A cable-driven lower arm interface for haptic applications

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INTRODUCTION

The use of teleoperated robots for specialized activities that exceed human capabilities is a very relevant topic in the present context. This can be necessary when an expert is required to interact with an environment but does not have the opportunity to be physically present in the required space.

This research aims to propose the use and design of a new haptic interface, focused on the hand and forearm, that allows for greater control of the force exerted by the remote device. Additionally, this interface should be able to identify the relative weight of the objects with which it interacts.

METHODS

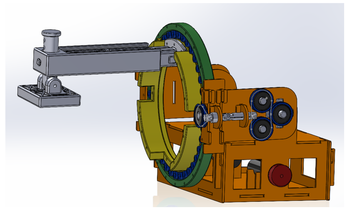


Fig. 1: CAD Model

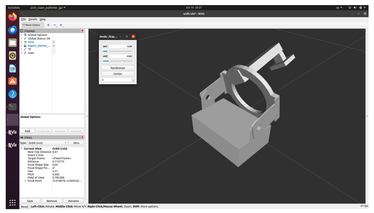


Fig. 2: URDF Model

RESULTS

Problems:

- Dynamic model doesn't account for second joint.
- Too little torque on the motors.
- Insufficient current on power source.
- Weight of the prototype is not properly balanced.

Fig. 3: Physical prototype

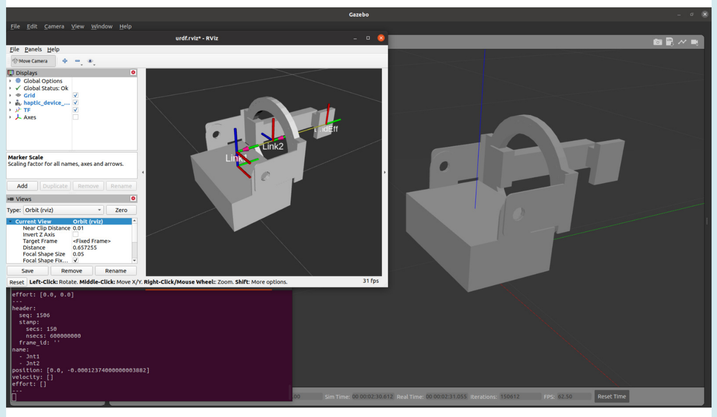
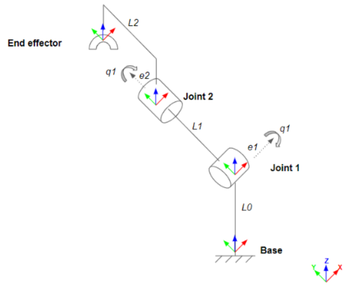


Fig. 4: Simulation



τ_{q1}	$F_z * (L_1 * cos(q_1) + L_2 * cos(q_1)) - F_y * (L_1 * sin(q_1) + L_2 * sin(q_1))$
τ_{q2}	0

Fig. 5: Force to torque in joints

CONCLUSION

- The model needs fixing to become functional.
- The simulation is still basic and needs some changes to accurately represent real device.
- Ease of manufacturing shows potential for future use if fixed.

Fig. 6: Physical prototype use

ACKNOWLEDGEMENTS

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