Robot Arm

Mikhail Romanov and Jaakko Aalto

December 2023

1. **Idea**

Our idea is to build simulation of the robot arm that can be controlled, by the user’s hand via camera using computer vision.

Simulation is being built in the Simulink (picture of inspiration below), mainly by Jaakko. And computer vision part will be in Python, we will have ready to use computer vision using Google’s Mediapipe ML to allow faster testing. But we will also be developing our own deep learning model using Tensorflow.

In depth our idea is based that we will have program that will open web camera of the computer and it will detect users hand, and calculate theirs coordinates, after what program will send this coordinates to the Simulink where robot arm will receive them and move itself according to them. On the start this all will be two dimensional, but if we will have time and motivation, we will make this three dimensional, where computer vision will be calculation distance to the hand from the screen.

1. **Structure**

Structure is relatively simple. Ready to use computer vision will be located in python folder where is one python file that runs all.

Our own dl model will be in dl model folder. Where are four python files for collecting and processing data, one file for the model training and one file for executing hand detection. Also there are few folders that contain all the data that model trains on.

Simulink part …

1. **Division of work**

Mainly Mikhail will be developing computer vision part of this project and Jaakko will be developing simulation part. But also our idea is to learn with this project so both developers will be telling and explaining own art to another one so both will be having understanding of the whole project.