Human Robot Interaction
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This summer, thanks to the Penn Undergraduate Research Mentorship program, I had the opportunity to work in the Haptics lab with Dr. Kuchenbecker and her PhD student Naomi Fitter. The project I worked on centered on human robot interaction, more specifically, allowing humans to play handclapping games with robots (i.e. pat-a-cake, slide, etc). The ultimate goal of the project is to learn how humans react when the robot leads in the handclapping game vs when the human leads in the handclapping game.

However, in order for the human to lead the handclapping game in an organic way, we had to design the interaction so that any person could walk up to the robot, put two sensors on his/her wrists, pantomime a handclapping game to the robot, and then the robot could join in on the game. The first step in completing this interaction was reading in the sensor data from the user's wrists as he/she pantomimed the game and classifying this data into different handclapping motions (i.e. front fives, claps, back fives, etc.). During this process, I learned a lot about Python and how to use different computer learning techniques to classify the sensor data. The second step in completing the interaction was sending commands to the robot so that it could mimic the motions the human just pantomimed. Through this process, I learned a lot about Robot Operating System and how it allows communications between a computer and a robot.

This research opportunity not only gave me technical experience, but also greatly contributed to my overall educational experience. As an electrical engineer, working in a lab with a majority of mechanical engineers exposed me to many topics outside of my major of study. I will definitely be taking some mechanical engineering classes after my experience with this project and this lab. Furthermore, because Dr. Kuchenbecker ran weekly lab meetings where all lab members shared what they had been working on for the past week, I also got to learn about many other research projects and what unique problems they were solving.