

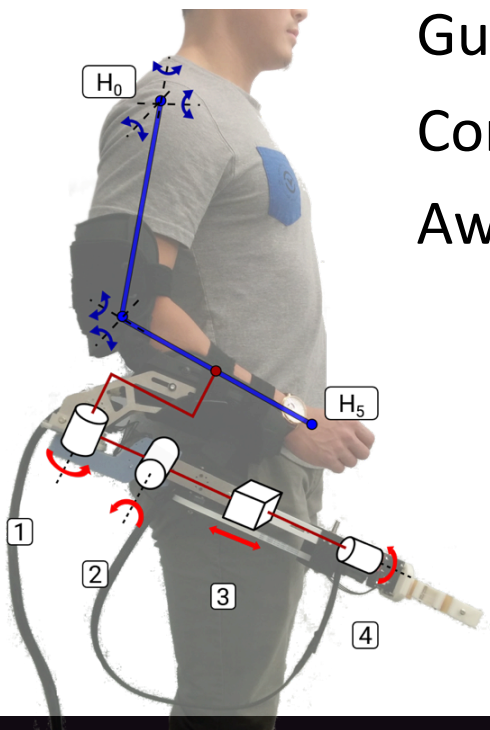
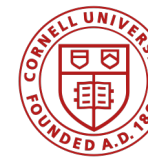


NRI: FND: Collaborative Control for Wearable Robots

Guy Hoffman

Cornell University

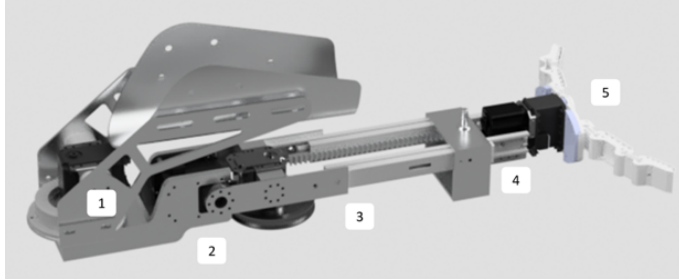
Award Nr. 1734399



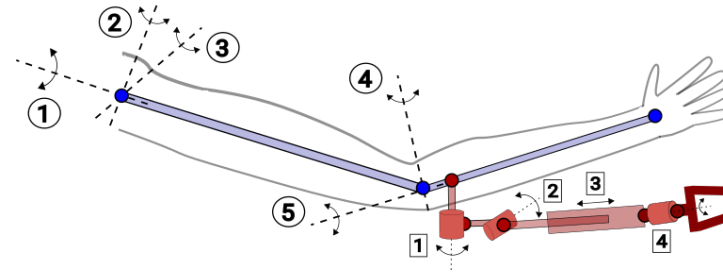
NRI: FND: Collaborative Control for Wearable Robots



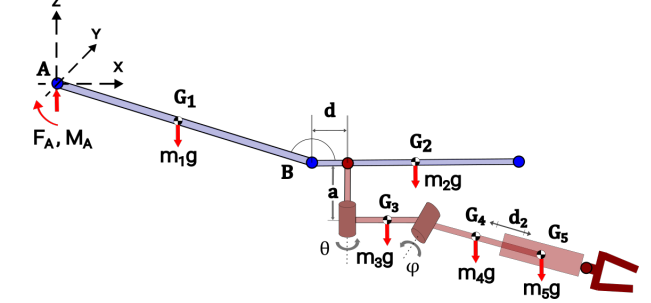
Design



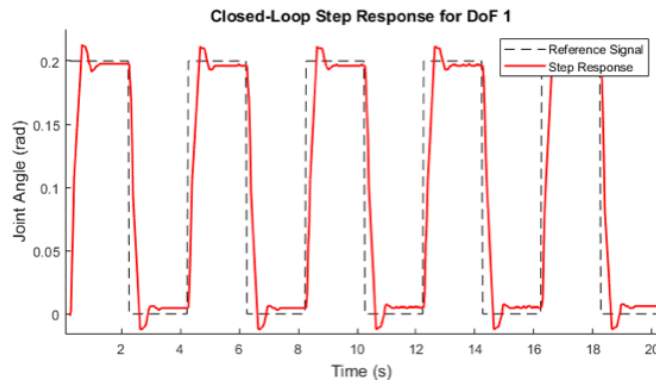
Kinematics



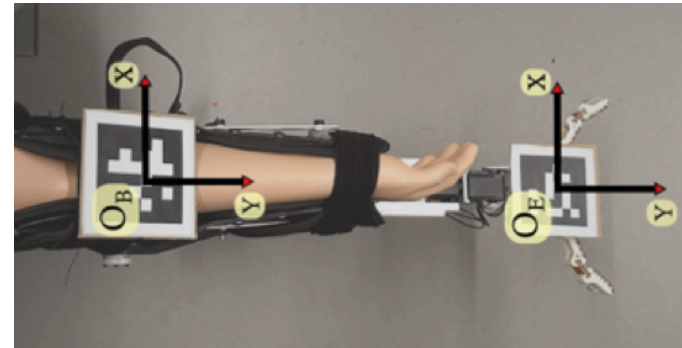
Biomechanics



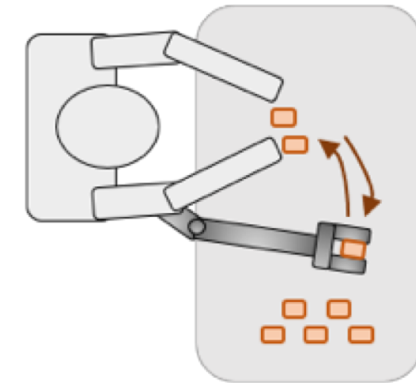
Controls



HRI Stabilization



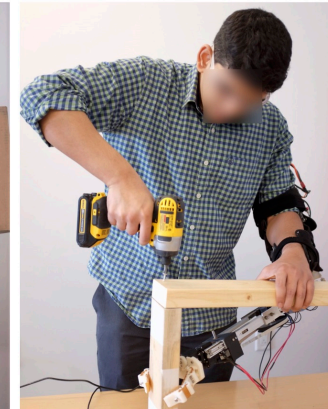
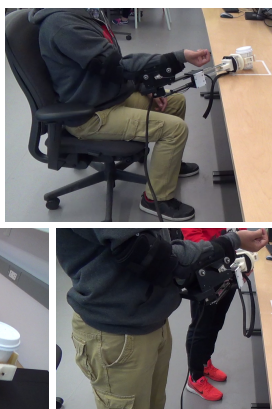
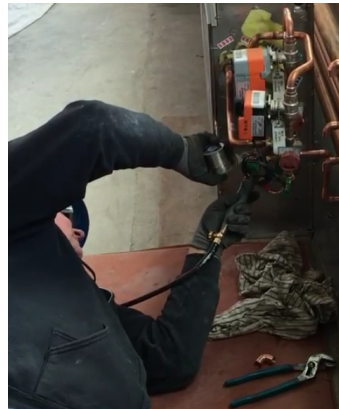
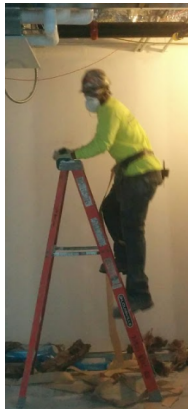
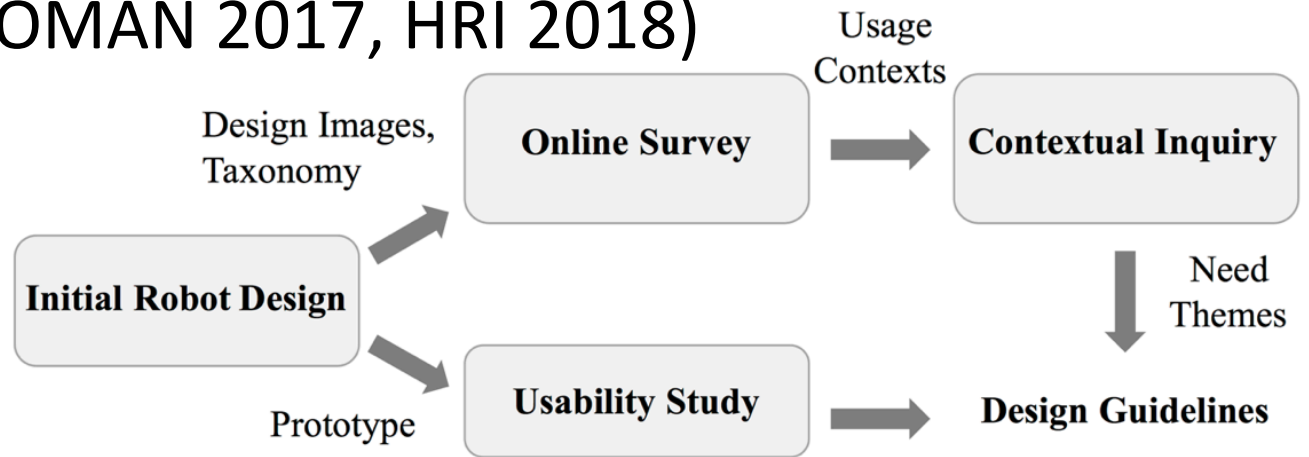
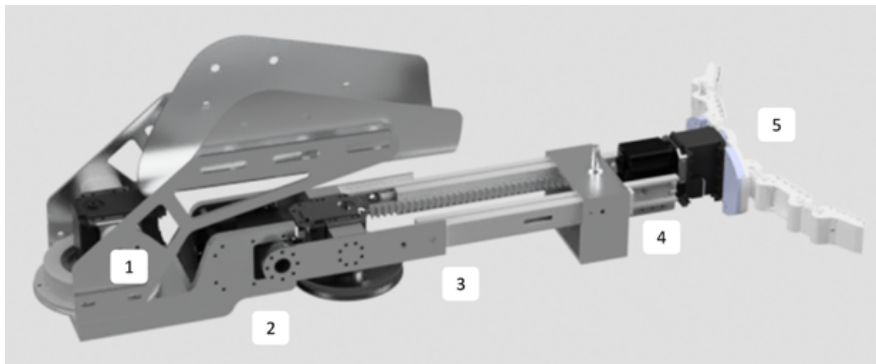
Autonomy



NRI: FND: Collaborative Control for Wearable Robots



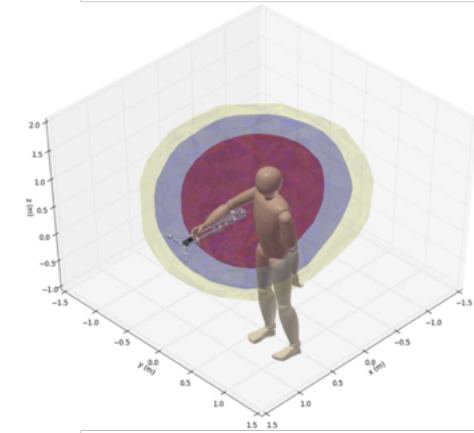
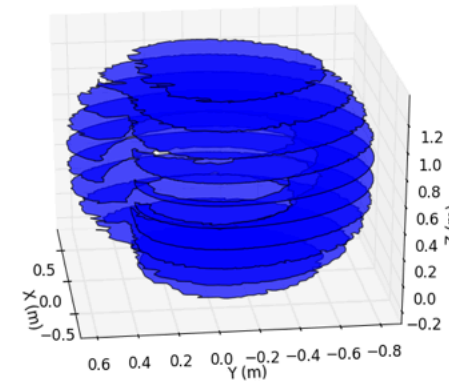
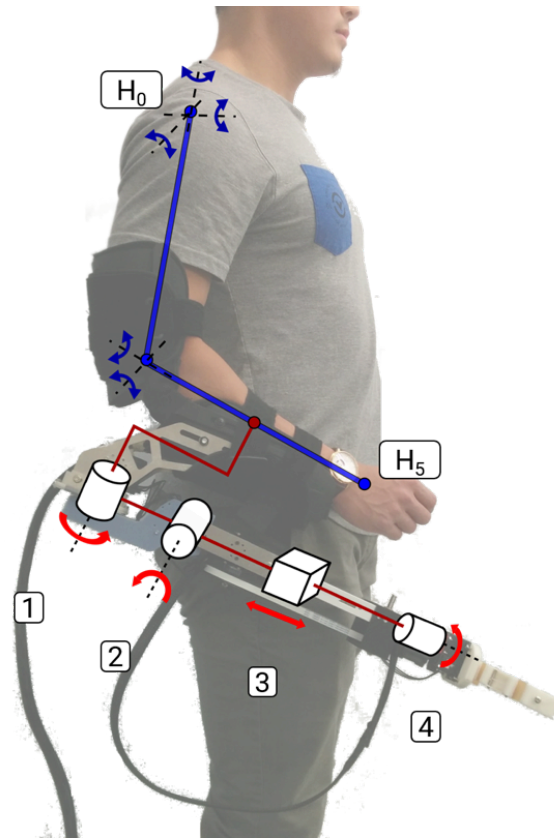
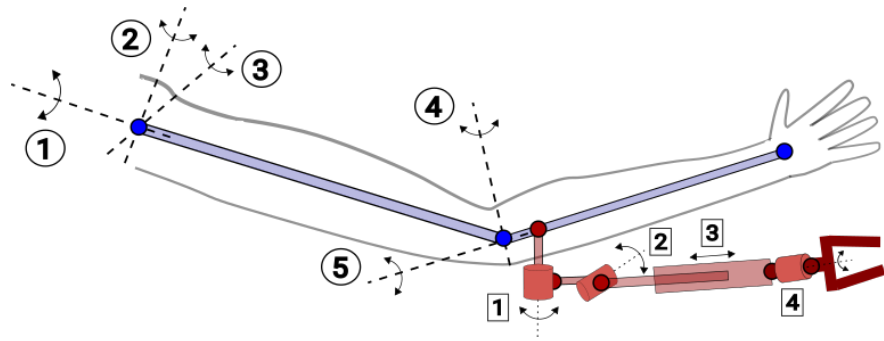
Design — Vatsal & Hoffman (ROMAN 2017, HRI 2018)



NRI: FND: Collaborative Control for Wearable Robots

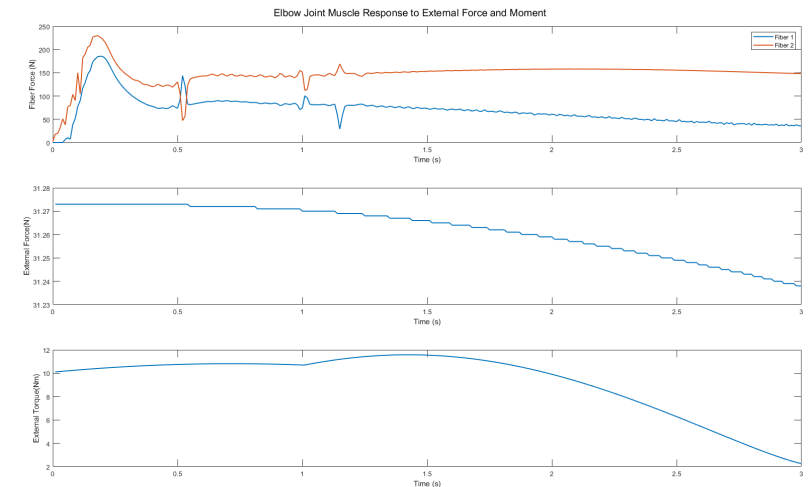
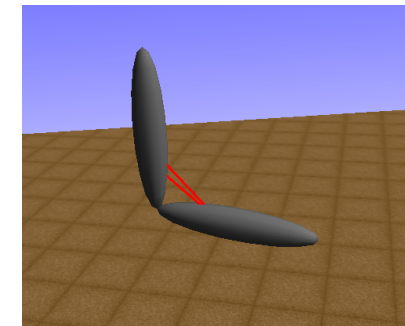
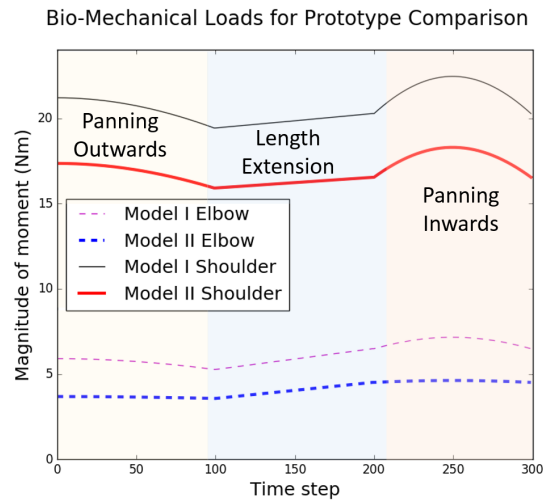
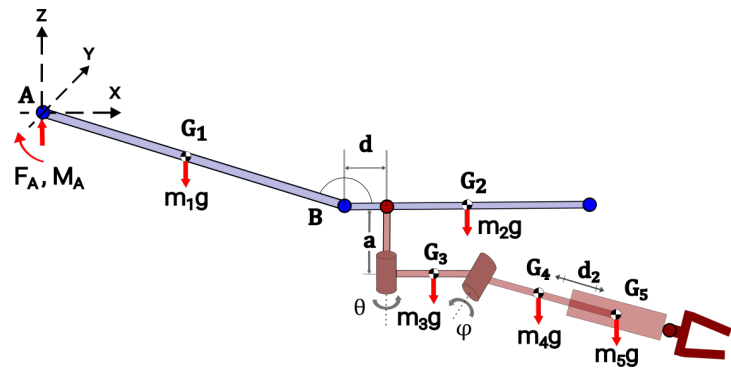


Kinematics — Vatsal & Hoffman (ICRA 2018)





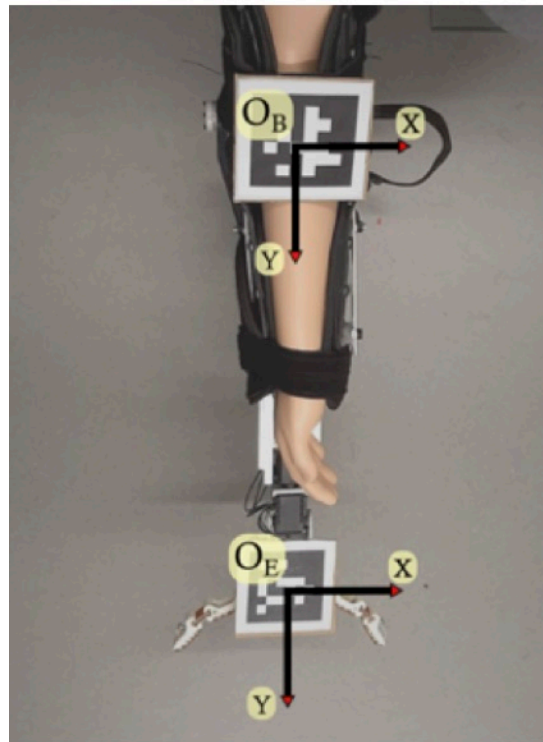
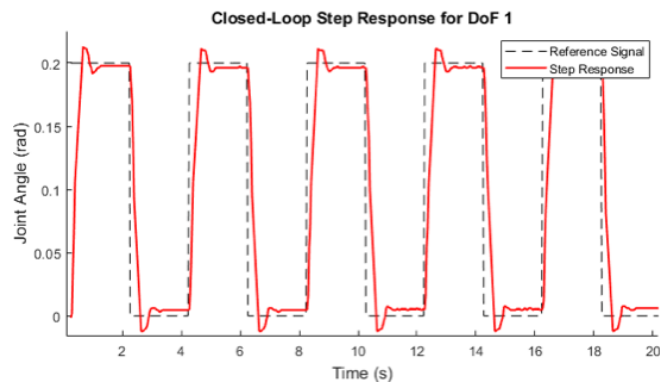
Biomechanics — Vatsal & Hoffman (ICRA 2018 & Forthcoming)



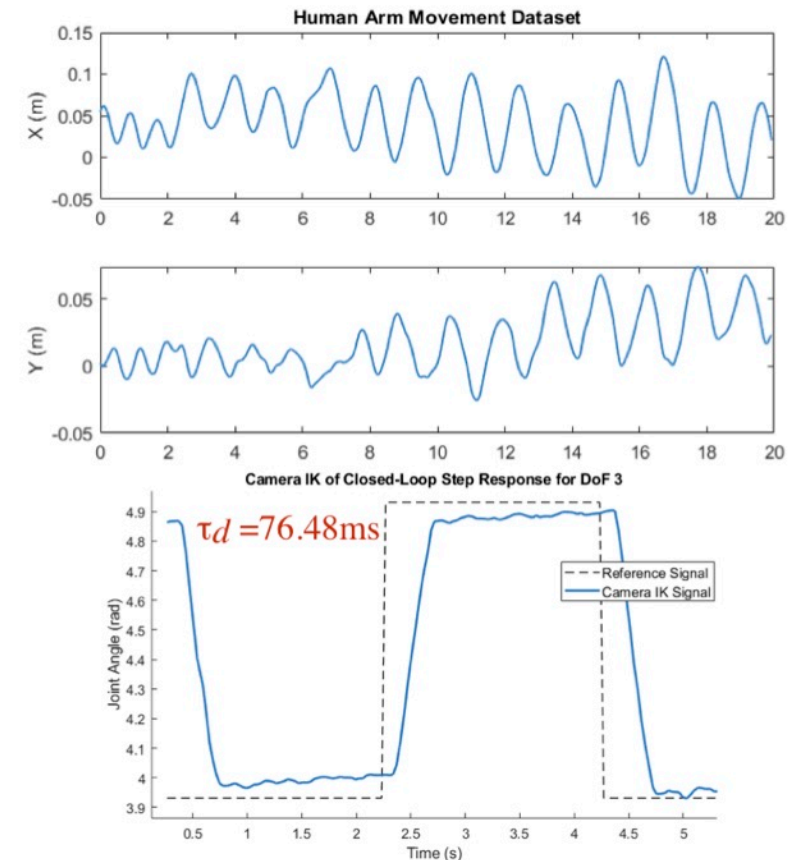
NRI: FND: Collaborative Control for Wearable Robots



Controls & HRI Stabilization — Vatsal & Hoffman (DSCC 2019 & Forthcoming)



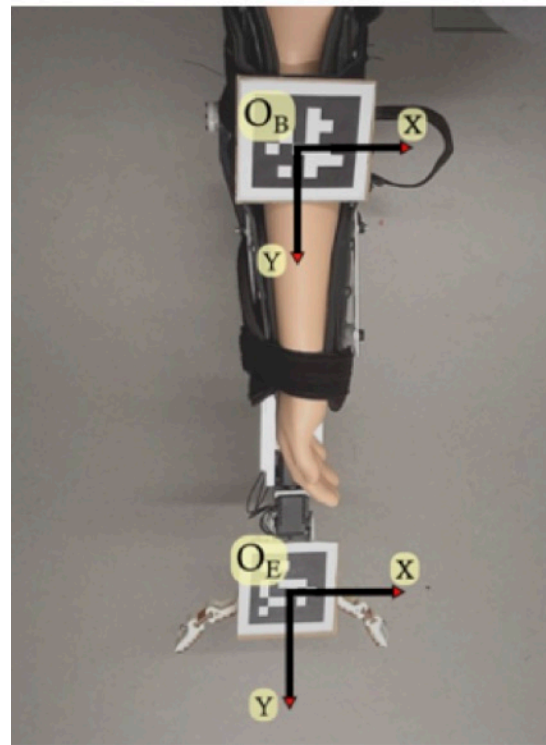
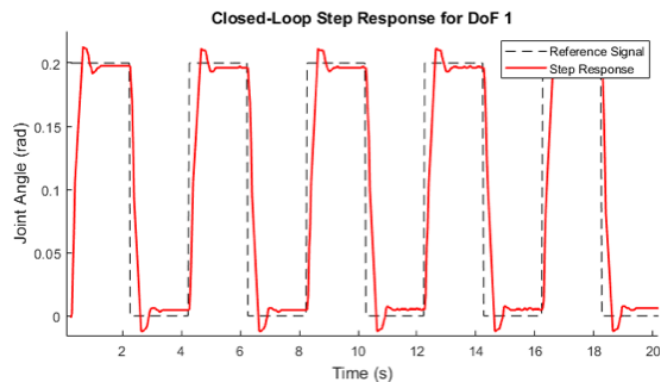
FPS = 26Hz [38.6ms]



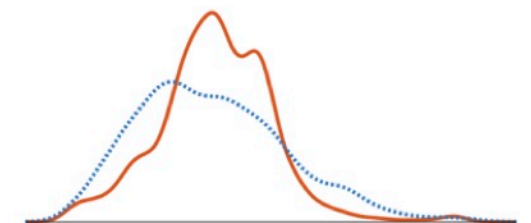
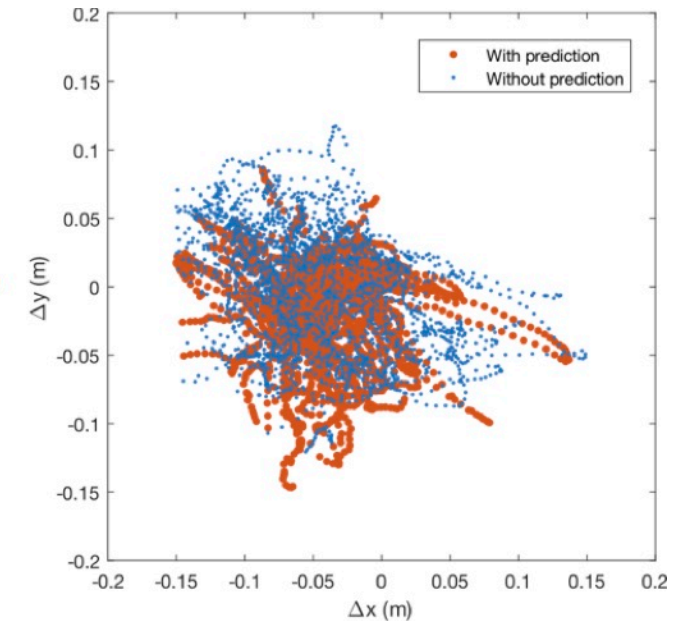
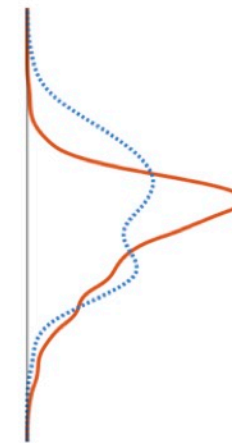
NRI: FND: Collaborative Control for Wearable Robots



Controls & HRI Stabilization — Vatsal & Hoffman (DSCC 2019 & Forthcoming)

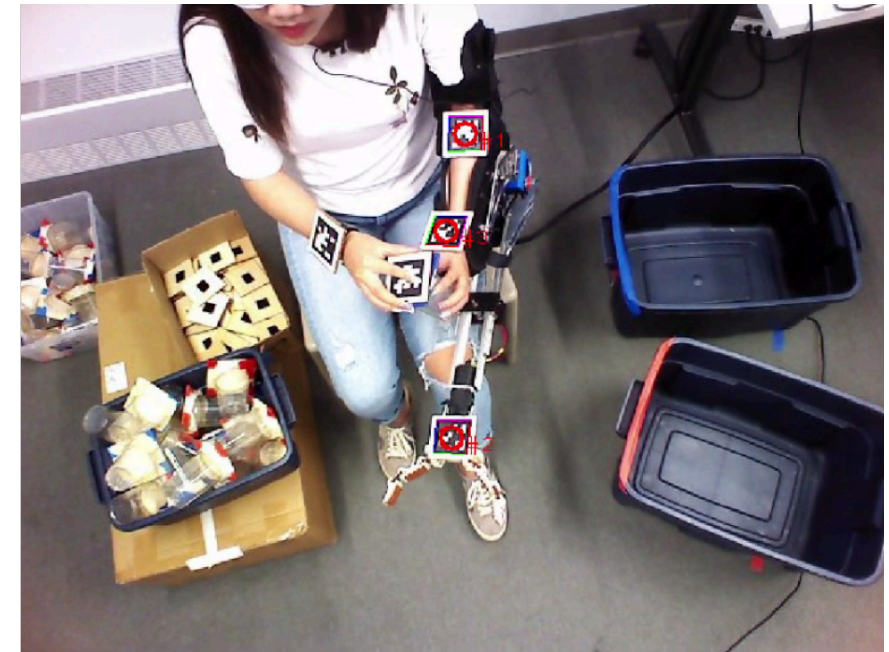
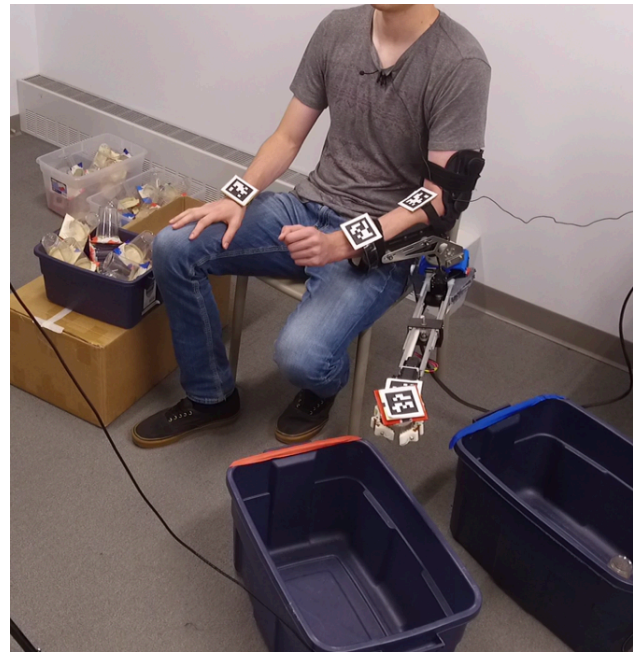
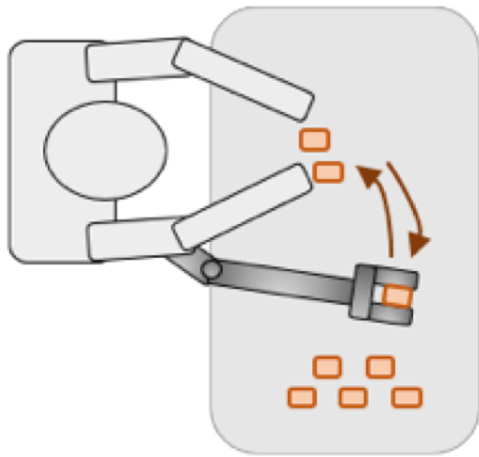


FPS = 26Hz [38.6ms]



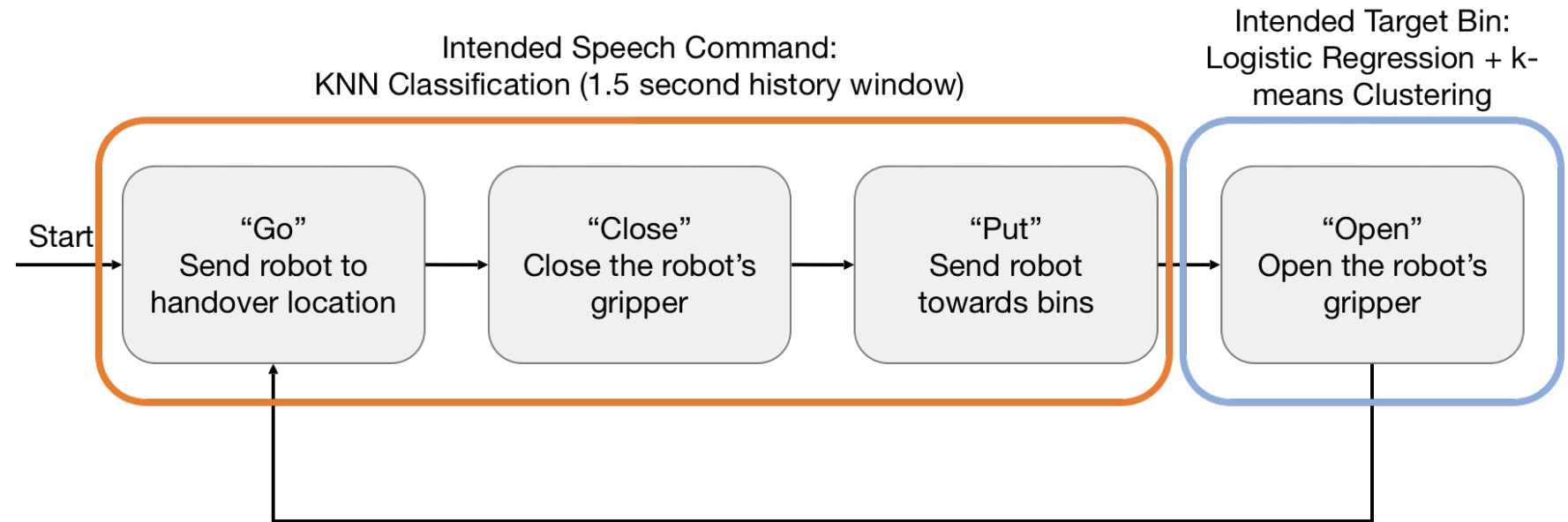
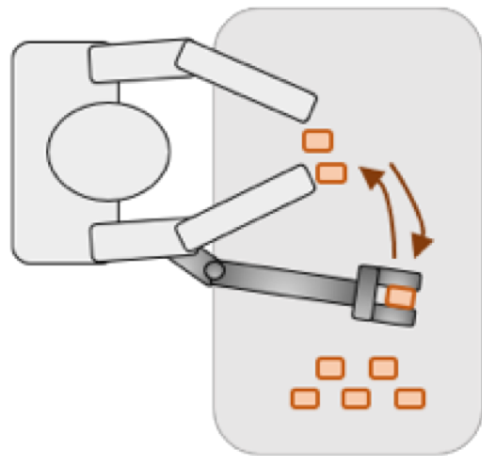


HRI Autonomy —Forthcoming





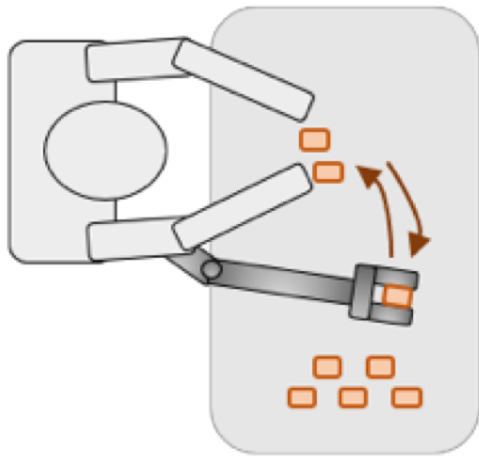
HRI Autonomy —Forthcoming



NRI: FND: Collaborative Control for Wearable Robots



HRI Autonomy —Forthcoming



Terminal logs:

```
Going to handover
Gripper closing
Putting away cup
Found target. Opening gripper
Prediction: Going to handover
Prediction: Gripper closing
Prediction: Putting away cup
Found target. Opening gripper
Going to handover
Gripper closing
Prediction: Putting away cup
Found target. Opening gripper
Prediction: Going to handover
```

Number of Targets: 2

| Target | Probability |
|----------|-------------|
| Target-1 | 83% |
| Target-2 | 17% |

Task State

| State | Probability |
|-------|-------------|
| Go | 0% |
| Put | 0% |
| Close | 0% |
| Open | 0% |
| Stop | 100% |

Speed

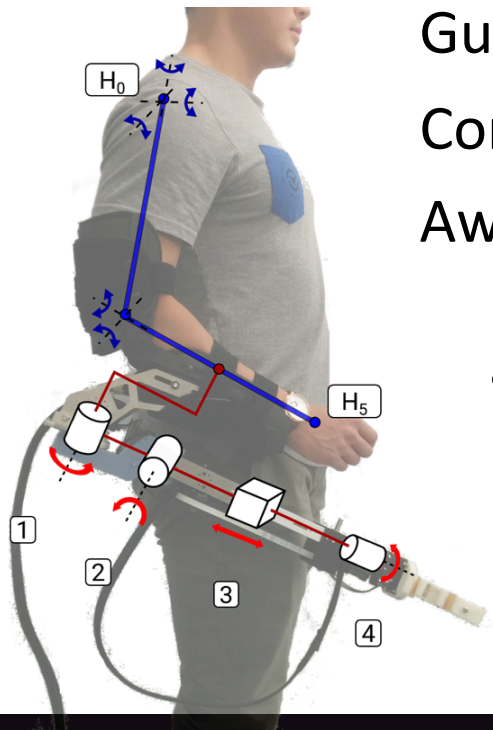
ROS Time: 1565385191.59 ROS Elapsed: 1187.89 Wall Time: 1565385191.62 Wall Elapsed: 1187.89





NRI: FND: Collaborative Control for Wearable Robots

Guy Hoffman
Cornell University
Award Nr. 1734399



Thank you!

