(ECE3) Virtual Assistive Robotics Module (VARM)

DEPARTMENT OF COMPUTER SCIENCE

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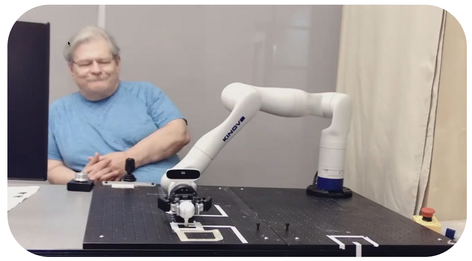
Introduction

What is the optimal level of robotic assistance?



Shared Autonomy in Assistive Robotics

- Blends **human commands** with **autonomous assistance** to complete tasks
- Inverse relationship between a user's **sense of agency** and the level of autonomous assistance

Background Research

- **Collier Paper** - put trial participants in charge of assistance level, finding that users preferred more manual control of assistive robots

Objective

Build a virtual, configurable platform to study how robotic assistance impacts sense of agency

Key Features

Flexibility and Scalability

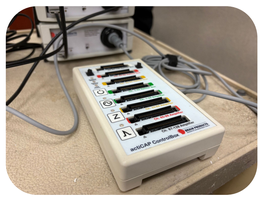
- A digital replica of the Collier experiment enables more flexibility and scalability and reduced cost of setup

Automatic Data Logging

- Data collection at any frequency provides accurate real-time data to accomplish study goals

EEG Integration

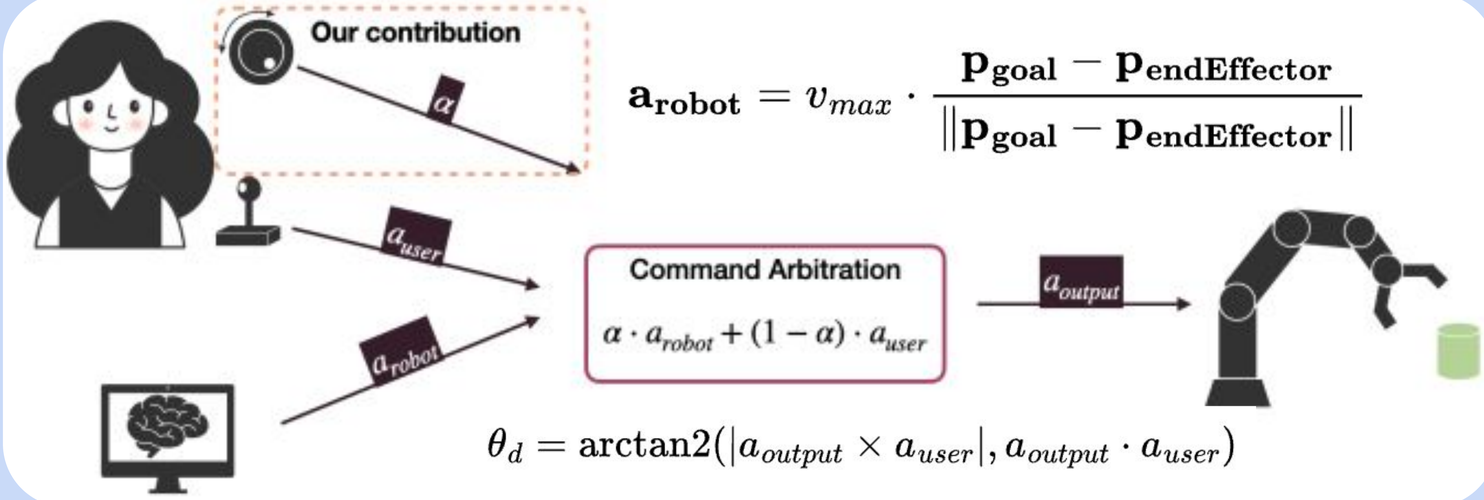
- measure and record participant's brain activity while they complete tasks using the VARM simulation



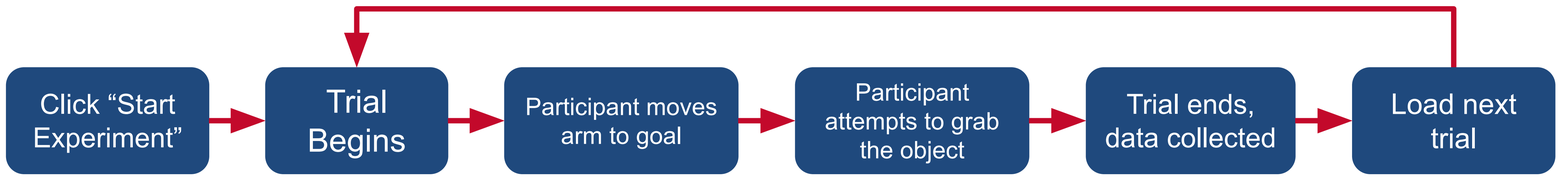
Final Design

Running Experiment

- The participant will:
  - Control the robot using a joystick
  - Attempt to align the robot hand with the indicated region
  - Pull the trigger twice to close the robot hand
- Grabbing sequence begins and logs success/failure
- Custom Likert scale survey is given to participant
- System logs input, robot input, output, trial data, and survey results.



Combine user input and robot input, weighted by assistance parameter α to get output



Citations

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