Read me,

Let's get started. To get an overview of the tasks and goals at and, I think it makes sense to go one step at the time. Therefore, I have attached 2 files:

One is a .mat file that contains the output from Python (A)

One is a .mat file which is the EMG recoding. (B)

The goal is to extract response times from the EMG file (B) and compare the responses to the ones you can extract from the file with the registered responses. (A). To achieve this, you'll need a bit of background.

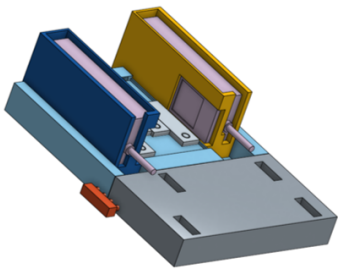
The task consist of 200 trials (see figure..but ignore the duration of the phases..they are a bit outdated)

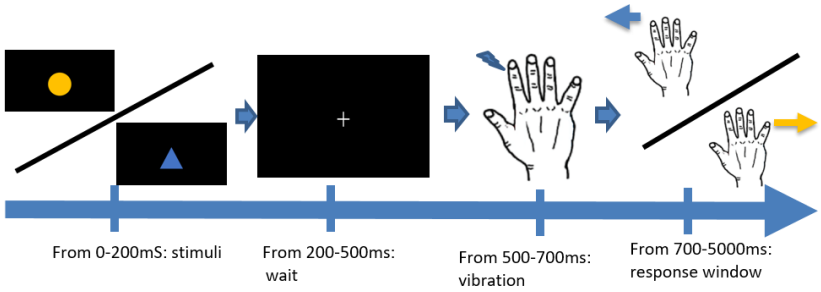
Each trial starts with one of two visual ques ('stimuli') followed by a delay, followed by a vibration of either the index (D2) or little (D5). In the figure it is D2, which is vibrated, and in case of a preceding blue triangle, subject should respond with a D2 abduction. We call this a 'homotopic' response or more specifically a 'D2→D2'. We hypothesize that homotopic responses are faster than heterotopic responses.

The subject then responds with either the vibrated or the other finger dependent on the visual cue.

The subject responds by abducting the finger to one of the two response-boxes, that then pick of the response time and log it.

The subject is wearing EMG electrodes on FDI (D2 abductor) and ADM (D5 abducted) as well as accelerometers on D2 and D5 (way more tricky, so we save it for later).






**Task 1: Extracting and summarizing output data (from the response boxes).**

Thus, there are 4 different trial types: '1', '2', '3', '4'.

There are two different types of registered responses: 'b' and 'y' and a no response, which appears as '99' (for some reason).

ACTION POINT: Plot the 50 response times for each of the 4 conditions/trials.

HINT: you can find the response /reaction times in the .mat files. Anything below 200ms (0.2 seconds is very fast) anything above 600ms (0.6s) is slow.

Questions:

- Which of the 4 trial types yields the fastest response times?
- Within trial type: Is the mean and median close to each other? If not, why not, and which one to use?

**Task 2: Getting responses fingers and reaction times from the EMG file:**

There are 200 trials each with 6 channels (ch3-ch6 are noise..ignr ehtem).

Channel 1 is FDI and channel 2 is ADM.

Each trial is triggered by a ttl pulse that also triggers the vibration.

In some trials you can clearly see the response in the EMG data, in some it is harder.

It some trials e.g. trial 1 channel 1, you can see a movement artefact (low frequency artefact).

This can be removed by high pass filtering the data. E.g. from 50Hz.

ACTION POINTS:

Pre-processing: Remove offset, high pass filter, and rectify the data.

Find onset of responses (this could be 2xSD above background EMG)

Questions:

- Which of the 4 trial types from above corresponds to FDO and ADM responses resp.?
- In the trails that the boxes didn't pick up '99' which finger did the subject respond with?
- Compare the respond time from the output form the boxes (unit: seconds) with those form the EMG file (unit: samples) What is the EMG sample frequency?
- Do the same summary statistics as above.
- Are the reaction time slower or faster than those registered by the box?