

Social Robotics

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Winter Semester 2017/18

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Classwork Sheet 8

Exercise 8.1 (Basics of correlations)

Which statements about correlations are valid?

- Life expectancy and alphabetization correlate highly positive. This means that people live longer because they can read.
- The amount of lions and antilopes in a desert correlates highly positive. This means where you can find lions you can also find antilopes. It also means that where you can find antilopes you can find lions.
- In case the correlation coefficient of temperature and robots goes towards -1 it means: “The higher the temperature, the less robots are there.”
- A correlation coefficient of 0 states that there is no linear relation between the variables considered.
- You should not consider possible third variables when interpreting correlations.
- Pearson correlations can always be interpreted in both ways.

Exercise 8.2 (Correlation)

An experiment was conducted to investigate the relation of the number of Hexbugs in an waiting area and the duration until people seemed to be bored (rated by a professional psychologist). The hypothesis states that people are bored after a longer amount of time if there are more Hexbugs.

Amount of HexBugs	Time until Boredom
x_i	y_i
8	26
8	26
10	11
7	22
8	34
8	29
7	13

- (a) Which scale levels do the variables have?
- (b) Draw a scatterplot of the data.
- (c) Describe the plot in one sentence. What kind of correlation do you expect – (slightly, strongly) positive/ negative, etc. ?
- (d) Calculate the mean, covariance and standard deviation for both variables.
- (e) Calculate the Pearson correlation to find out if there is a relation between both variables.
- (f) Is the result significant with $\alpha = 0.05$?
- (g) Interpret the results.

Exercise 8.3 (Spearman's Correlation Coefficient)

A fashion store has started to use a shopping-assistance-robot to enrich their customers' experience. The supermarket asked some of their regular customers to evaluate their experience with the robots. The managers were especially interested in the correlation of the likeability of the robot and how much the customers like shopping in general. Both variables were measured on a 15-point scale ranging from 1 (low robot/shopping likability) to 15 (high robot/shopping likability). The ratings are shown in the table below.

Like Robot	Like Shopping
1	13
1	12
11	14
8	8
7	7
2	8
5	8
12	11
4	13
9	6

- (a) Calculate the Spearman's correlation coefficient.
- (b) Is the relationship statistically significant with $\alpha = 0.05$?