



MECH 493 project: Train to Train: Development of hand-over-hand training approach for robot kinesthetic teaching

Background and research goal

Kinesthetic teaching is an approach to providing task demonstration to a robot whereby a human physically holds the robot and guides it to perform a task. The robot's trajectory during the demonstration is recorded and can be used to redo the same task or even generalized to many tasks. Kinesthetic teaching has been used extensively in the literature with many robots to teach them different tasks. Typically, roboticists or experts are teaching the robot which generates an accurate and clean trajectory data. On the other hand, novice users who do not have experience manipulating a robot usually struggle to manipulate and guide the robot through a task which in turn generates jerky and noisy trajectory data. In this project, we provide a platform for training novice users on how to kinesthetically teach a robot the same way as an expert.

Tasks to be performed by the student

- Review the literature on training techniques for novice users.
- Develop a master-slave system using the two WAM robots in CARIS lab. The expert user will hold the master arm while the novice is passively holding the slave arm.
- Design experimental protocol to train novice users and then measure their performance with teaching a robot a specific task.
- Test the system with many participants.
- Analyze the data.
- Report findings and prepare a research paper.

Facilities and team:

- The student will work in CARIS lab located at ICICS building, Room X015
- The student will work with: Maram Sakr, a PhD student at CARIS lab.