Teaching Perspective Taking with Socially Assistive Robots to Children with ASD

Cassandra Jeon – soojkj10@gmail.com
Diamond Bar High School, Class of 2020
USC Viterbi Department of Computer Science, Interaction Lab SHINE 2019

Introduction

I'm a part of the Interaction Lab under Professor Maja Matarić. The Interaction Lab researches about Socially Assistive Robotics (SAR). I worked with my PhD student mentor, Jessica Lupanow. Her project focuses on teaching children who have Autism Spectrum Disorder (ASD) about empathy.

Some children with ASD struggle with empathetic behaviors, which are often comprised of three factors: the perspective of others, identifying and distinguishing emotions, and having a shared affective response. My lab partner and I worked to create a web-based survey to measure the child's perspective taking ability in real time.

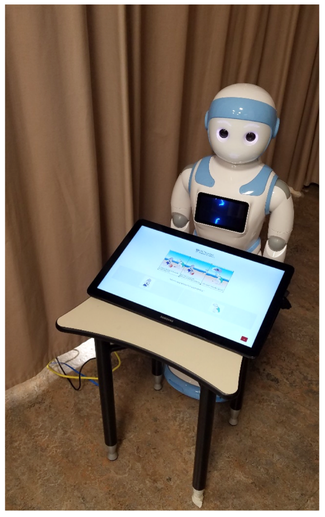

Figure 1. Project uses a "wizard of oz" setup
PC: Cassandra Jeon

Objective & Impact of Professor's Research

The objective of Professor Matarić's Interaction Lab focuses on developing computational principles and techniques to enable SAR systems for human interaction. The goal of SAR is to improve health and wellness, learning, and autonomy for stroke patients, older adults, children with special needs, and more.

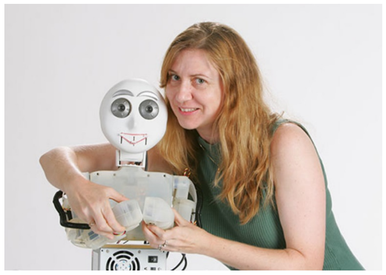

Figure 2. Professor Maja Matarić with one of her earlier robots
<https://psmag.com/.image/t_share/MTI3NTgyMzc3NDU4NDYyNjkw/maja-mataric.jpg>

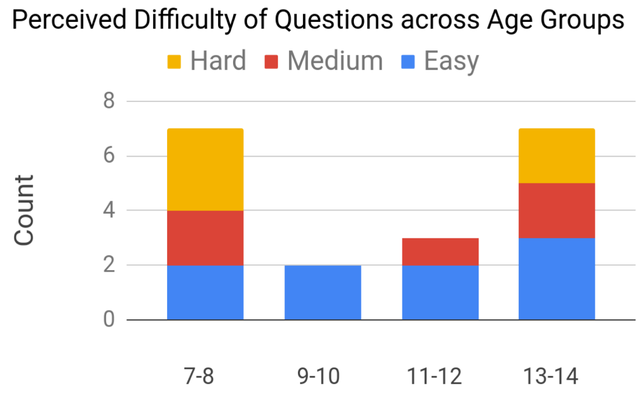

Figure 3. Qualitative data from my mentor's pilot testing
PC: Jessica Lupanow

Skills Learned

The very first thing my lab learned about was **Robot Operating System** (ROS). Then we learned how to use and navigate through the **Terminal.** Shortly after, I learned how to use **GitHub**, which is a web-based hosting service for software development projects that use the Git revision control system. I also learned about different text editors like **Sublime.**

Figure 5. Terminal

Figure 6. Sublime

Webpage Development involved learning the following languages:

- CSS
- HMTL
- JavaScript
- jQuery
- Python
- Java

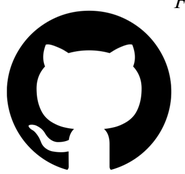

Figure 7. GitHub

Finally, I figured out how to use **Bootstrap**, which I used to give the website its finishing touches and **Flask** which gave the website its own IP address.

Figure 8. Bootstrap

Figure 9. iPal Robots Lu & Kai used for this research
PC: Josh Huang

Advice for Future SHINE Students

My advice to future SHINE students is that the "Imposter Syndrome" is a very real thing. It doesn't matter what level you're at or how much prior knowledge of your lab you already know. Remember that everyone at SHINE is there for the same reason: to learn. You are also there for a reason. Your SHINE experience depends on You and how you want to make the most out of it. Don't forget that you have your mentors and peers to help you get along the way!

How it Works

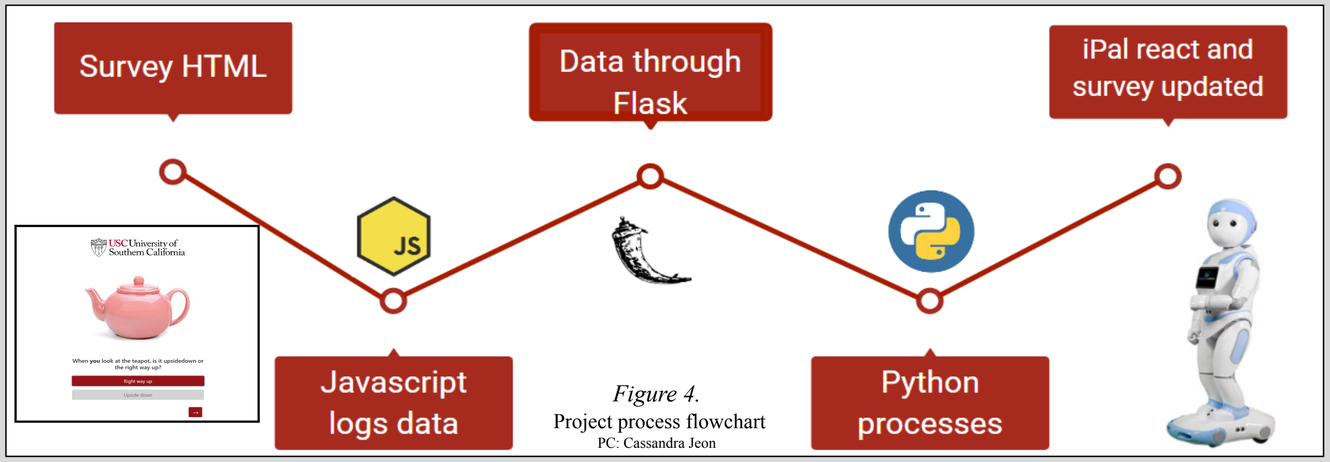

Figure 4.
Project process flowchart
PC: Cassandra Jeon

How This Relates to Your STEM Coursework

My experience with JavaScript that I learned from AP Computer Science Principles last year helped me since I already knew the basics. I used my previous knowledge and learned how JavaScript could be used to make webpages interactive. I will definitely use my website making skills to produce and create more websites in the future.

Acknowledgements

A huge thank you to Dr. Katie Mills and Dr. Megan Herrold for organizing such an amazing program, Professor Dr. Maja Matarić for opening up her lab to me and providing such knowledgeable advice, my wonderful PhD mentor Jessica Lupanow along with PhD mentors Tom Groechel and Chris Birmingham, my lab partner Josh Huang, and of course, my parents for their continuous support.

Figure 10. iPal Robot Lu