Some Formulas to Make Time Predictions

Fitts' Law and the

Keystroke-Level Model

Fitts' Law

The goal is to calculate the time that it takes to "point at an object" as a function of the *distance* to that object and the *width* of that object.

Several variations on the formula exist.
- The original version was: **Difficulty = log$_2$(2D/W)** where **D** is distance and **W** is width but where they are assumed to be on the same axis.
- Later versions had more parameters added, such as **Time = a + $b \cdot$ log$_2$(D/W+1)** [the Shannon formulation] where constants a and b are changed due to things like pointer type or user details, but two-dimensional movement is also an issue not in the original so in practice we need to consider diagonal movements.

Thinking more about Fitts' Law

How does being on the edge of a screen impact the "width" (or "height") value of a target according to Fitts' Law?

- Can we take advantage of this value? What is the size of a target in the corner of a screen?
- What UI choices might needlessly discard these advantages that an edge provides?
  (both Microsoft and Apple made mistakes on this at times)

What happens if you have multiple monitors?
http://itunes.apple.com/us/app/edgecase/id513826860?mt=12

A "quiz" from 1999, where the answer is always Fitts

Some of the examples are dated, but they still help us consider the impact of Fitts' Law.

http://www.asktog.com/columns/022DesignedToGiveFitts.html

Of course, having just one button in the same spot to keep pushing might make Fitts numbers drop, but there's more than that to usability…

DILBERT — BY SCOTT ADAMS

http://dilbert.com/strip/2016-06-12

Mobile Devices

What do mobile devices bring to the Fitts table?

- Do you do "thumb typing" or "index tapping" on a mobile device?
- On an iPad, have you ever split the keyboard?
- With a "mouse-based" system (mouse, trackpoint, touchpad) the easiest spot to click might be your current position, but with touch how do things change?
- On single monitors with mouse-based systems, corners are "infinite" in width. Are the similarly "large" targets on a mobile device?

Touchscreens Everywhere!

The basic Fitts Idea is that the further away and smaller the target, the more time it will take the user to be able to click on it.

The sense of touch (edges of screens, divots on a button) are also not to be under-appreciated in the time it takes to do certain actions, but that is beyond the Fitts equation.

Does Apple's new Touch Bar connect to this Fitts' law discussion?

What about car radios in today's cars that are part of a touch-based console rather than having dedicated physical buttons?

Keystroke-Level Model

Used to predict the amount of time it will take to perform a certain task.

Discusses and estimates time for actions such as:
- Pressing keys
- Moving the mouse
- Pressing buttons
- Moving between keyboard and mouse
- Typing a sequence of letters
- "Mental activity" between certain steps
- System response delay

Deleting a File

If you want to discuss something like deleting a file, Fitts' Law can discuss parts, but not the whole thing. Why not? What aspects are missing?

Steps:
- Point to the file you want to delete
- Press and hold left mouse button
- Drag file to trash
- Release mouse button

Are there steps missing above?
- Return to pointing at the window where you started?
- Move any window that is blocking the trash can?

How would you describe using the File menu to delete?

How would you describe using the context menu to do it?