

CompPsych Project 2

Report 1

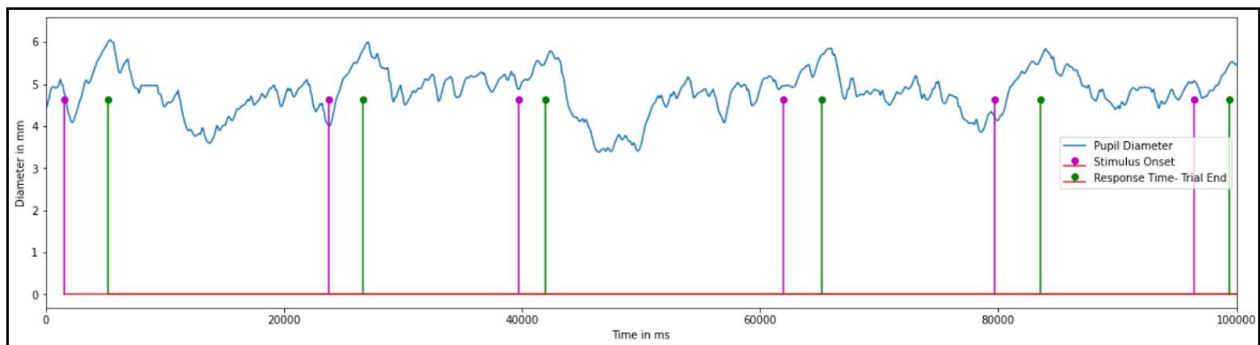
Dataset Description:

1. Behave Data:
 - Time (ms) - Start time of Trial
 - RT (ms) - Time it took to respond
 - Difficulty, isCorrect (1 for correct, 0 for wrong)
2. Pupil Data: Time (ms), Pupil Diameter (mm)

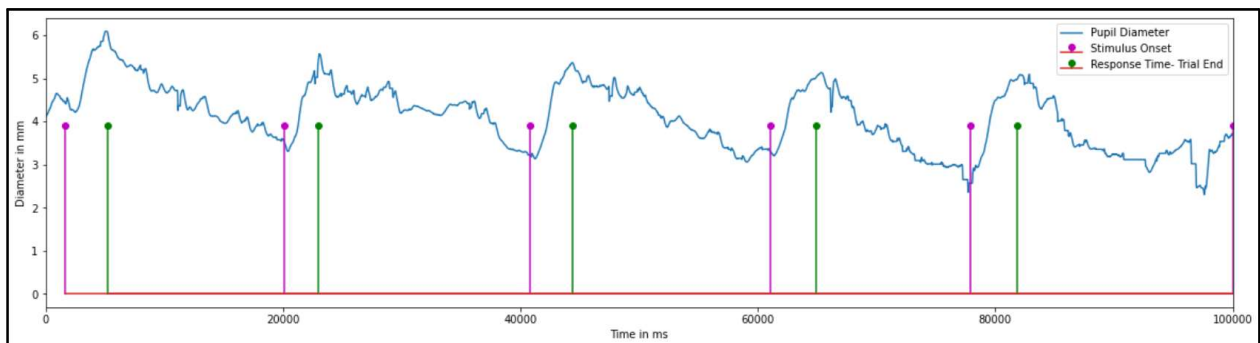
Step 1 (Inspection and Visualize):

Example of data plot:

subject_01:



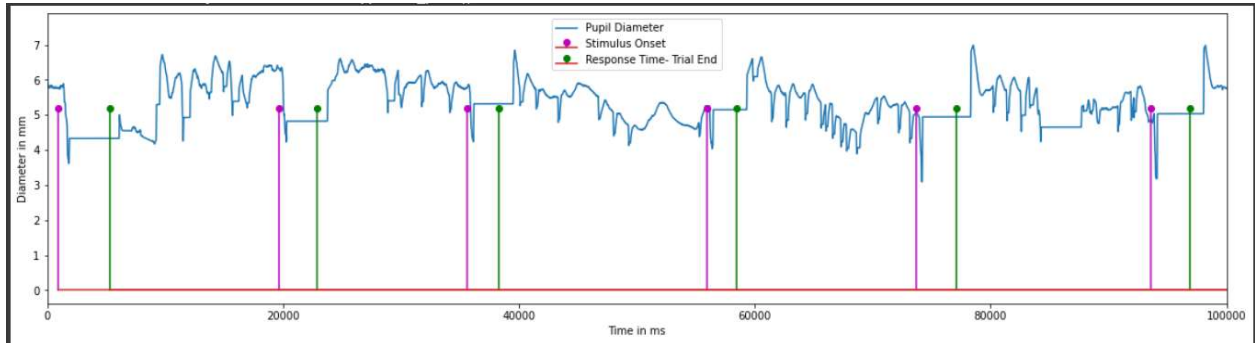
subject_33:



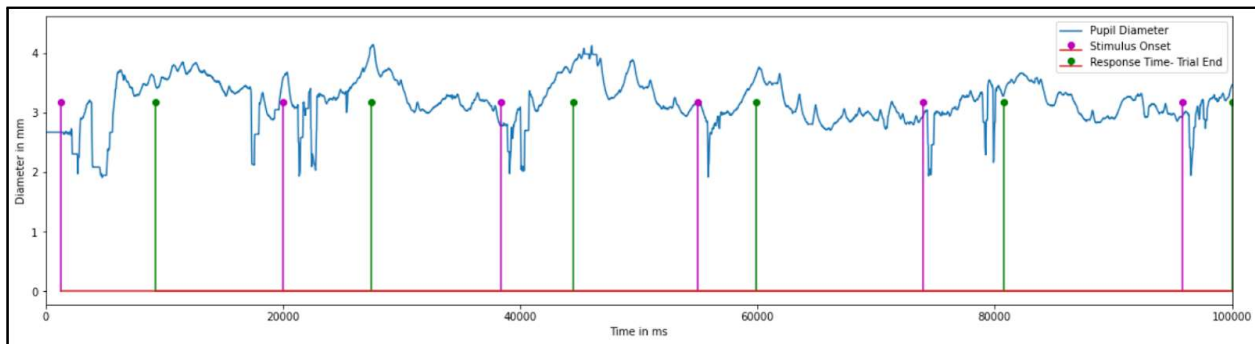
The plot shows the pupil diameter for the time range (0,100000) ms. The pink line is the stimulus onset, which is the start time of the trial and the green line represents the end of the trial. From these plots, I can see that the pupil diameter increases during the trial. The pattern is similar for all the subjects.

Anomalies Found:

subject_03:



subject_19:



The above plots for subjects 03, and 19 looked wrong to me. There might be some blinks happening. Hence I removed the data for these subjects. So now, the number of subjects is 50.

Step 2 (Average Pupil Response):

To find the average pupil response over time, I created a 2d array, in which rows represent the trials, and columns represent time. The cell value is baselined pupil diameter. Baseline means I subtracted the diameter at stimulus onset from the subsequent values in the trial. Since the trial time is not the same for all trials, I appended the trial of less time with nan values.

	0	1	2	3	4	5	6	7	8	9	...	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
0	0.0	-0.001284	-0.002765	-0.004494	-0.006521	-0.008919	-0.011712	-0.014920	-0.018600	-0.022778	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
1	0.0	-0.000251	-0.000421	-0.000508	-0.000515	-0.000443	-0.000288	-0.000048	0.000277	0.000691	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
2	0.0	0.001053	0.002226	0.003520	0.004930	0.006457	0.008097	0.009850	0.011713	0.013683	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
3	0.0	-0.000066	-0.000129	-0.000187	-0.000240	-0.000286	-0.000326	-0.000360	-0.000388	-0.000412	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
4	0.0	-0.002823	-0.005647	-0.008465	-0.011272	-0.014059	-0.016821	-0.019547	-0.022228	-0.024856	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
...
1995	0.0	-0.005240	-0.010607	-0.015663	-0.019912	-0.022858	-0.024459	-0.025191	-0.025776	-0.026598	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
1996	0.0	-0.000605	-0.001928	-0.004684	-0.009686	-0.017414	-0.027643	-0.039411	-0.051315	-0.061972	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
1997	0.0	-0.006970	-0.018514	-0.033416	-0.049465	-0.064361	-0.076084	-0.083530	-0.087272	-0.089917	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
1998	0.0	0.002532	0.004907	0.006660	0.007093	0.005542	0.001775	-0.003865	-0.010717	-0.018175	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
1999	0.0	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN

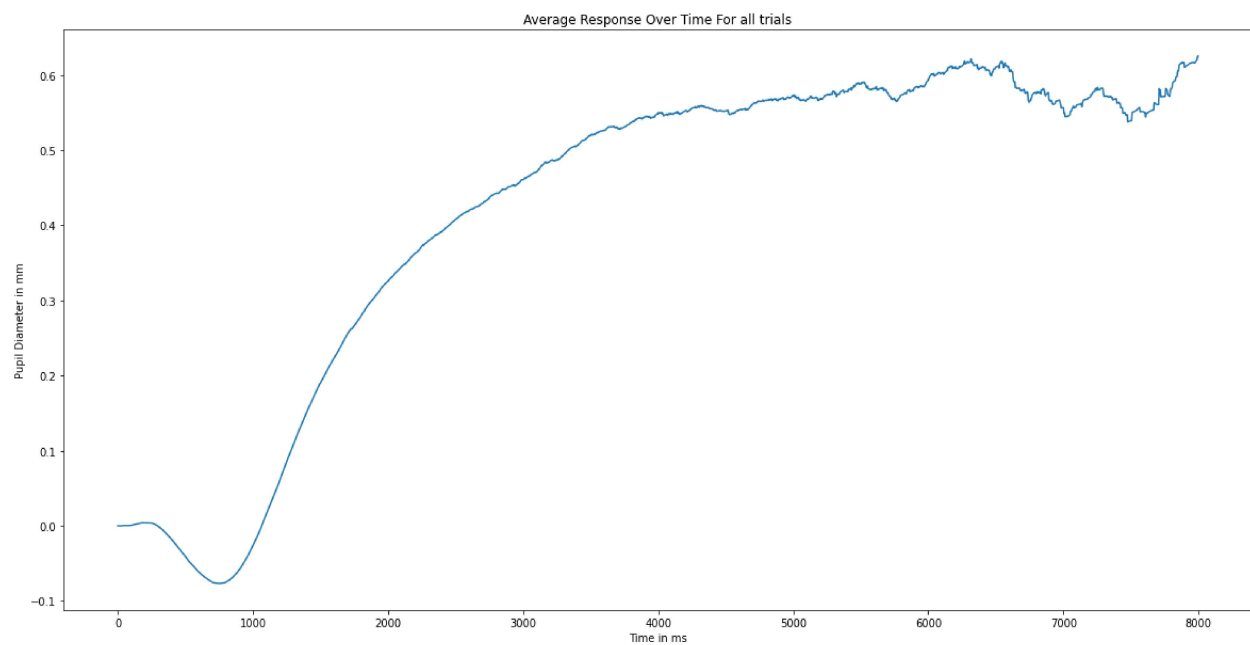
2000 rows x 2000 columns

Rows => Trial No.

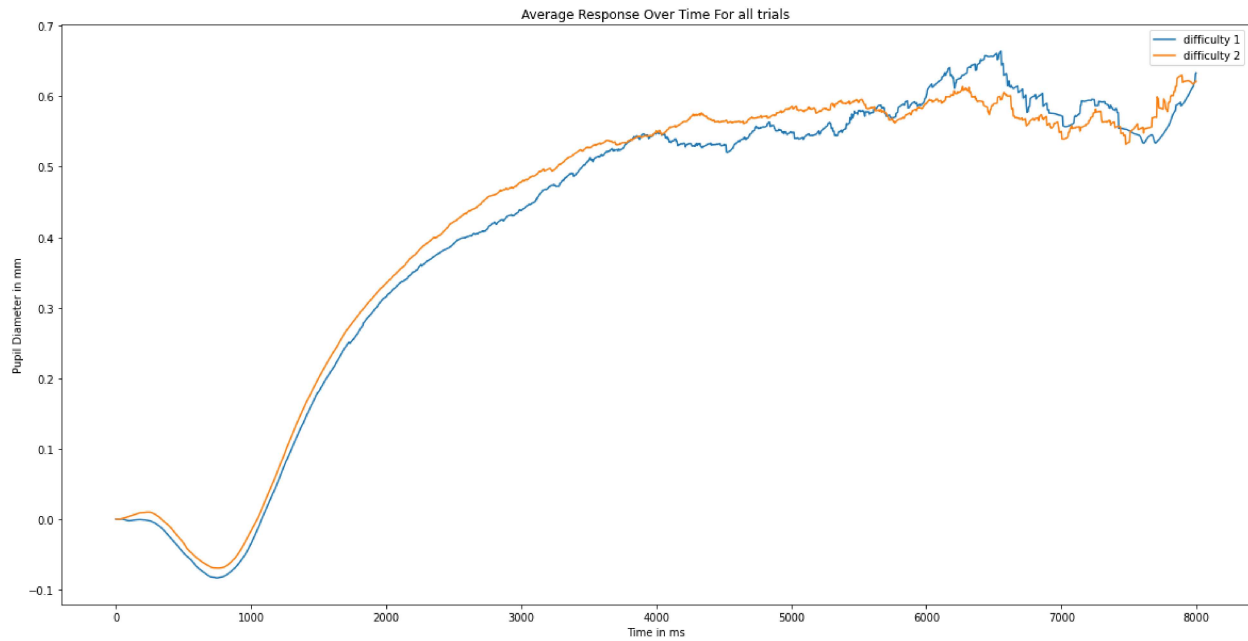
Columns => Time (difference of 4 ms)

Then I calculated the average response over time for the time-series of diameter.

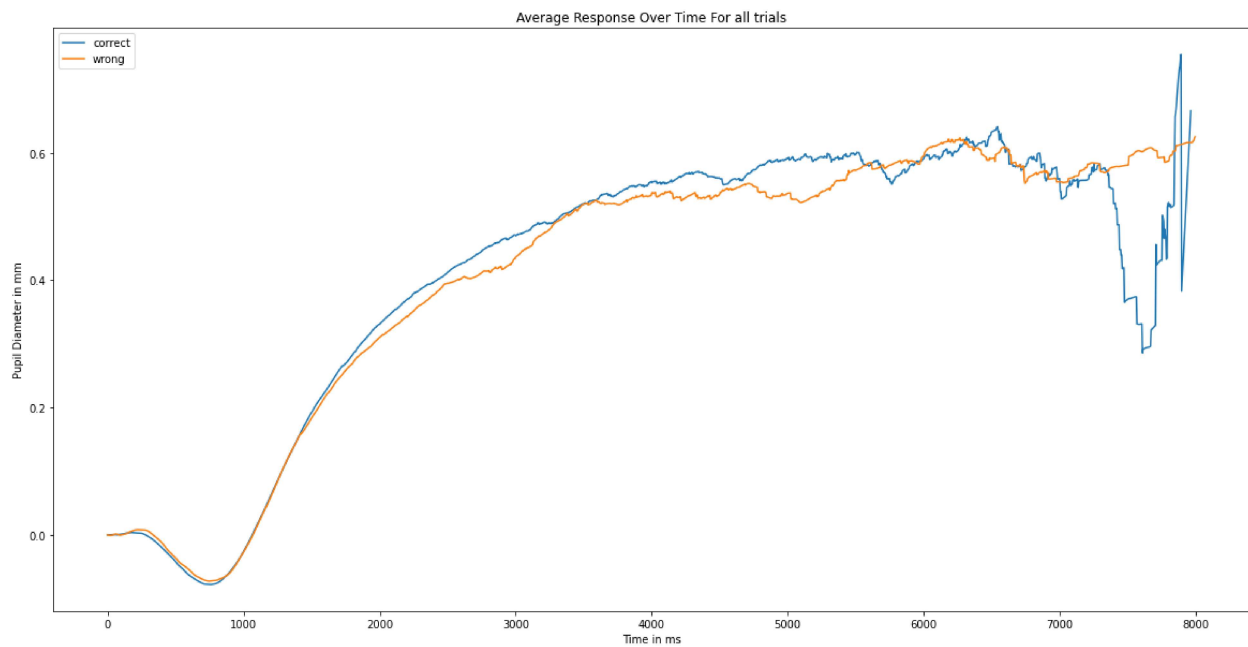
Average Response Over Time for all trials:



Average Response Over Time for easy (difficulty 1)/ hard (difficulty 2):

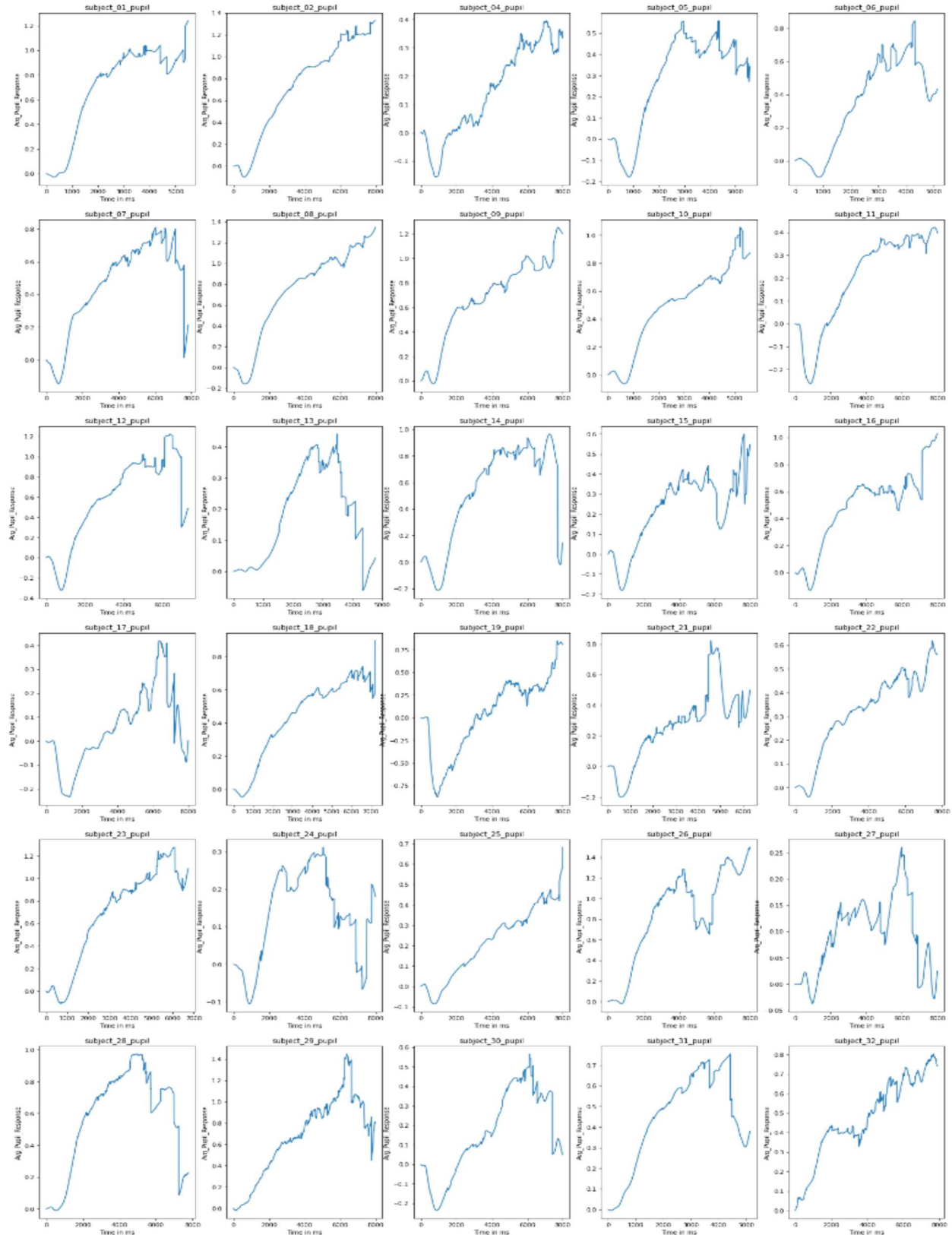


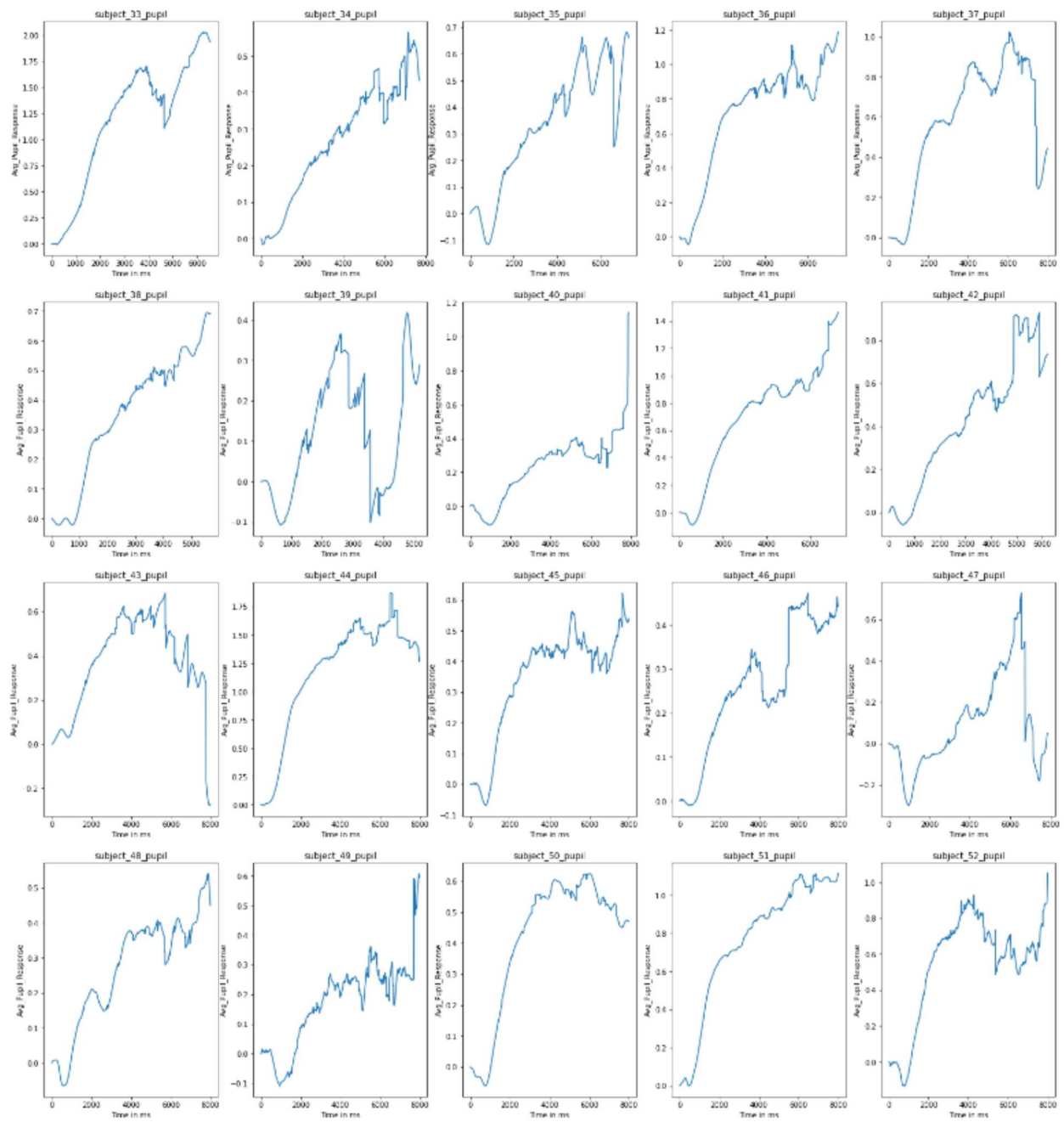
Average Response Over Time for correct/wrong:



From this, I can observe that the diameter for difficulty 1 is lesser and then increases, compared to difficulty 2. Also, the diameter is more, when the answer is correct.

I also tried to find the average pupil response over time for each subject.





The pupil response is different for every subject, but the pattern is the same, there is an increasing trend of diameter during the trial.