

Statistical evaluation of artificial intelligence systems

Project I

January 2020

Human arm trajectories in obstacle avoidance

Introduction Ten right-handed people were asked to move a cylinder over another cylinder in 16 different experimental setups. The movement were recorded by motion capture equipment. Each person repeated this movement 10 times.

Although all participants did the same arm movement, there is a clear effect of person in the data. Therefore, we would like to investigate if we can use artificial intelligence tools to identify the person who did the movement by looking at the resulting curve.

The size and position of the obstacle cylinder were changed, giving sixteen different experimental setups in total, see supplementary material and references.

Experiments For the classification task, each group will be assigned one of the sixteen experiments to work and report their results on.

Data Data is a nested list of matrices with three layers. Each matrix has dimensions 100×3 , where x (longitudinal), y (transversal) and z (vertical) coordinates are column 1, 2 and 3, respectively.

- First layer: *Experiments*.
- Second layer: *Persons*.
- Third layer: *Repetitions*.

Data have been slightly pre-processed so that all curves have the same length.

Aim of project

- Apply at least two different machine learning models to the classification problem of identifying a person from the observed curve, and evaluate and compare the results.
- Using one or more appropriate test statistics, investigate whether there is a significant effect of experiment on the resulting curves.

Remarks The attached pdf `armmovement.pdf` contains a good introduction to data.