

I started working on this project to analyze the mice pupil diameter changes with respect to baseline and drug injection conditions. To begin with, I tried to explore an alternative to deeplabcut for generating h5 files, thus I implemented the 'Facemap' software to experiment how efficiently it labels the face coordinates. However, the coordinates were not precisely being marked in facemap as compared to deeplabcut. Also, deeplabcut seemed to be more user-friendly and easy to use/install software compared to facemap. Therefore, using deeplabcut, I generated h5 files for the subjects 'sert38b_3', 'sert40b_2', 'sert40c_1', 'sert40c_5', 'sert46b_5', 'sert47a_1', '126031_5' to carry out the analysis. But there were coordinates that had very less likelihood, thus, to get accurate eye pupil diameter results, I decided to interpolate these low likelihood coordinates. Moreover, there were instances where the subjects had blinks and those coordinates were not useful to calculate the diameter. Thus, I calculated eye area and used that variable to filter out the outliers. Furthermore, I had the behavior data for the subjects 'sert40b_2', 'sert40c_1', 'sert40c_5', so I studied the pupil eye diameter in relation to the velocity, treadmill position. For the ease of analysis I categorized the velocity variable, wherein I assigned a velocity of less than 0.1 as a 'Stationary' state of mice and velocity of greater than or equal to 0.1 as 'Movement' state of mice. Based on the majority results that I derived, I proposed the following hypothesis:

1. After drug injection, the minimum eye area decreases drastically but no concrete analysis can be made on the changes in the maximum eye area. This decrease might suggest that the drug imparts a drowsiness effect on the subject. The values in the below table helps to study the same:

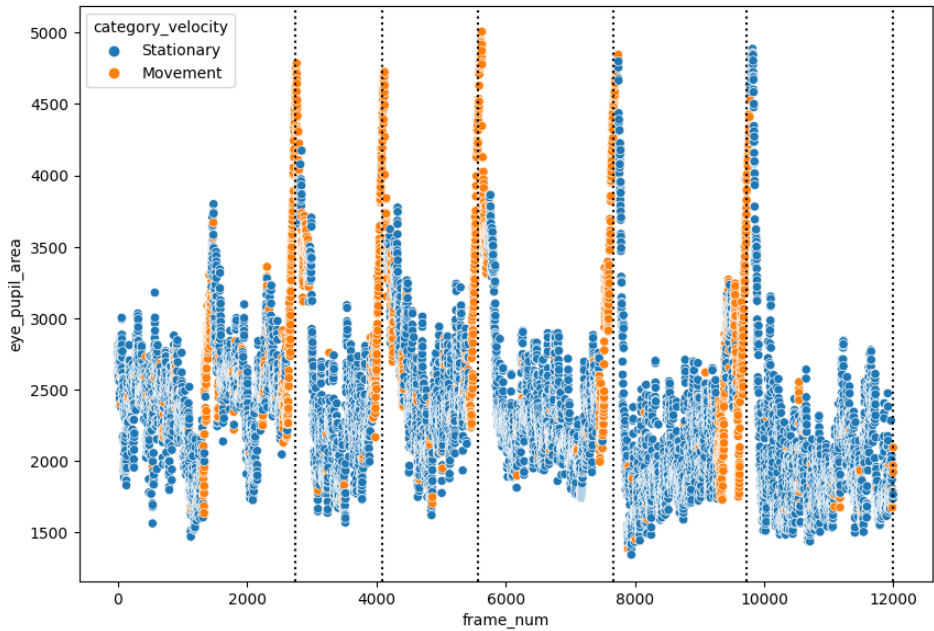
40b_2				
Type	Stationary		Movement	
Eye Area	Min	Max	Min	Max
Baseline	1500	2900	1300	2900
pcb1	400	3200	400	3000
pcb2	200	3200	1200	3200
pcb3	800	3300	800	3300

40c_1				
Type	Stationary		Movement	
Eye Area	Min	Max	Min	Max
Baseline	1700	5200	1800	5100

pcb1	600	4900	600	5000
pcb2	1200	5000	1300	4900

40C_5				
Type	Stationary		Movement	
Eye Area	Min	Max	Min	Max
Baseline	200	3700	1000	4200
pcb1	1200	3750	1100	3800
pcb2	200	3800	300	3900
pcb3	950	3900	1300	3800

2. The velocity of the subject increases, that is, gets into movement state from stationary state at the beginning and end of the laps. During the lap duration, the subject is observed to be in a stationary state. Further, there is a strong correlation between velocity and eye area, that is, the eye area increases with increase in velocity. The graph below reveals the same:



3. There is a strong correlation between treadmill position and eye area, that is, the eye area increases with increase in treadmill position. The charts below displays the same result:

