Human arm trajectories in obstacle avoidance

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Abstract

The summary should contain a summary of the problem that you are working with, which results you got, as well as main conclusions.
Don't get into technical details. The summary should not be very long
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1 Introduction

Briefly introduce the background and setting of the problem, as well as the aim of the report. Furthermore, you could give a very short description of the analysis that will be applied.

2 Data

Describe of the data you are analyzing. What kinds of data do you have, how were they collected (if applicable)?
Include a few good plots to highlight important features in data. You can put additional plots in the appendix.

Ten different test subjects performed obstacle avoidance tasks on a table by relocation of a cylindrical object from position A to position B. Different experiments, with varying heights of the obstacle were executed, and the test subjects were furthermore asked to avoid the obstacle by lifting the cylindrical object at hand. The movements were recorded with VZ 4000. The trajectories of markers were recorded using a sampling rate of 110 Hz. The starting position projected to the table is considered the origin in a three dimensional space. Fifteen different obstacle avoidance experiments were conducted, with one experiment for every S,M, or T with the given measure $d \in \{15, 22.5, 30, 37.5, 45\}$ as well as a control experiment with no obstacle. Each person repeated each of the sixteen different experiments ten times. The full data have a total size of $m_f = 174{,}160$. [1]
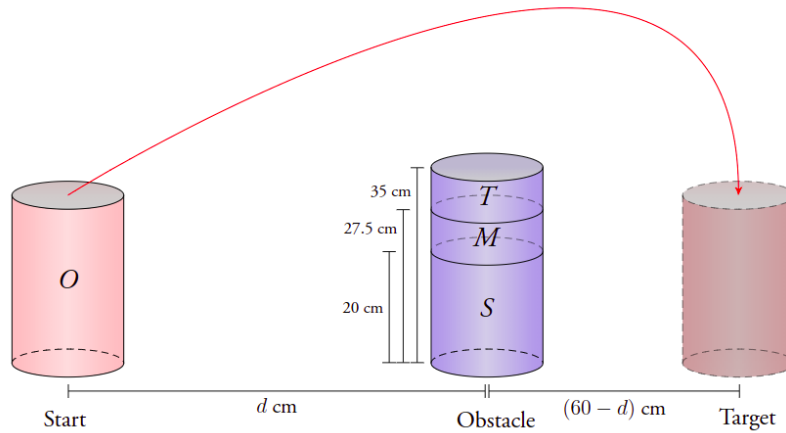

Figure 1: An illustration of the obstacle avoidance setup. Test subjects have to move the cylinder from start to the finnish position "target", while avoiding the blue obstacle.

The data itself consists of recorded trajectory movements, by measured x,y,z-coordinates in a three dimensional space. An illustration of the coordinates are given in 2.
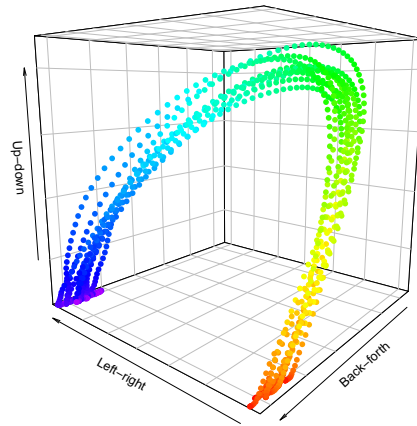
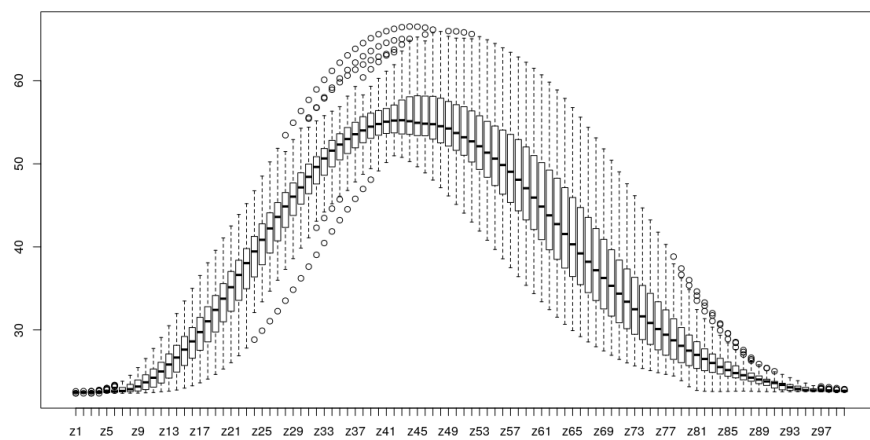Figure 2: An illustration of test subject 1's arm trajectories in experiment 1 repetition one through ten

Figure 3: Boxplots of the variation in the Z-dimension of the arm trajectories for all test subjects

3 Methods

Describe the methods you used and why you decided to use them. Also discuss the assumptions behind the methods. Do not go into detail with theory.

4 Results

Present the results.
Tables and figures are good ways of illustrating results.

5 Discussion

What do your results show?
Discuss your results. How reliable are they?

6 Conclusion

What are your conclusions? The conclusion should be connected to the aim of the report in the introduction.
Highlight important results
If you have found interesting problems/aspects that you haven't carried out, you can specify them here as 'future work'.

7 Appendix

8 References

[1] L. Lau Raket and B. Grimme, "Human Arm Trajectories in Obstacle Avoidance," 2014,

[2] B. Grimme "Analysis and identification of elementary invariants as building blocks of humanarm movements," 2014.

[3] K. Simonyan and A. Zisserman, "Vgg16: Very deep convolutional networks for large-scale image recognition," 2015.