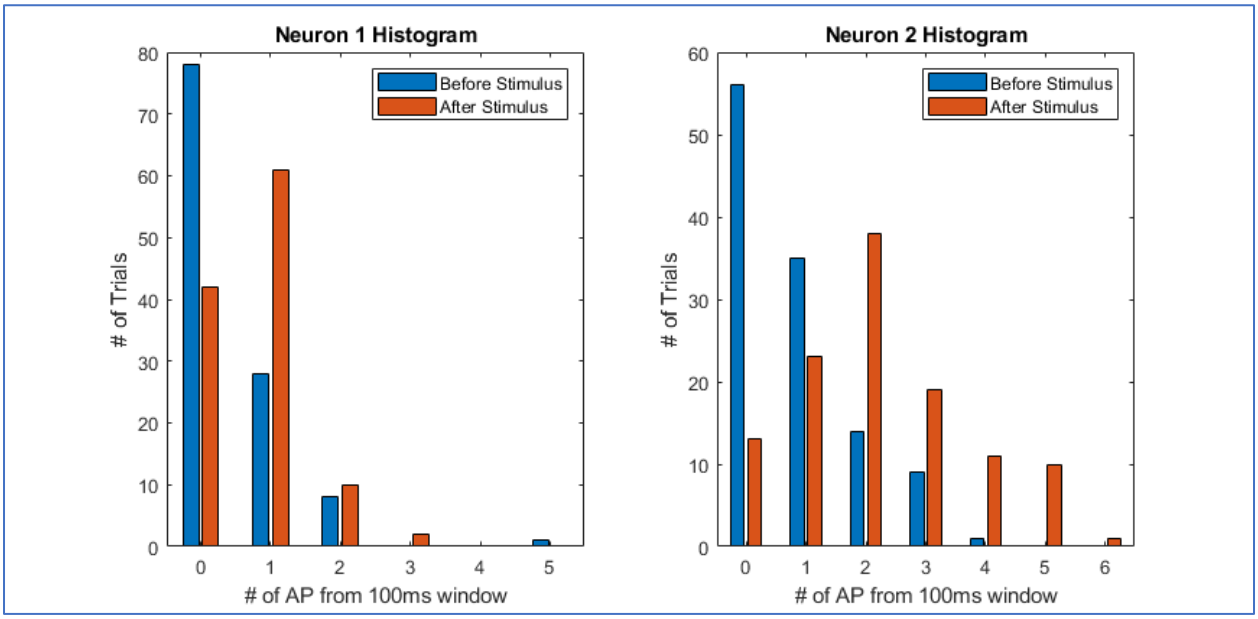
Nothing to report for this section

Part 2) Check the data

Nothing to report for this section

Part 3) ROC Neurometric Analysis

A) Histograms: # of spikes occurring during the 100ms window



B) Write a ROC Score function

The Function is viewable under `%% ***** FUNCTIONS *****` section in MASTER.m

The ROC score for Neuron 1 is 0.6487

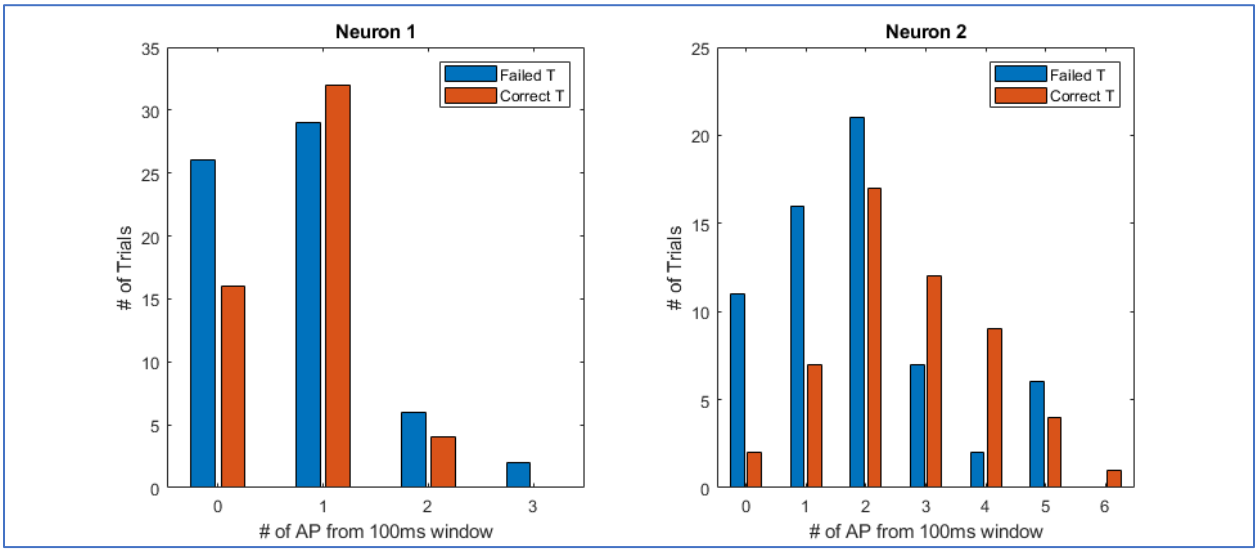
The ROC score for Neuron 2 is 0.78514

C) Discuss what the ROC score means; whether either neuron reliably signaled

The ROC in this context is the likelihood of the neuron to detect the motion pulse. Personally would not call a 0.65 a reliable probability but the 0.79 score by Neuron 2 can be interpreted as "reliably signaling" in comparison. It is able to detect almost 4/5 times, which I would consider reliable.

Part 4) ROC Detect Probability

A) Histograms: # of spikes occurring during the 100ms window



B) ROC DP Score

The Function is viewable under `%% ***** FUNCTIONS *****` section in MASTER.m

The ROC_DP score for Neuron 1 is 0.52991

The ROC_DP score for Neuron 2 is 0.67353

C) Discuss what the ROC means; whether either neuron was correlated to behaviour

The ROC in this context indicates the correlation between the neuron and the animal's behaviour (detecting the motion stimulus). Neuron 1 has 0.52991, which is barely above random chance given the discrete Bernoulli decision of {Fail, Correct}. A correlation of 0.67 from Neuron 2 can be concluded to be correlated, albeit not a strong or definite association (almost 0.7).

D) Alternate Analysis Method?

As covered in the lecture, the perception of a motion pulse can be measured via reaction times. An interesting avenue would be to see the correlation between neuron response with reaction times.