**Goal:**

To test the stability of the strain gauge system, and get the best threshold for training.

**Data:**

Saved in corresponding Github folder.

**1 Variance from the hardware:**

Arduino analog reading for the strain gauge circuit is not stable due to noise from multiple sources. Our training threshold (trigger “motion”) needs to be higher than the largest random analog reading.

Arduino voltage readings were recorded when the monkey is sitting in the chair and there is no obvious motion. The raw readings were:

A graph with blue lines

Description automatically generated

Investigation:

* There is clear drift in the reading. Fortunately our algorithm should eliminate such drift.
* The resolution of Arduino analog reading shoud be ~0.004. Somehow the change here could be smaller. Reason unknown… Another long-term reading showed correct voltage resolution.

When calculating the difference of the running average (like what we did during training):

A graph of a graph

Description automatically generated with medium confidence

All values are smaller than 0.005.

**2 Variance from shaking:**

The same record was done when the monkey is apparently shaking the chair:

A graph showing a number of data

Description automatically generated with medium confidence

A comparison of a graph

Description automatically generated

When the shaking happens, the reading apparently begin to oscillate at lower frequency than the noise and the reading goes beyond 0.01.

**3 Corresponding force:**

It’s just a coarse measurement of how much force on the head post can trigger “motion”. The measurement was done when there is no monkey sitting in the chair. Force meter was pulled against the aluminum part of the head post and the peak value was read when “motion” is triggered:

|  |  |
| --- | --- |
| Sensitivity | Force\_average |
| 0.01 | 61 |
| 0.005 | 16.2 |
| 0.008 | 32.4 |

Unit Newton.