

## 1] Modelling Target Movement Time in HCI using Fitts's Law:

Fitts' law states that the amount of time required for a person to move a pointer (e.g., mouse cursor) to a target area is a function of the distance to the target divided by the size of the target. Thus, the longer the distance and the smaller the target's size, the longer it takes.

It predicts time required to acquire a target on screen as a function of the distance to the target and the size of the target. Fitts's law is used to model the act of pointing, either by physically touching an object with a hand, finger or virtually or by pointing to an object on a computer monitor using a pointing device. It was proposed by Paul Fitts in 1954. (*Reference: [http://en.wikipedia.org/wiki/Fitts%27s\\_law](http://en.wikipedia.org/wiki/Fitts%27s_law)*)

Mathematically it can be written as

$$MT = a + b \log_2 (2A / W)$$

MT : Movement time (average) taken to complete the movement or point the target.

a : Start / Stop time of the device (y intercept)

b : Inherent speed of the device (slope of line)

W : Width of the target measured along the axis of motion, which corresponds to accuracy

A : Distance from the starting point to the center of the target

The term  $\log_2 (2A / W)$  is called the **index of difficulty (ID)**. It describes the difficulty of the motor tasks.  $1/b$  is also called the **index of performance (IP)** and measures the information capacity of the human motor system.

Thus  $MT = a + b ID = a + ID / IP$

### Perform the following:

1. Create a user interface (ideally web-based) that displays an circle on the screen.
2. You must click on the circle immediately after it appears.
3. After you click the first circle, another circle will appear on the screen with a random size, colour, and position.
4. Immediately upon seeing this next circle, click on it as well.
5. Continue steps 3 and 4 indefinitely if circles continue to develop (about 30 circles).
6. Construct a table including information about your selection time, target circle distances, and circle dimensions (a,b,A,W,MT).

7. Plot a graph with diameter of target along x-axis and corresponding selection time on y-axis. You will see an inverse relationship between the diameter of the target and the selection time.
8. Perform the same experiment using a touchpad on a laptop instead of the mouse. Will use of touchpad on the laptop increase or decrease the target selection difficulty or the slope of the line? Compare your results and graphs.
9. Write conclusion about your observations.

**References:**

<https://hci-iitg.vlabs.ac.in>

[http://en.wikipedia.org/wiki/Fitts's\\_law](http://en.wikipedia.org/wiki/Fitts's_law)

<http://www.slideshare.net/lrizoli/fitts-law-basics>

[http://en.wikipedia.org/wiki/Pie\\_menu](http://en.wikipedia.org/wiki/Pie_menu)

<http://msdn.microsoft.com/en-us/library/ms993291.aspx>

[http://en.wikipedia.org/wiki/Point\\_and\\_click](http://en.wikipedia.org/wiki/Point_and_click)

[http://en.wikipedia.org/wiki/Human-computer\\_interaction](http://en.wikipedia.org/wiki/Human-computer_interaction)

**NOTE:**

1. You need to upload PDF document which gives information about Fitts' law, details about the experiment you conducted, screen shots (initial page and some other samples), tables and graph generated, conclusion along with code.
2. Write your name and register number in the pdf document
3. Pdf file name must be your (Register\_No\_Assignment\_No)[ex:19IT101\_LAB1]