Assignment experiment

Computational Cognitive Science class, MFF UK 2018/19
Instructor: Jiří Lukavský

Study part

In this assignment, you will be exploring the relationship between human vision and motor planning called Fitt's Law.

- Read Wikipedia entry
- Read the original paper
- Feel free to google additional resources about analysis and visualisation examples
- Resources:
  - https://en.wikipedia.org/wiki/Fitts%27s_law
  - Fitts, Paul M. (June 1954). "The information capacity of the human motor system in controlling the amplitude of movement". *Journal of Experimental Psychology*. 47 (6): 381–391. doi:10.1037/h0055392 [link]

Preparations

- Download and install PsychoPy (http://www.psychopy.org/). Familiarize yourself with the environment, check the tutorial video
- You will need computer mouse
- Unzip the assignment package and open fitts.psyexp in PsychoPy, give it a test run (you can terminate experiments with Esc)
- Open design.xlsx and learn about variables used in the experiment
- In the current design, people are asked to click on a circle in top-left part of the screen and then to click on a target in random direction and with random size. You should be ok with default values, but if you screen is very large, consider updating the values.
- Based on your experiences and previous reading, write your own instruction in PsychoPy (intro/text_intro)
- Resources:
  - http://www.psychopy.org/gettingStarted.html
  - https://youtu.be/VV6qhuQgsiI

Data collection

- Your task is to collect data from 4 people (you can be one of them)
- It should take about 20 minutes to collect data from 1 participant
- With each person
  - Find a calm place where you can collect the data. Turn off the phone, turn off computer notifications.
  - Sometimes people are tired/ill (work definition: if able to drive, you can collect data)
  - Choose experiment ID (string, no spaces), remove any names in analysis/report
  - Explain experiment in your own words, explain there will be a training and main part
  - Training: Start the experiment, let the person to practice for 2 minutes. When fluent with the task, terminate the experiment with Esc.
  - Main part: Run the experiment again, wait until finished

Analysis

- You have data from N=4 participants
- Load data into R or other statistical software
- First, inspect your data
    - Remove response times (RT) > 2 000 ms
    - Plot RT as a function of distance (each participant with different colour or subchart)
    - Plot RT as a function of size (each participant with different colour or subchart)
    - Plot RT as a function of direction. We are not interested in the effect of direction here, is it ok or should we pay more attention to it?
- Analyse whether the individual data follow the pattern suggested in Fitt's Law
    - For the purpose of the assignment, you can analyse the data for each person separately with regression, and report individual adjusted R^2
    - Consider alternative relationships between RT on one hand, and distance and size. Compare their fit with results you found earlier.
    - Within R, you will need function like: lm, summary.lm, plot (or qplot)

Report

- Write a brief report about what you measured and how
    - What is Fitt's law (ca. ½ page)
    - Describe the experiment (½-1 page) - describe the task, describe your setup (screen size and resolution), describe the variables and their values
    - Results (ca. 1 page) – what you found out, descriptive statistics, models you tested, pick suitable charts (1-4 charts)
    - Conclusions (½-1 page) – your interpretation (what you found and what is expected), your explanation/suggestion why this happened? What could be done differently? What would be an interesting extension of this experiment?
- Keep the report below 4 pages
- At least 7 day before the exam date send your report (pdf) and zipped data to lukavsky@praha.psu.cas.cz
- What contributes to your grade
    - Performing the experiment correctly
    - Clarity of your report and figures
    - Appropriate statistical calculations
    - Timeliness