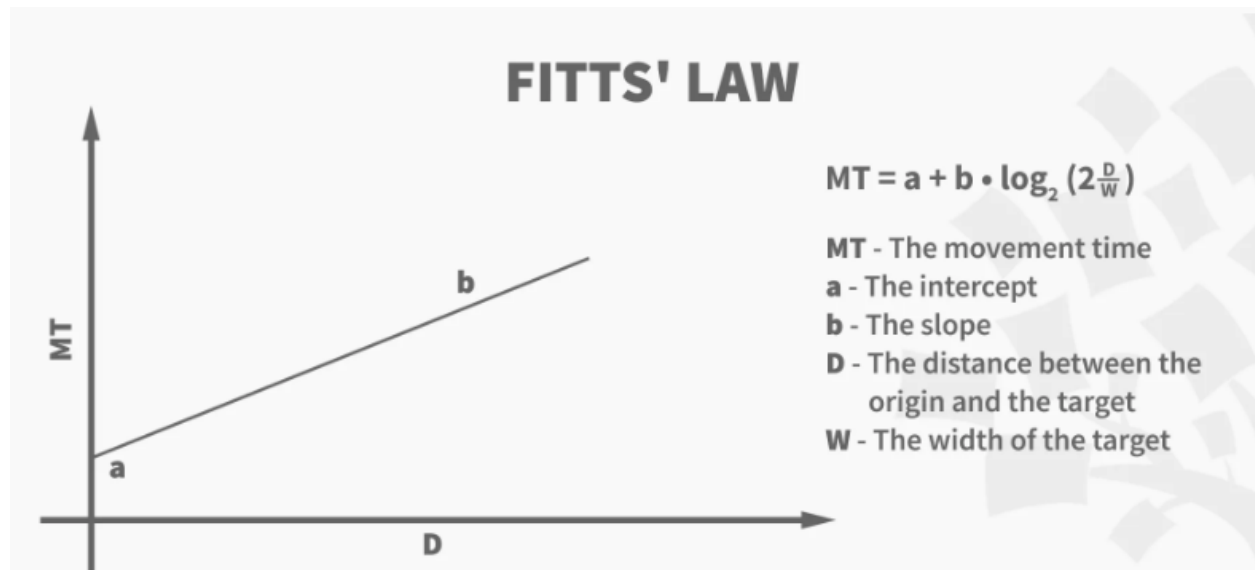# IT351 Assignment-1
Fitts's Law

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Fitts's Law is a principle in human-computer interaction and ergonomics that describes the relationship between the size of a target and the time it takes to reach it with a pointing device, such as a mouse. The law states that the time required to rapidly move to a target area is a function of the distance to the target and the size of the target. In other words, the time it takes to move to a target is proportional to the distance to the target divided by the size of the target. This law has important implications for the design of user interfaces, as it can be used to optimize the speed and accuracy of pointing tasks.

FITTS' LAW

$$MT = a + b \cdot \log_2 \left(2\frac{D}{W}\right)$$

MT - The movement time
a - The intercept
b - The slope
D - The distance between the origin and the target
W - The width of the target

This graph would demonstrate how Fitts' Law can be used to predict the time it takes for a user to perform a pointing task, based on the properties of the target and the pointing device.

Details about experiment conducted:

A user interface was created with a start button. On clicking start circles of different size, color and dimensions appear one by one till the user clicks on 30 circles. The movement time, target distance and diameter of circle is stored each time the user clicks on a circle. Finally the data is displayed in a table and the graph is plotted with X as diameter and y as movement time.

HTML: Structure of the experiment was created by defining the targets, buttons, and other elements on the screen. Series of targets of different sizes and distances, as well as buttons to start the experiment was created.

CSS: Style the elements on the screen was done using CSS. CSS was used to control the size, color, and position of the targets, buttons, and other elements.
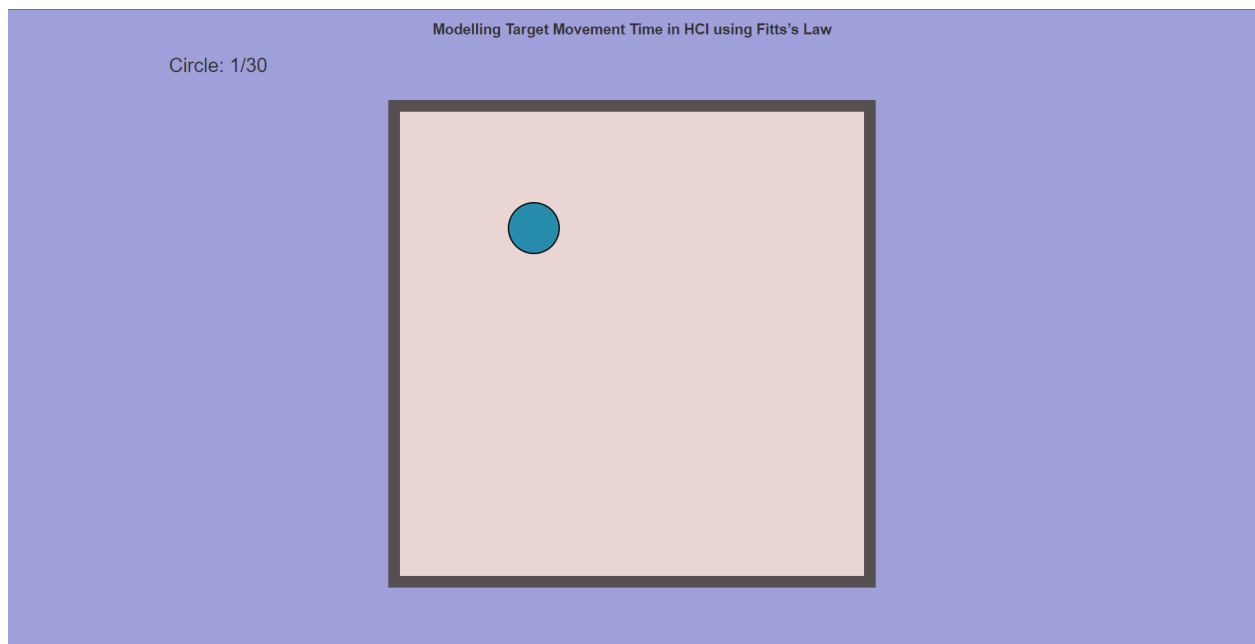
JavaScript: JS was used to control the behavior of the experiment: record the time it takes for the participant to move the mouse to each target, diameter of circle, target distance. Finally the graph of diameter vs time and ID vs time is plotted and a(y intercept) and b(slope) is calculated.

Event Handling: Event handling was implemented to respond to mouse movements and clicks. Event handlers such as onmousemove and onclick is used to track the movements of the mouse and to trigger actions in response to user input.

Data Collection: Data was collected and stored from the experiment. JavaScript was used to store the data in an array. Finally a(y intercept) and b(slope) are calculated.

Screenshots

Starting page

Modelling Target Movement Time in HCI using Fitts's Law

Start

Modelling Target Movement Time in HCI using Fitts's Law

Circle: 1/30

Experiment using touchpad

Circle No.	Movement Time(s)	Target Distance(A)(in px)	Circle Diameter(W)(in px)
1	2.621	174.14	75
2	2.273	287.33	22
3	1.343	321.14	56
4	1.237	177.45	93
5	1.598	157.70	23
6	1.449	109.13	83
7	1.115	113.22	67
8	1.123	108.85	73
9	1.364	251.34	54
10	1.236	300.83	97
11	1.533	206.89	25
12	1.325	52.50	39
13	1.301	156.52	75
14	1.343	99.20	60
15	1.25	28.30	85
16	1.703	183.85	52
17	1.222	125.00	88

Diameter vs Time

a = 1.2953815493967156 b = 0.11405628218569693
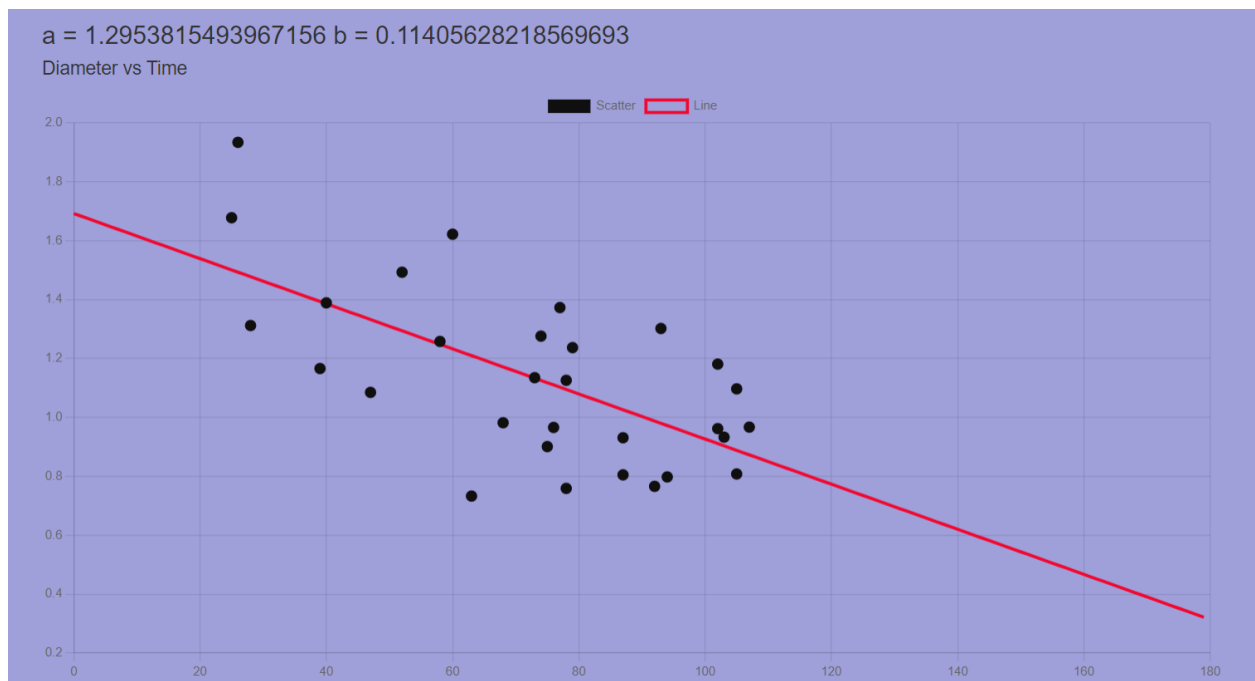
Diameter vs Time

ID vs Time
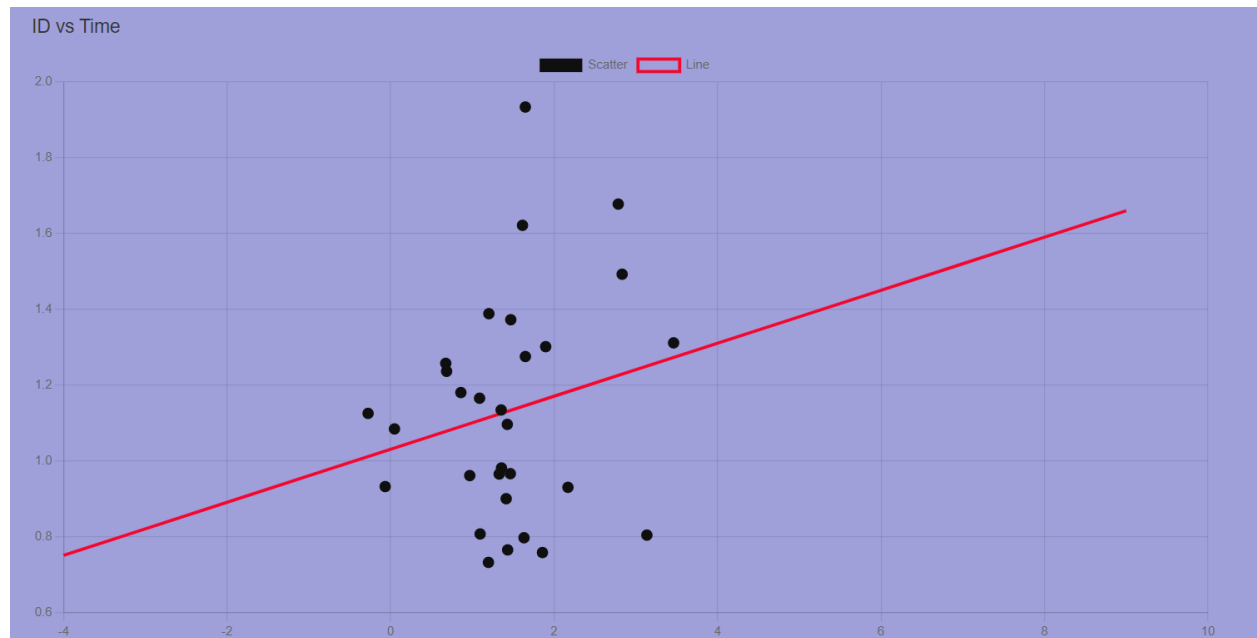
Experiment using mouse

Circle No.	Movement Time(s)	Target Distance(A)(in px)	Circle Diameter(W)(in px)
1	0.805	764.79	87
2	0.759	282.85	78
3	0.966	190.95	76
4	0.962	199.67	102
5	0.766	248.36	92
6	1.302	346.56	93
7	1.389	92.07	40
8	0.967	295.45	107
9	1.622	183.70	60
10	1.678	172.39	25
11	1.258	92.62	58
12	1.135	186.49	73
13	1.237	127.06	79
14	0.982	174.18	68
15	1.166	82.98	39

Diameter vs Time

a = 1.0313174321934069 b = 0.06990226774246902

Diameter vs Time
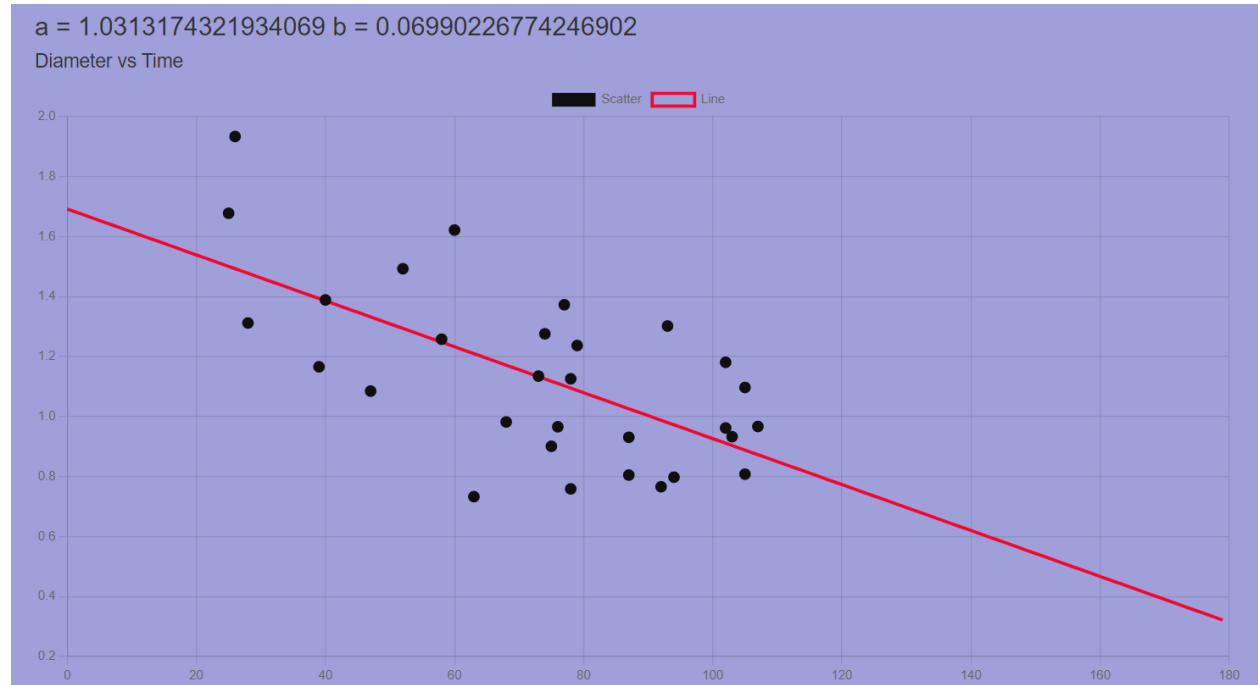
ID vs Time

ID vs Time
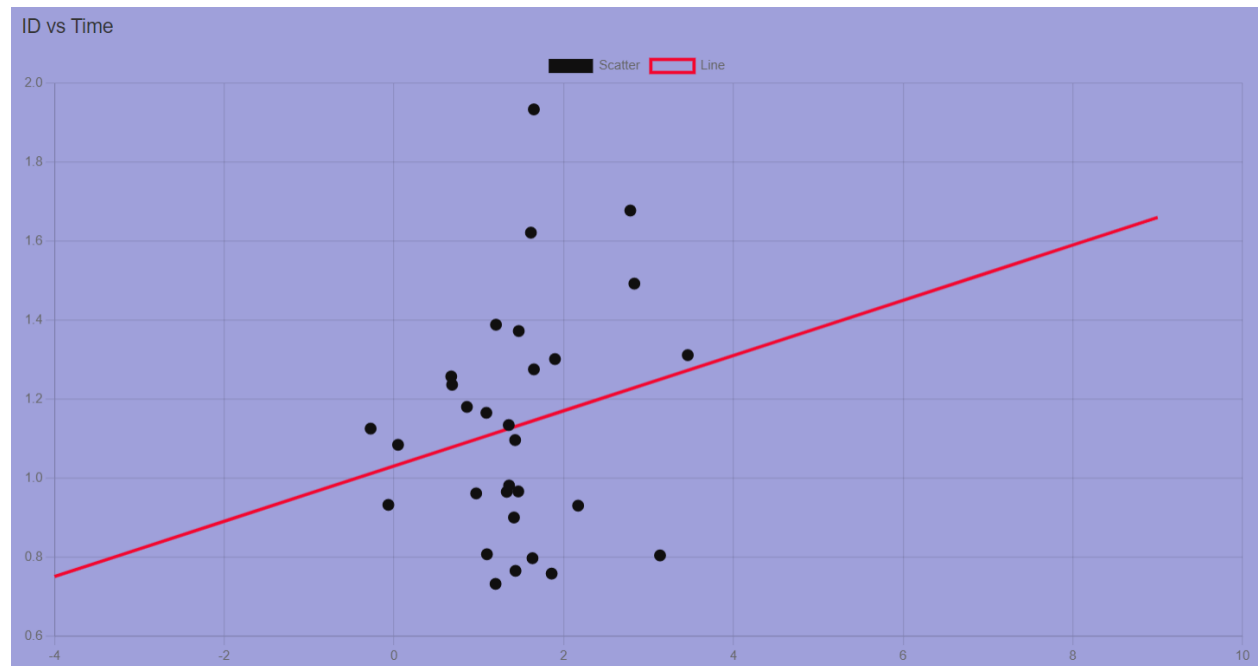
Touchpad vs Mouse comparison
If you conduct a Fitts' Law experiment using a touchpad and a mouse, we observe that the movement time to reach a target is faster and more accurate with the mouse compared to the touchpad. This is because mice typically have a higher precision and accuracy than touchpads, allowing users to reach targets faster and with more accuracy.
However, the results may also depend on the individual's personal preference and experience with using each device, as well as the specific touchpad and mouse being used. It's also important to note that Fitts' Law is just one factor to consider when evaluating the performance of a pointing device, and that other factors such as user comfort and the design of the user interface can also impact the results.

Conclusion

From the above plotted graphs we see that graph would show a linear relationship between the index of difficulty(ID) and the movement time(MT), with the slope of the line(a) representing the speed of movement. As the index of difficulty increases (i.e., the target is smaller or farther away), the movement time would also increase.

This graph demonstrates how Fitts' Law can be used to predict the time it takes for a user to perform a pointing task, based on the properties of the target and the pointing device.