Interaction Technology and Techniques
Assignment 4: Analyzing and Visualizing Experiments

Summer semester 2017

Submission due: Thursday, 1. June 2017, 23:55

Hand in in groups of max. two.

Note: As this assignment is significantly less work than the previous and following ones, you will only receive ten points for it (i.e., its weight in the final grade is lower).

Goals of this assignment

- get more comfortable with Python, the iPython Notebook, numpy and matplotlib
- conduct analysis of your experimental data and document the results
- read up on pointing devices and study design

4.1: Analyze your experimental data

Create an iPython Notebook that contains the complete analysis and visualization process for your experimental data.

In particular, your notebook should contain the following parts:

- a title (markdown cell) "Reaction Time Analysis"
- a brief description of your experiment, containing the most important details about setup and participants (for an example of how and what to document about your study, see the paper on the 'Shift' input technique mentined below).
- code which imports the raw data from a CSV file and extracts the relevant data for further processing (the CSV file should be in the same directory)
- sensible headings that describe what happens in the following lines
- scatterplots showing reaction times for each of the conditions and for all conditions combined (color-coded).
- boxplots and t-test results
- a brief discussion of the most noteworthy results, including whether there are statistically significant differences between attentive/pre-attentive and non-distracted/distracted conditions.

Hand in a file **reaction_time_experiment.ipynb** and one or more CSV files (**data.csv or data1.csv ... dataN.csv**) which must be in the same directory as the iPython notebook.

Points

- **1** The iPython notebook has been submitted, is not empty, and does not print out error messages.
- **2** The notebook correctly reads the data from the file(s) and outputs the required visualizations
- **1** Visualizations are self-explaining and contain units and axis description.
- **1** The notebook is well-structured and generally follows the Python style guide (PEP 8).
- **2** The results are discussed in sufficient detail and clarity.

4.2: Read up on pointing devices

Read the Wikipedia article on pointing devices[1] and the paper Shift: a technique for operating pen-based interfaces using touch by Daniel Vogel and Patrick Baudisch (a great example of good study design). Explain in a few sentences:

a) Which advantages do direct pointing devices have over indirect pointing devices? Name one use case where using a direct pointing device would not make any sense.

b) How would you characterize "Shift" based on the classification criteria mentioned in the Wikipedia article?

c) What is the size of the display used in the study?

- **1** Great answer to the first question
- **1** Great answer to the second question
- **1** Great answer to the third question

Hand in a plain-text file **pointing_devices.txt**

Submission

Submit via GRIPS until the deadline

All files should use UTF-8 encoding and Unix line breaks. Python files should use spaces instead of tabs.

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`Have Fun!`

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[1] https://en.wikipedia.org/wiki/Pointing_device