Mission Report: February 21st- February 23rd, Lille INRIA

21/02

- lab's overview with Julien, see all the robots, printers, systems and crazy stuff

- seen the new robot design (made by Julien), the motors (already in function by themself) and the Optitrack system (already in function by itself)

- seen the new simulation model for Sofa (started but not finished, some work on using it has to be done)

- meeting with Christian: we decide the plans for the day and the next days. Established the primary objective of acquiring data as soon as possible, with the simulation finishing as a secondary priority.

- Work Plan:

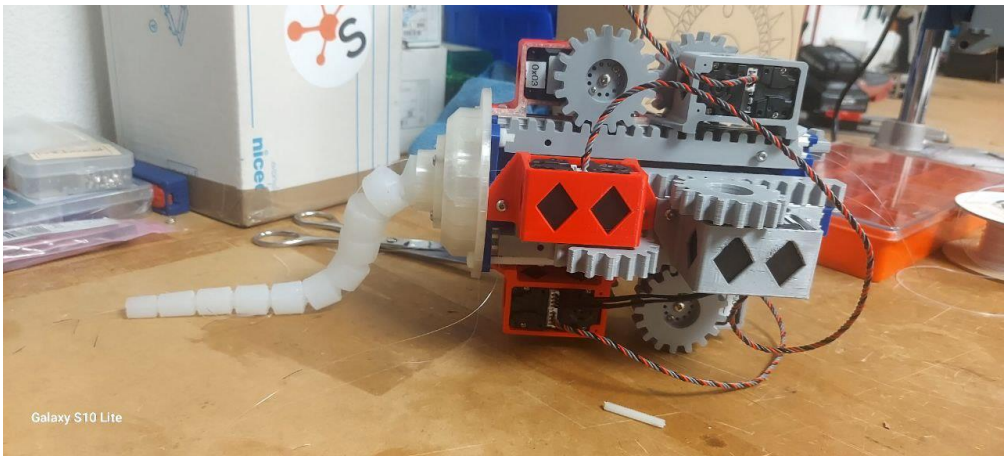
1. Have a first control by keyboard (pull/release actions) of the motors and install the trunk, see the data acquired by markers with Optitrack

2. Calibrate well the system (displacement of the cables, control frequency, initial position) and sync data between observations and actions

3. Implement the control of each of the 16 actions and try to hard-code a real trajectory

- also with Christian we though it can be good controlling the robot during real experiments solely through Arduino, rather than relying on Sofa simulation.

- in the meanwhile, I'm looking at some results of training in simulation using a reduced sensing (only 3 points instead of 21 to define the observation state of the trunk): the results seems quite good but sometimes the performance is a bit degrades. That means we can use this reduced amount of markers but maybe more than 3 is better (they have pretty much markers but not enough to use 21 points)

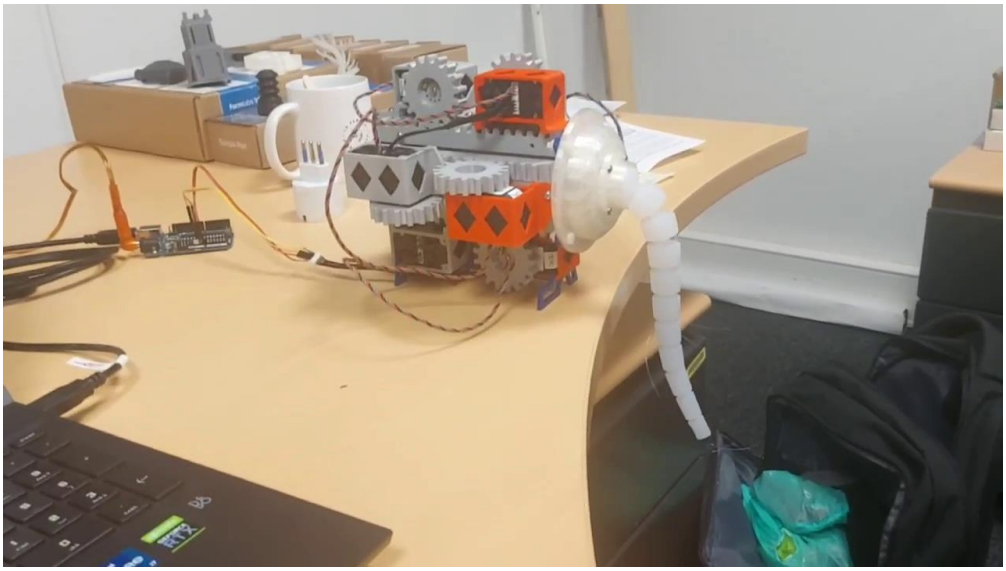


22/02

- resolved problems with motor position feedback by implementing an array-based approach (i.e., saving the actual position and updating it)

- completed mounting cables on the racks

- implemented Arduino code for controlling the trunk by (a) keyboard (b) hardcoded policy (i.e., sequence of actions predefined and hardcoded)



23/02

- checked consistency between actions between sim and real

- checked consistency in displacement between sim and real

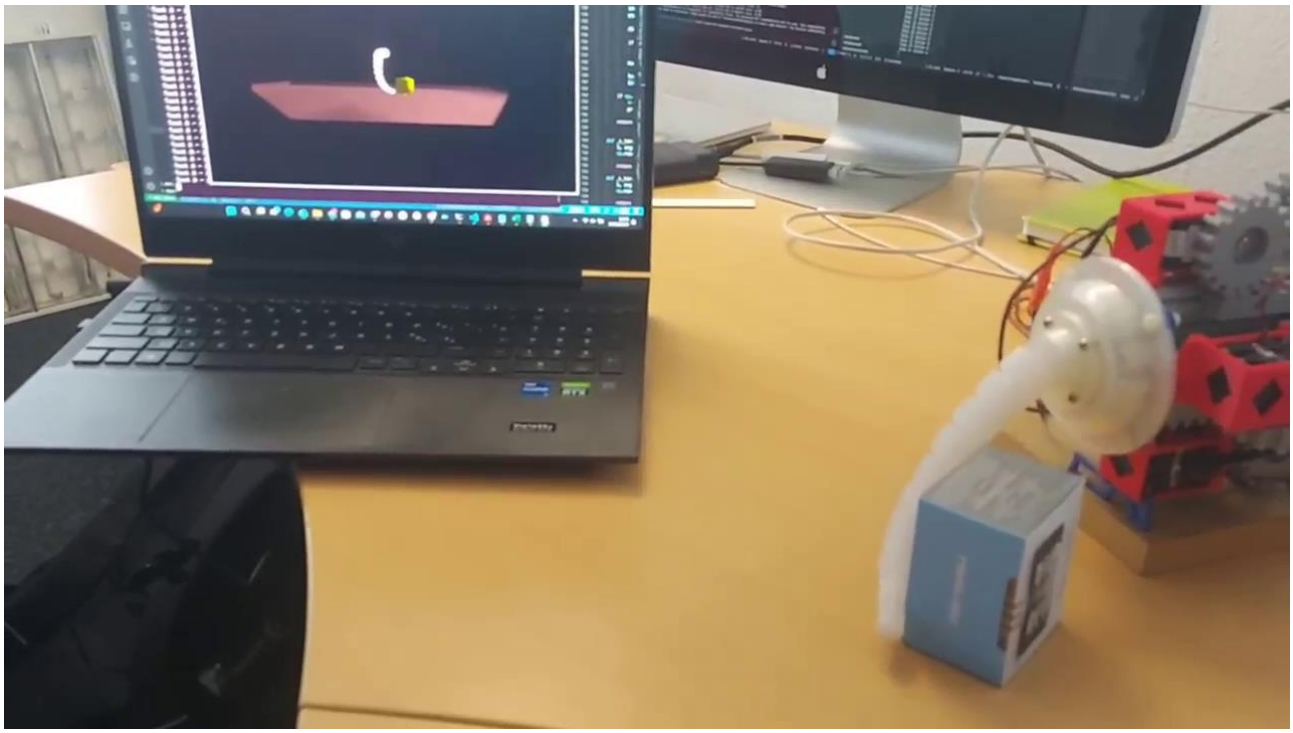
    - *servo goes from -166.4 to 166.4*

    - *0° —> 512*

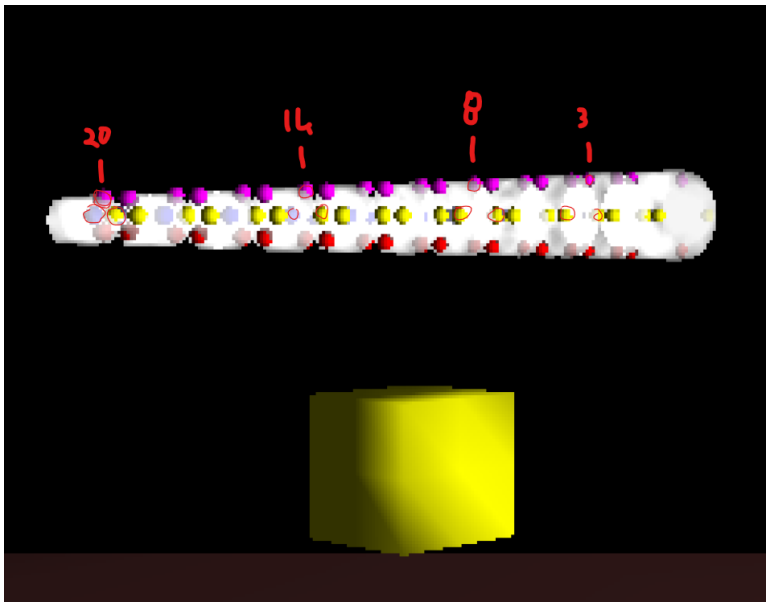
    - *25 ticks movement in the servo means —> 537 —> 8° —> 3.1415mm for each action*

    - *39 ticks —> 5mm*

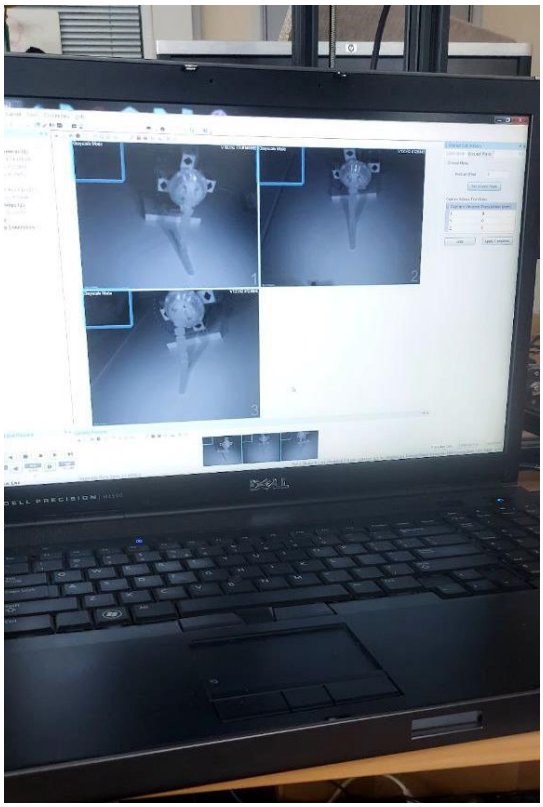
- tried hardcoded policies with cube pushing

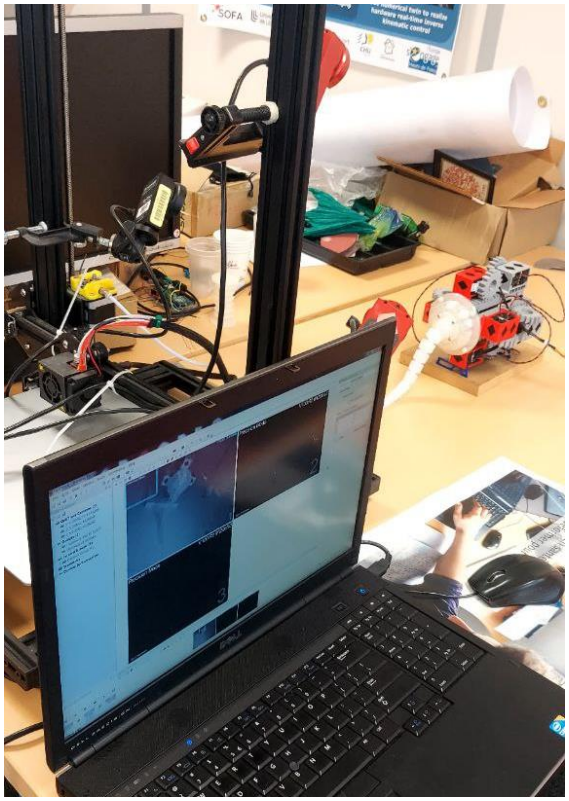


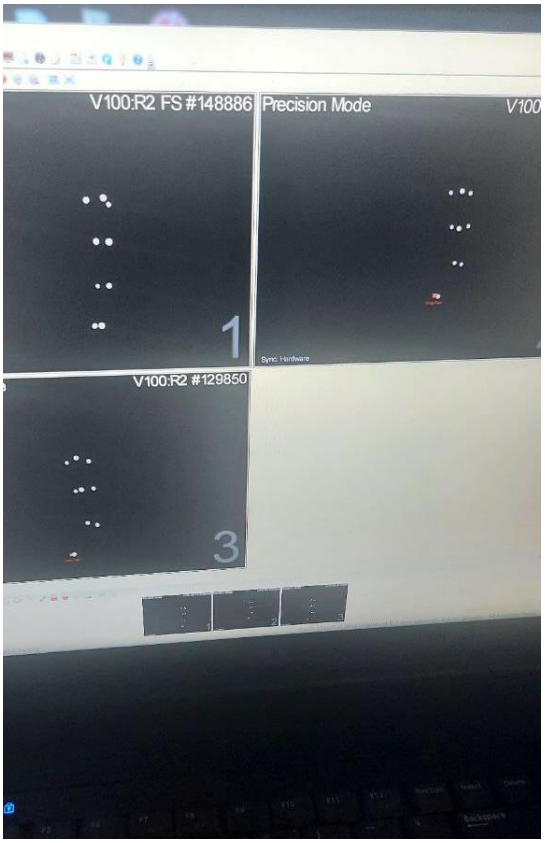
- first setup of markers (like in the photo) and acquisition of data trajectory also with interaction with the cube



4 sections of markers, 3 (top, left, right) per section






V100:R2 FS #148886
Precision Mode
V100
1
Sync Hardware
V100:R2 #129850
3

TODOs

- initial position is changing after one experiment

- tubing problem

- tension of cable problem

- new design of racks to give more tension and decide if change the motor setting with max/min release

- New sofa scene, to be finished and used for training in simulation

- controller needed for control the robot with sofa (*second priority*)

- position of trunk in simulation must be consistence of reality: is it really horizontal only for the tension of the cables?

- decide the position of cube, if under the trunk or close to it

- goal be fixed also in reality

- set up a specific board for experiment components.

- refine legs and floor, with the correct height corresponding to the simulation

- real-time data recording for policy usage and evaluation.

    - for this point Gabriele told me that is better using ROS doing the streaming of the data on a ROS topic. Then on the controller we get from ROS the values

- put the motor bounds in Arduino to be multiple of the RANGE

- check policy frequency (20 Hz) for consistency