Fitts' Law for mouse pointing interactions (600 XP)

Overview:

For this project, you will build a simple interface to test Fitts' Law[1]. For this simplified experiment, you will measure users' abilities to point and click on random circles shown on the screen for different value of the index of difficulty (ID) while using a Mouse or a Trackpad.

Instructions:

- Design and develop the experimental protocol to run the study by determining when and where will the experiment take place, who will be your participants and what will your participants be doing during the experiment.
- Use your favorite programming language to develop the experiment.
- Create a statement to serve as informed consent. In the statement briefly explain to the participants what they are about to do and have the participants agree to participate in the study. Include the informed consent statement as part of the study which is explained in the next section. Sample informed consent forms may be found in the following link: https://grad.mnsu.edu/irb/checklist.html
- Recruit 15 participants for this test with similar computer usage abilities. Participants must be 18 years or older.

Experiment Design:

You will design a simple interface to measure Fitts´ law parameters. Testing will take place in the UX lab in the ACC. Reserve time by following this link: https://b507-ux-lab.youcanbook.me/

The requirements for the interface are as follows:

- Present participants with a welcome screen which must include an informed consent electronic statement. Have participants agree (and record their choice) before beginning the experiment. This can be done with a button on the screen that says "I agree".
- Consider 3 circle diameters (small, medium, and large), 2 distances (short, long) from the initial position of the cursor which should be at the center of the screen and two directions (left, right). You will ask participants to complete a total of 6 possible size and distance combinations in two different directions for a grand total of 12 distinct tasks in a repeated measures experiment.
- Each task consists of presenting a random combination of (diameter, distance, direction) on the screen and having the participant click on the circle as fast as they can. The following as sample tasks:

  Sample task 1: Small circle, long distance to the right

  Sample task 2: Large circle, short distance to the left

[1] http://www.yorku.ca/mack/GI92.html

- For each trial, the cursor will begin at the center of the screen. A user would have to move the cursor towards a circle and click on the circle.
- A triple (diameter, distance, direction) defines a single task. All 12 distinct tasks define as testing block. You must present all task at random in each testing block. A single participant must complete 10 testing blocks for a total of 120 trials.
- Record the time to complete each trial, the actual distance travelled for each trial and the errors in each trial. Errors are instances where the user did not click inside of the circle.
- You must provide feedback to the user when a task is completed. This can be done with sound.
- Present a completion screen at the end of the test thanking the participant for their time.

- Write a report describing your experimental findings (see details below).

  Your report should contain:

  - A description of your protocol including:
    - How, When, Where and Who
    - the independent and dependent variables
    - the possible confounding variables in your setting
  - An explanation of the results obtained from linear regression. This is done by calculating the index of difficulty for each width/distance combinations and record the time completion aggregate of each task. (see http://www.yorku.ca/mack/GI92.html)
  - Answer the following questions:
    - What difference does it make if tasks are performed in different directions?
    - What differences did you observe between participants with respect to error rates, time completions and distance travelled per trial?
    - Why does computer usage ability matters? What would happen if your participants have a varying range of motor skills?
  - A discussion of any problems you encountered during the experiment and potential limitations to the experiment.

Deliverables

- Code used for experiment
- Report (e.g., Word file)
- Data and Results file (database and/or Excel spreadsheet)

Warnings:

- Failure to deliver any of the items in the Deliverables section will result in 0 XP
- No late submissions will be accepted
- Email attachments will be ignored

- Any signs of academic dishonesty (e.g., Copying code from an online source) will result in failing the course.