**Within Task Analysis**

Herein, we will apply the ANOVA to test the group differences within and across tasks. After the test, investigate the performances of several classifiers.

The tables below shows the ANOVA tests within tasks, values in the blocks are mean difference of features between each two groups, values inside the blankets are p-values. The significant values are followed by the star mark (90% CI is used).

From the three tables, it is noticeable that all three groups perform similarly in the head task as non feature is significantly different between groups. Within the clothes task, no difference is discovered between MCI and Alzheimer’s groups. The differences are mainly in features related with clothes, where control participants have less mean gazing duration on clothes but higher frequencies.

|  |  |  |  |
| --- | --- | --- | --- |
| Task: Clothes | | | |
| Groups | | | |
| Features | MCI-Alzheimer's | Control-Alzheimer's | Control-MCI |
| Clothes\_duration | 0.37(0.969) | -3.85(0.067\*) | -4.22(0.028\*) |
| Head\_duration | 1.51(0.206) | -0.13(0.988) | -1.65(0.178) |
| Other\_duration | -0.75(0.928) | -3.01(0.376) | -2.26(0.541) |
| Notrace\_duration | -0.66(0.876) | 0.31(0.974) | 0.98(0.766) |
| Clothes\_num | 0.69(0.958) | 7.49(0.021\*) | 6.79(0.029\*) |
| Head\_num | 0.58(0.969) | 5.67(0.098\*) | 5.09(0.125) |
| Other\_num | -0.40(0.980) | 4.04(0.194) | 4.44(0.114) |
| Notrace\_num | 0.89(0.921) | 0.67(0.962) | -0.22(0.995) |

|  |  |  |  |
| --- | --- | --- | --- |
| Task: Heads | | | |
| Groups | | | |
| Features | MCI-Alzheimer's | Control-Alzheimer's | Control-MCI |
| Clothes\_duration | -0.69(0.821) | 0.01(0.999) | 0.69(0.832) |
| Head\_duration | 0.70(0.657) | -0.78(0.649) | -1.48(0.185) |
| Other\_duration | 0.54(0.941) | -1.81(0.576) | -2.36(0.360) |
| Notrace\_duration | 1.48(0.851) | -0.26(0.995) | -1.75(0.812) |
| Clothes\_num | -0.64(0.974) | 2.84(0.661) | 3.49(0.503) |
| Head\_num | -2.50(0.637) | 1.54(0.866) | 4.04(0.341) |
| Other\_num | 2.77(0.353) | 1.91(0.658) | -0.86(0.910) |
| Notrace\_num | 2.29(0.542) | 3.66(0.276) | 1.37(0.815) |

|  |  |  |  |
| --- | --- | --- | --- |
| Task: Free | | | |
| Groups | | | |
| Features | MCI-Alzheimer's | Control-Alzheimer's | Control-MCI |
| Clothes\_duration | 1.30(0.700) | -3.88(0.079\*) | -5.18(0.008\*) |
| Head\_duration | 0.88(0.396) | -1.08(0.318) | -1.96(0.018\*) |
| Other\_duration | 1.06(0.681) | -1.15(0.683) | -2.21(0.219) |
| Notrace\_duration | -1.79(0.515) | -1.10(0.809) | 0.68(0.912) |
| Clothes\_num | -1.41(0.885) | 6.77(0.105) | 8.18(0.028\*) |
| Head\_num | 0.17(0.997) | 6.84(0.045\*) | 6.67(0.039\*) |
| Other\_num | -0.35(0.980) | 6.73(0.004\*) | 7.08(0.001\*) |
| Notrace\_num | 0.90(0.940) | 5.51(0.156) | 4.61(0.236) |

In terms of the free view task, no significant difference between MCI and Alzheimer’s participants can be concluded. However, more dissimilarities could be discovered between control participants and other two groups. The same as in the clothes task, control participants focus on clothes less than other two groups on average. The head duration only show the impact between control and MCI. In terms of the gazing number, control participants tend to gaze more frequently on clothes, heads and other regions. The standard deviation of gazing duration on clothes for control group is smaller, meaning more similarities within the control group.