Social Robotics

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Exercise Sheet 4
Due: June 03, 2019

Exercise 4.1 (Implementing Confidence Intervals and z-Test)

(a) You are asked to write a R function *meanci* that computes the mean along with its $p\%$ confidence interval.

- The function takes as input the following parameters:
  - `x`: The data sample.
  - `p`: The confidence level.
- The function should write to the console the mean and the confidence interval, e.g., $\overline{X} = 3.2$, *95% CI [2.8, 3.6]*
- *Hint:* You may need the inbuilt R functions `mean`, `sd`, `sqrt`, `length`, and `qnorm`.

(b) While R does implement a lot of statistical tests, there is no function for z-Tests in the standard library. You are asked to fix that.

- Implement a function called `z.test`, which takes as input the following parameters:
  - `x`: The data sample.
  - `mu`: The population mean.
  - `sigma`: The population standard deviation.
  - `alternative`: Indicating whether the alternative hypothesis (i.e., H_1) is of type *lesser than*, *bigger than*, or *different*.
  - `alpha`: The significance level at which to reject H_0.
- The function should write to the console the decision whether or not H_0 is to be rejected plus the p-Value, e.g., *H0 rejected, p = 0.027.*
- *Hint:* You may need the inbuilt R functions `mean`, `sqrt`, `length`, and `pnorm`.