

## Social Robotics

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### Exercise Sheet 6

**Due: December 21, 2017, 10:00**

#### Exercise 6.1 (Hypothesis Testing, ANOVA)

You want to test different movie recommendation algorithms for a smart home assistant robot:

- The *baseline* algorithm always selects a random movie from a database out of 1000 more or less well-known movies of all different genres.
- The *popular* algorithm selects a random movie from a selection of movies which have a high overall rating and which are popular at the moment.
- The *data-mining* algorithm uses machine learning on the user's social network data to match the user's preferences as closely as possible.
- The *improved data-mining* algorithm also incorporates the feedback provided by the user.

In our experiment, each participant got 50 movies recommended during a time span of three months and had to rate each movie on a scale between 1 and 10 directly after watching it. Then, the ratings were averaged into a single score assessing how satisfied the participant was with the recommendations.

You can find the (fictional) experimental data in the file `ex06/experiments.csv` in your repository.

- (a) Formulate three hypotheses about the relative quality of the algorithms (and the corresponding null hypotheses). At least one of the hypotheses should be about a relation between at least three of the conditions.
- (b) Decide on the statistics you plan to use (t or F) for testing your hypothesis, as well as on the order of your tests and the alpha-adjustment technique (Bonferroni, Holm, Frane).
- (c) Use R to perform the tests accordingly.
- (d) Report your results. Visualize.