Assignment 7: Pointing (20P)

Hand in in groups of two.

Goals

You can apply advanced computer vision libraries to implement pointing techniques. You can evaluate pointing techniques and visualize the results.

1 Pose-Based Pointing Technique   5P

Create a new Python program called *pointing-input.py*. Use the Google MediaPipe library to detect users' hand and/or body pose. It might be necessary to counteract low camera frame rates by interpolating between frames! It should map suitable body landmarks to a pointer position. Use the *pynput* library to move the mouse pointer.

Score

(2P) Pose detection works reliably and with low latency
(2P) Mapping of landmarks to a pointer position works
(1P) The application controls the mouse pointer

2 Fitts' Law Application   7P

Create a new Python program called *fitts-law.py*. The program should display a Fitts' Law study setup and log data automatically. Use command line parameters and a config file to set important parameters, such as participant ID or the number of trials. Add an option to you application that allows for adding latency to the pointer.

Score

(2P) The Fitts' Law application works
(2P) Data is logged correctly
(2P) Latency can be added
(1P) The application can be parametrized

3 Evaluating Input Techniques   8P

Conduct a Fitts' Law experiment with at least three participants. You and your team mate are also allowed to participate. The third one must not currently be a member of the ITT course.

Investigate at least four input device conditions:

- Input via pose-based pointing
- Input via mouse

- Input via mouse with additional latency of 150 ms

- Input via touchpad

For each of the input device conditions, further investigate different Fitts' Law conditions:

- at least three different target radii

- at least three different target distances

Every condition should be repeated at least three times.

Choose an appropriate procedure for your study. Describe it, capture data, and report the results of your study. (Remember everything you have learned about designing good user studies.) Also, describe all problems that occurred during implementation of the input technique, implementing the apparatus, and conducting and analyzing results.

(**2P**) Methodology and study procedure are described well.

(**3P**) Data of at least three participants is captured appropriatly.

(**2P**) Results are reported, compared, and discussed well.

(**1P**) There is a section discussing problems that occurred during the assignment.