Intuitive, Wearable Haptic Devices for Communication with Ubiquitous Robots

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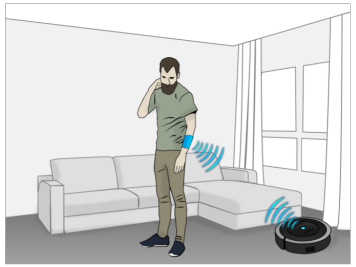
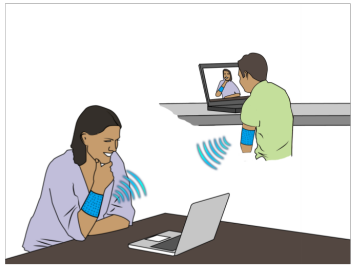
Challenge

How can we make haptic devices intuitive, unobtrusive, and wearable?



Humans and Robots

Humans and Agents



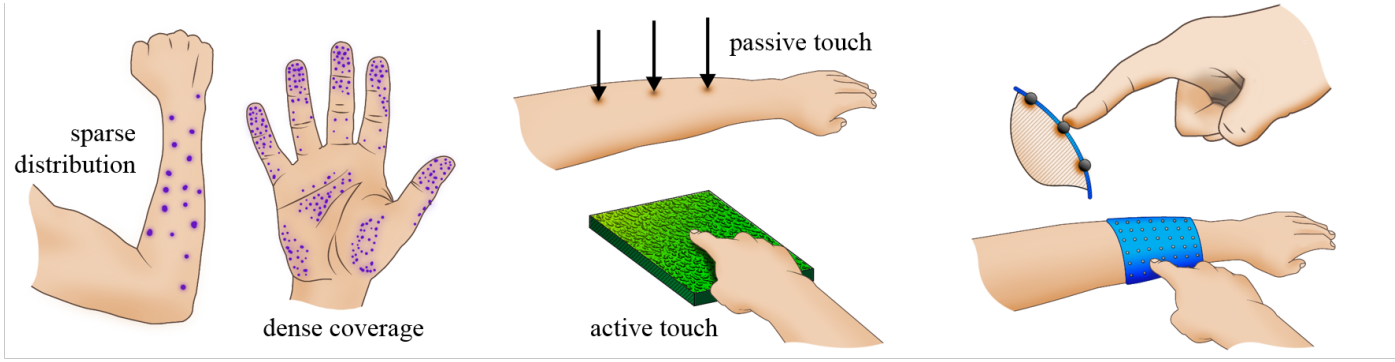
Humans and Humans

Scientific Impact

Haptic devices allow private, salient, touch-based information transfer between humans and intelligent systems

Solution

Overcome inherent trade-off between where we want to place devices for maximum wearability and where skin exhibits highest density of touch receptors



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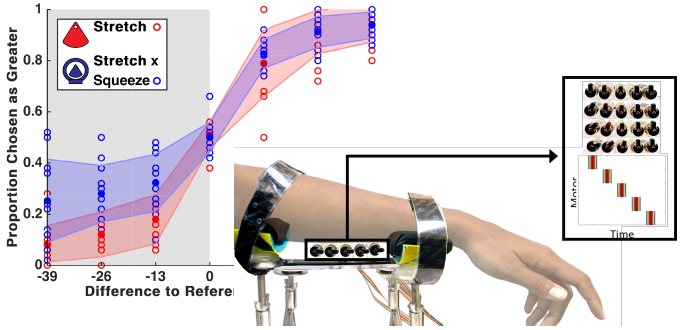
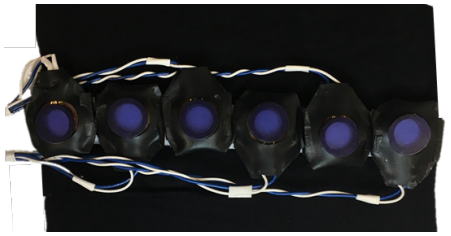
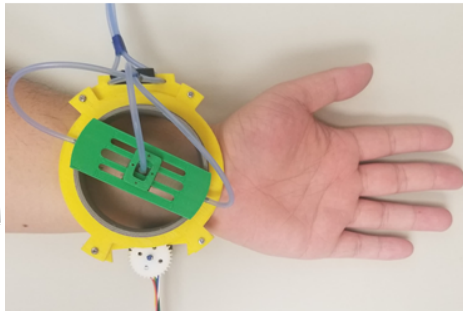
Solutions from Y1+

- Characterizing human perception of multi-modal haptic cues



- Designing and building prototype wearable devices





Human Understanding

Objective 1: Characterize tactile perception on the forearm

Design

Objective 2: Design soft wearable multi-scale haptic device

Objective 3: Develop multi-scale haptic rendering algorithms

Applications

Objective 4: Create application scenarios and evaluate wearable haptic systems

- Developing software tools for designing vibrotactile haptic cues

Broader Impact

- Improve health, quality of life
  - safe and efficient human-machine interactions
  - Guidance and feedback
  - Aging in place
- Broadening participation in STEM
  - Haptics education
  - Mentorship of diverse populations
  - Focus on making technology accessible