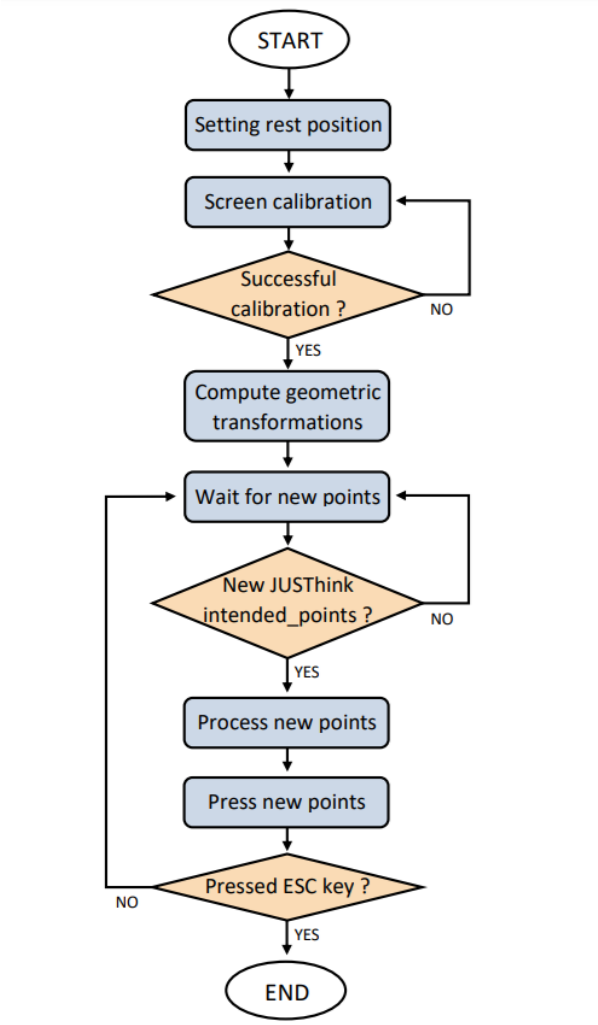
Making Reachy use a touchscreen

Elisa Bianchi

Supervisors: Utku Norman, Barbara Bruno

MOTIVATION

Reachy is a humanoid robot that has already the ability to write and socially interact with humans. With its precise arm and hand control, we now want Reachy to be able to play alongside users by physically interacting with a touchscreen.



Flow-chart of the touchscreen interaction

METHODS

For Reachy to be able to physically interact with the touchscreen, it first needs two main features : to gather some data on the said screen, and to know where we want him to press.

For the screen data, we perform an initial screen calibration via the trilateration of points on the screen. We continue this with the computation of the geometric transformations that allow Reachy to know the screen size, as well as to know where the screen is located in relation to itself, through translation and rotation matrices.

With this information, we can now subscribe to a ROS2 topic. On it, a JUSThink publisher will publish the array of goal points (x, y) that the game's algorithm wants Reachy to connect by touching them individually on the touchscreen. Reachy's motion itself consists of a three-step process : go above the point, press the point, go above the point, implemented to minimise any accidental presses on the screen in between points.

RESULTS

The final result is satisfying and encouraging. The accuracy of Reachy's presses is of 90%, and its precision is over 99%. The calibration step remains the most fragile and prone to error if executed badly, but the overall project is very modular, and easily adaptable to make Reachy play any simple game.

Link to the code repo and report: https://github.com/cest-elisa/reachy_screen