Mutually Assistive Robotics

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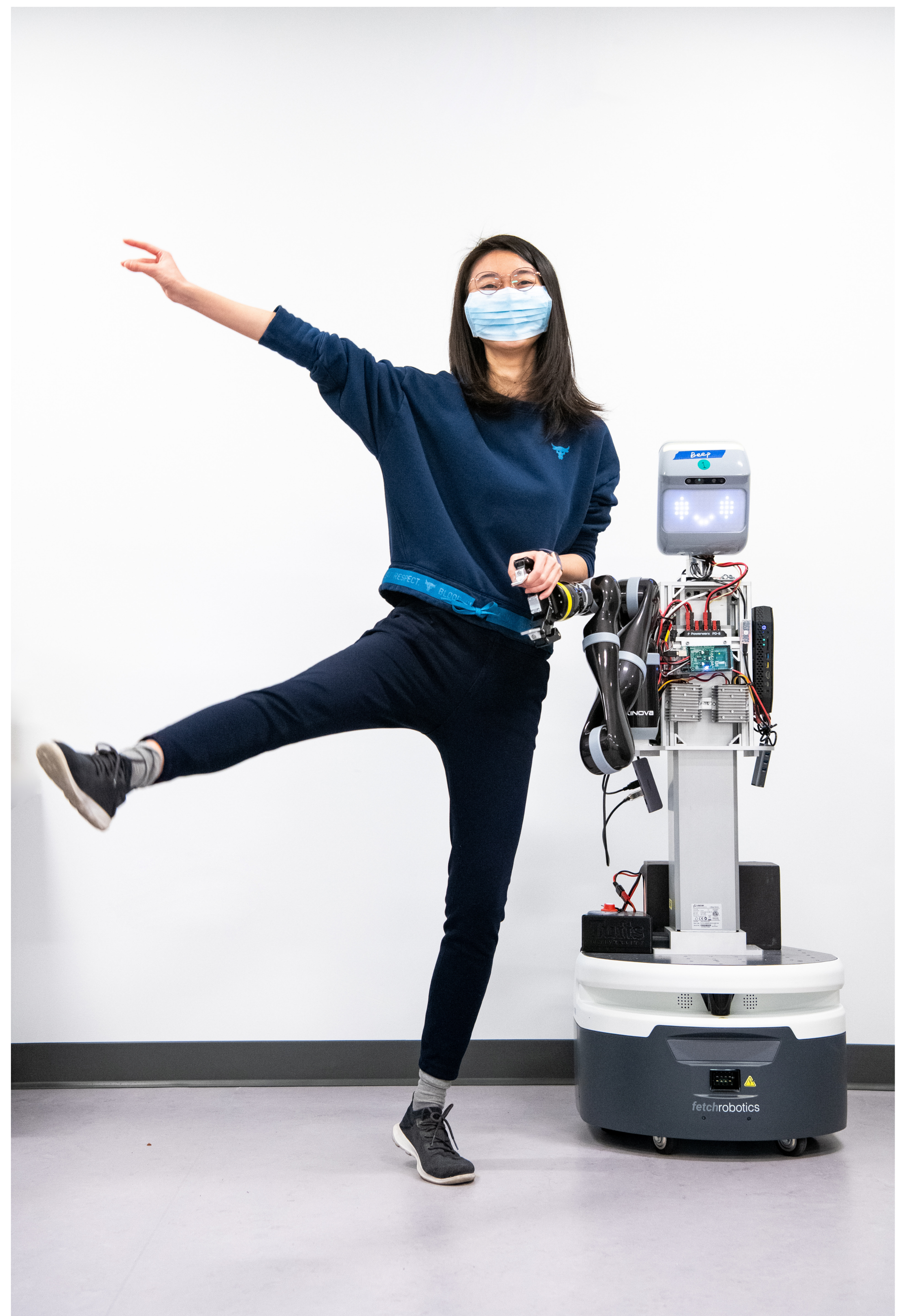
http://aabl.cs.tufts.edu/NRIMutuallyAssistive



Scientific Challenge:

- **Strengths-based approach** to assistive robotics: users are **empowered** relative to robots
- User and robot **complement** each other, with **assistance freely flowing in both directions**
- Enable users to understand and control high-level task goals **and** low-level characteristics of robot's movement
- Center **joy and self- determination for disabled users** in tasks that make life enjoyable, not just easier for caregivers

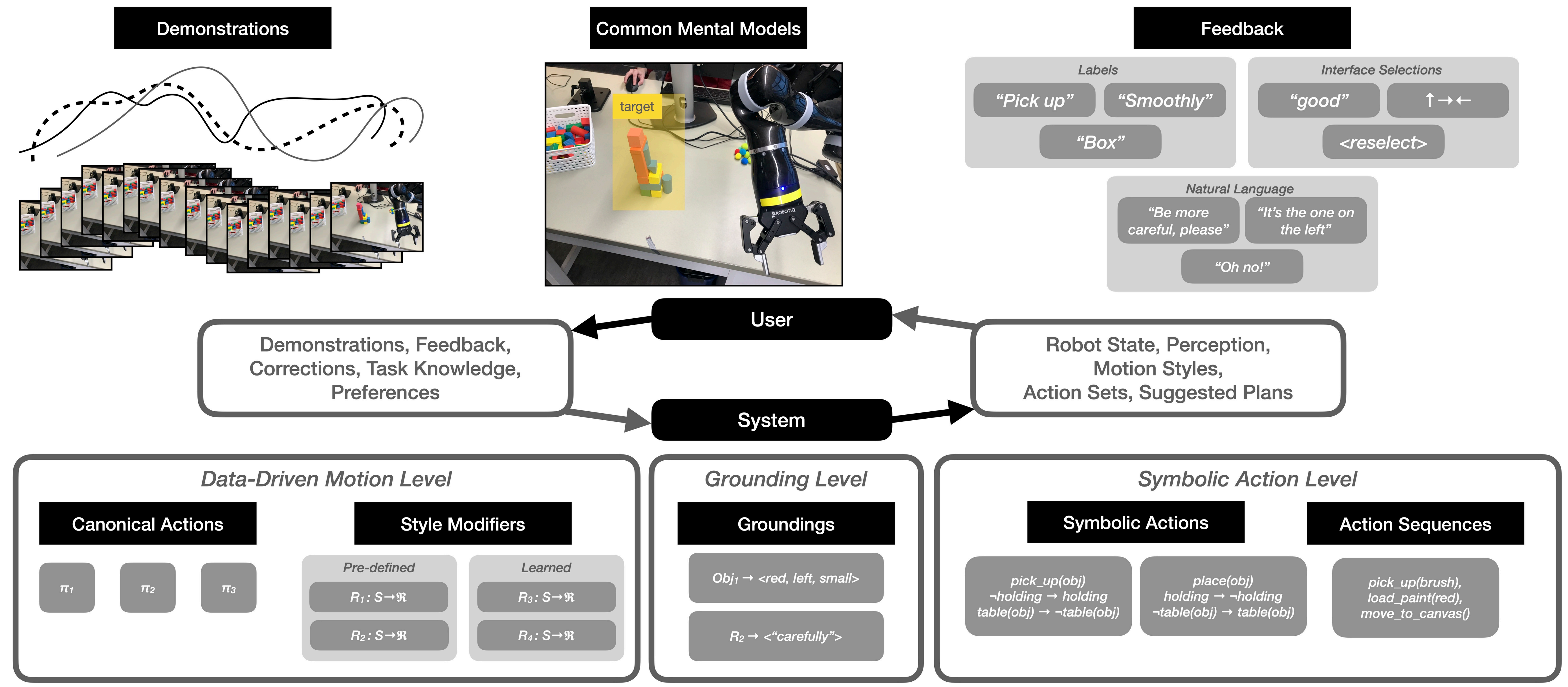
Outreach and Education:

- **Hybrid virtual/in-person community** to support disabled people in modifying their own intelligent assistive devices
- **Direct dissemination** to disability community through PI connections (AccessComputing BPC Alliance; self-advocacy groups)

Broader Impacts on Society:

- Improved performance and customizability of co-robots through human assistance
- More disability-friendly intelligent assistive robotics
- Assistive robots designed for joy, not just chores

Approach:



Key Scientific Contributions:

- ***Algorithms for learning new manipulation skills*** for robot arms, with mutual assistance from robot to human and human to robot at ***multiple levels of abstraction***, from direct motor control to high-level language inputs
- ***New methods for giving users usable mental models of the robot***, such as selecting and displaying information through AR that will ***empower users*** to understand robot perception and decision-making and improve their ability to influence robot behavior
- ***New algorithms for mutual assistance after initial models have been learned***, enabling users to provide feedback to the robot and adjust all aspects of learned robot behavior, from motion trajectories and styles to symbolic representations of action primitives and high-level plans.
- Validation in tasks where ***control of how the task is completed*** is as important as the goal: ***personal grooming, artistic expression, exploration and creativity***

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