Models of Perception and Action
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BSc in Cognitive Science
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Motion tracking and analysis (contd.)

Homework

In your study group, try to do the following analysis steps with a single trial of the hand priming data in R. Upload your commented code to Blackboard (or share it with me in some other way). If you get stuck anywhere make a comment about it – just see how far you get! We'll discuss it together during the next class.

Deadline for submission: Tuesday, April 9th.

Note: Use the data 21, not any of the others I had previously uploaded. The data folder contains all 20 trials of that one participant. The data are already filtered.

1. Remind yourselves what we did in the study and what we expected and why.
2. Load one trial of your choice into R. The four columns refer to: sample, condition, x and y.
3. Plot x against y.
4. Map the y data to a more intuitive screen output with 0/0 in the lower left corner and where upwards movements are increasingly positive (i.e. so that it looks like the movements we made on the screen).
5. Calculate the distance travelled (for x and y combined).
6. Add a time vector. I forgot to measure time so I had to estimate it post-hoc (fine for this exercise, not great if it was a real experiment). We can assume that each sample takes .0025 s.
7. Calculate velocity and acceleration for y, i.e. vertical movement. Remember: Velocity = distance difference / time difference. Acceleration = velocity difference / time difference.
8. Play around with some filter to smoothen velocity and acceleration (most common: Butterworth filter).
9. Using zero crossings in the acceleration, calculate velocity extreme values (maxima and minima). Mark those extreme values on top of the x/y plot you made earlier.
10. Using e.g. a range of x positions, specify a segment during which the critical movement happens, i.e. the 6th movement is what we would want to compare in this study. Mark the peak in that segment in a different color.

Bonus: If you want, analyze and plot all 20 trials separately for each condition.

Here’s my Matlab output ☺