Co^3-Robot controllers for human-like physical interaction and enhanced motor learning

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https://www.sralab.org/clinical-trials/human-robot-controllers-enhanced-motor-learning-hrceml

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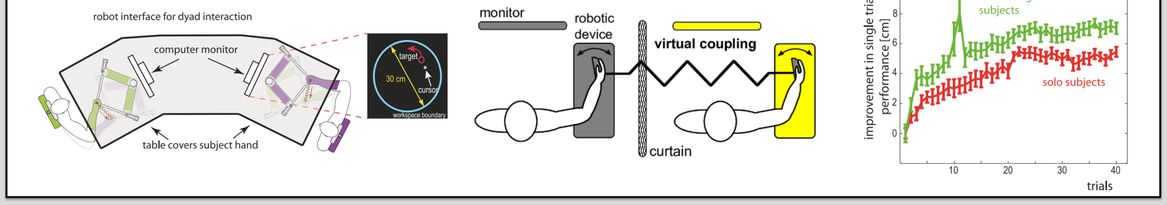
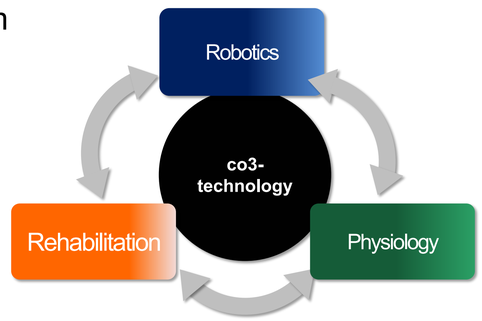
A Background

- Human *dyads* have been shown to perform motor tasks better and to learn new tasks faster during interactive tasks when compared to individual tasks (Ganesh, 2014)(Takagi, 2018)



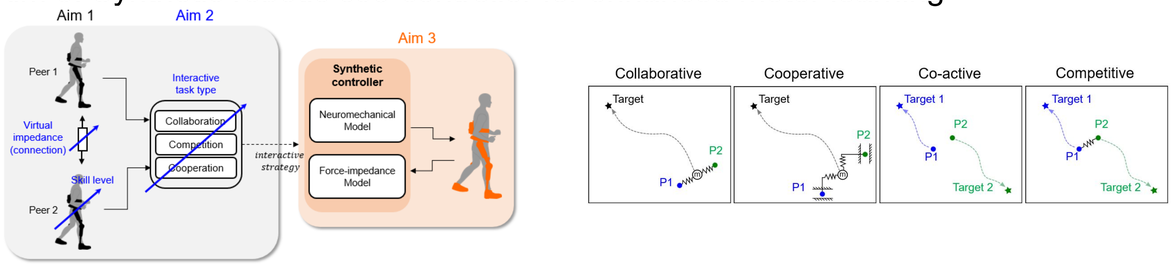
B Scientific Impact

- Understanding the underlying mechanism of human-human interactive motor behaviors
- Design and control of a robot systems to improve human-machine performance (e.g. teleoperation/collaborative robots)
- Enhance human motor learning capabilities (e.g. rehabilitation robots).



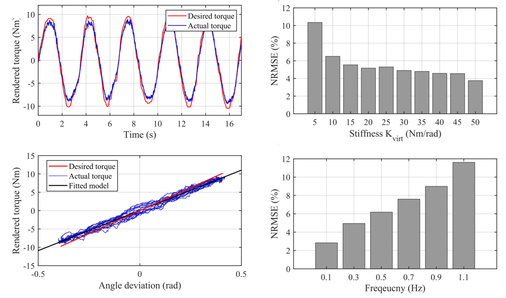
C Key Innovation & Contributions

- Project Overview
  - Aim 1: Infrastructure development
  - Aim 2: Mechanisms of human-human dyadic haptic interaction
  - Aim 3: Synthetic robotic co3-controller for enhanced motor learning

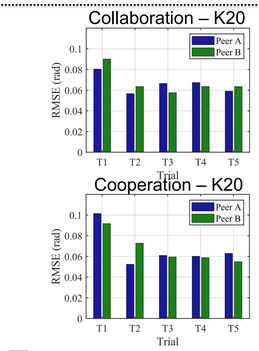


- Current Development (Aim 1)

Experimental setup for dyadic studies



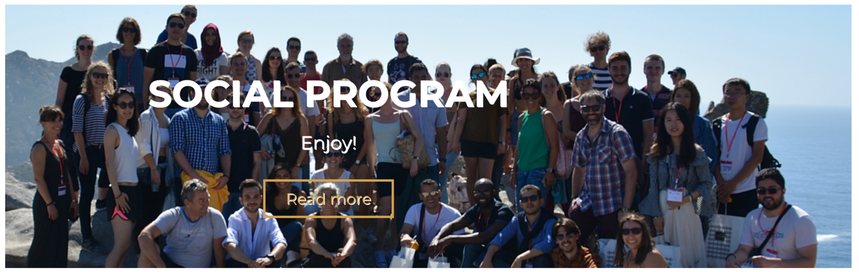
Virtual spring rendering



Tracking performance during interaction

D Broader Impact

- Synthetic co-robot controllers to enhance existing machines for seamless human-like behavior, thus supporting joint physical interaction between humans and robots.
- Open source dyadic haptic co-robot that can be used for motor control studies, robot controller design and motor learning during dyadic haptic interaction.
- Hospital-based outreach programs to increase science awareness in the community, and through a related K-12 learning module in math, science and social science.
- Annual summer school on neurorehabilitation to provide education on advanced procedures for neurorehabilitation.



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