Lab # 1: Fitt's Law [Feb 10, 2011]

Course: BESE 15 B **Instructor: Lab Engr. Nausheen**

OBJECTIVE

The purpose of this lab is to study Fitt's Law. Interactive systems generally require the user to move to a particular target (button, icon, menu etc.) on a screen. The time required to move the cursor from a given location to a target is a function of ***target size*** and the ***distance*** to be moved. Fitt's law predicts this movement time as you will see during the course of this lab.

INSTRUCTIONS

1. Copy the soft copy of your lab report at the end of lab on following path:
   \\csdept\data\Assignments\Lab Engr Nausheen\BESE15B - HCI\Lab1 Submissions
2. Do save the folder by your full name.
3. Copy reports will be given zero credit
4. No group submission allowed.

Task 1

In the first task, we will study the movement ***time*** with respect to the ***size*** and ***distance*** from target. The ratio ***distance/size*** will be termed as ***Difficulty Index*** from now onwards.

1. Open the file *FittsLawApplet.html*.
2. You will see an Interactive panel similar to the one shown in Figure 1.

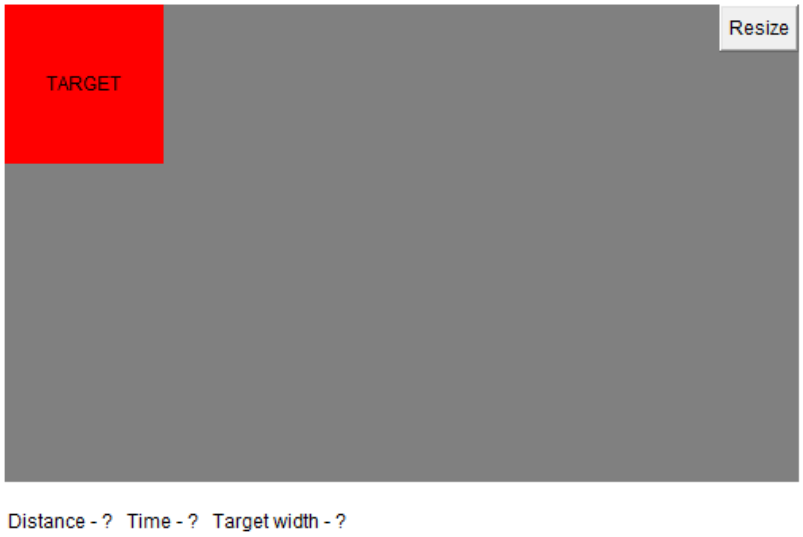

Figure 1 Interactive Panel

3. You can click on the target and drag it around the gray area to change the location of the target. You can also click on the "resize" button to randomly change the size of the target.
4. Moving the mouse over the gray area, at a given mouse position, you will see:
    a. the time to reach the target (starting from that point)
    b. the distance to the center of the target
    c. the width of the target along the axis of movement towards the target center

Figure 2 Time to reach the target for a given distance and target size (width)

5. Changing the target location, target size and cursor positions of the mouse in the gray area; take at least 15 values for *time*, *distance* and *size*. For each value, compute the respective difficulty index as well.
6. Using Microsoft Excel, plot the data *time* vs. *difficulty index*. (Use 'Scatter Plot' option, keep *difficulty index* on x-axis and *time* on y-axis.)

In the lab report, you have to produce/answer the following:

a. The table of observations (*times* and *difficulty indices*).
b. The corresponding plot.
c. What type of function the plot resembles? (Linear, Exponential, Logarithmic?)
d. From the observations you made, are you convinced that increasing the *difficulty index* would result in an increased *movement time*?
e. What should you do to the target in order to reduce the *difficulty index*? (Recall: *difficulty index = distance/size*. In case you are unable to figure it out, see the conclusion below).

Conclusion

Targets should generally be made as large as possible and the distance to be moved as small as possible

Task 2

In task 1, you must have noticed that you did not actually move the (mouse) pointer from its location at a given time to the target. The movement times, in fact, reflected the times predicted by using Fitt's law. In task 2, you will actually be moving the pointer from its present location to the target and your movement times will be recorded. We will then see if the Fitt's law holds for your actual movement times.

Go the following interactive demo:

http://fww.few.vu.nl/hci/interactive/fitts/

And perform the instructed steps. When you are asked to click the targets, make at least 20~25 clicks before proceedings to the next step.

a. At step 5 (summary of experiment 1), report the average times you took to target the three circles

b. Report the three target times at step 8 (summary of experiment 2). Are you convinced that it took you a longer time to point distant targets?

c. Report the target times at step 12 (summary of experiment 3). Is your observation consistent with the statement that bigger targets are easier to point?

d. At step 16 (summary of experiment 4), state the target time for red and green circles. Are they more or less equal? If yes, are you convinced why?

Continue up to step 24

Now, we are in a position to define Fitt's law:

$$\text{Movement Time} = a + b\log_2(D/\text{W} + 1)$$

Where *a* and *b* are empirically determined constants (depending upon the device as well as the skills of the user with that device), *D* is the distance to the center of the target and *W* represents the width of the target along the axis of movement.

Continue up to step 26 (Menus)