

Introduction

Prof. Maja Matarić's Interaction Lab pursues Socially Assistive Robotics (SAR) [1], a field that aims to provide social assistance to users through Human Robot Interaction (HRI). My lab mate Mena and I spent our SHINE process learning from Prof. Matarić's Ph.D student Tom Groechel, who creates SAR tutors that measure and boost student kinesthetic curiosity.



Figure 1.
Kuri claps with augmented
reality arms
PC: Tom Groechel

Tom works with Kuri, a mobile robot, as a platform and uses mixed reality in order to increase Kuri's expressivity. He uses Kuri's mobility along with augmented reality to create an engaging kinesthetic learning experience.[2]

Objective & Impact of Professor's Research

Prof Matarić's research aims to create robots that help vulnerable populations through Human Robot Interaction (HRI).



Figure 2. Interaction Lab Logo
<http://robotics.usc.edu/interaction>

Socially Assistive Robots are designed to connect with human users in order to provide assistance and achieve the goals of a specific task, such as tutoring or rehabilitation.

Social Robots can help populations such as:

- students
- individuals with cognitive disorders
- the elderly.
- individuals with physical impairments
- individuals in convalescent care

Skills Learned

I worked on creating packages for Kuri that would perform certain tasks, such as locating a user's face and approaching them, displaying colourful lights or reacting to being touched

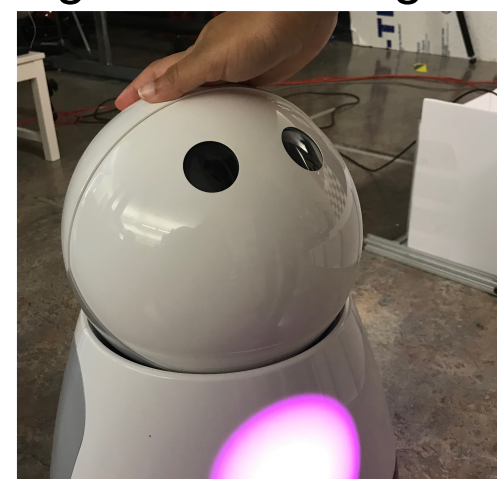


Figure 3.
Kuri's chest light
turns pink after
being pet
PC: İpek Gökten

Through my SHINE experience, I learned skills such as:

- Using ROS
- Reading research papers
- Working with GitHub
- Navigating the terminal
- Threading in Python
- Working with various text editors, such as Sublime and Vim



Figure 4. Ros Logo
<http://www.ros.org/press-kit/>



Figure 5.
Sublime Logo
<https://www.sublimetext.com/>

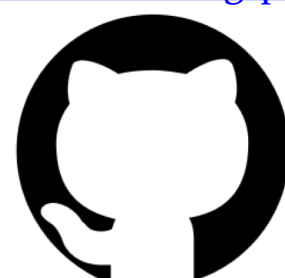


Figure 6. Github Logo
<https://github.com/>



Figure 7.
Terminal Logo
<https://github.com/github/octicons>

Structure of Publishers and Subscribers

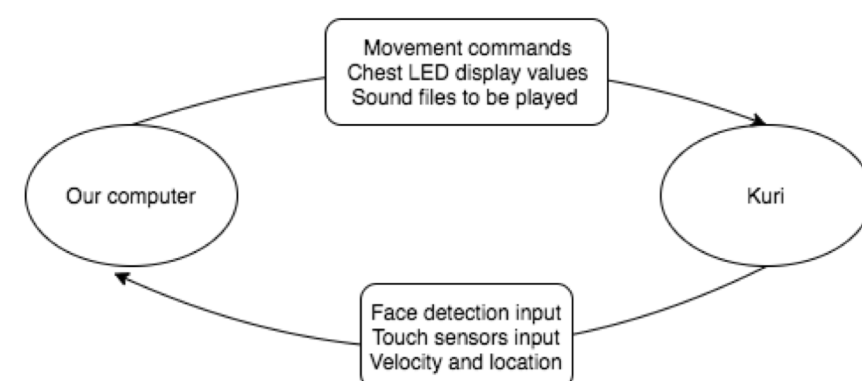


Figure 8. Publisher and Subscriber Systems on Kuri PC: İpek Gökten

How This Relates to My STEM Coursework

My work in the Interaction Lab allowed me to better understand the real world applications of the STEM skills I learn in my Computer Science, Math and Physics classes. While building our packages, I was able to use my abilities in programming in Python and C++, along with skills such as working with matrices and coordinate systems.

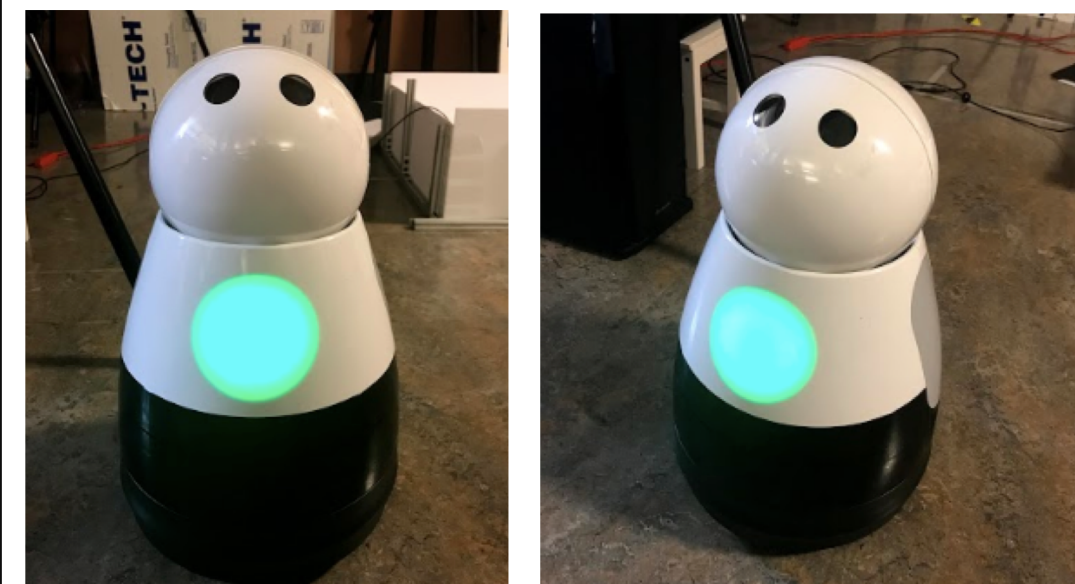


Figure 9. Kuri's color display package PC: Mena Hassan

I strongly believe that I will be utilising the skills I acquired through this program, such as using ROS, in my future work related to computer science. Moreover, I like to think that I will be able to analyse academic papers for my future college coursework with more ease now that I have learned how to efficiently read a research paper.

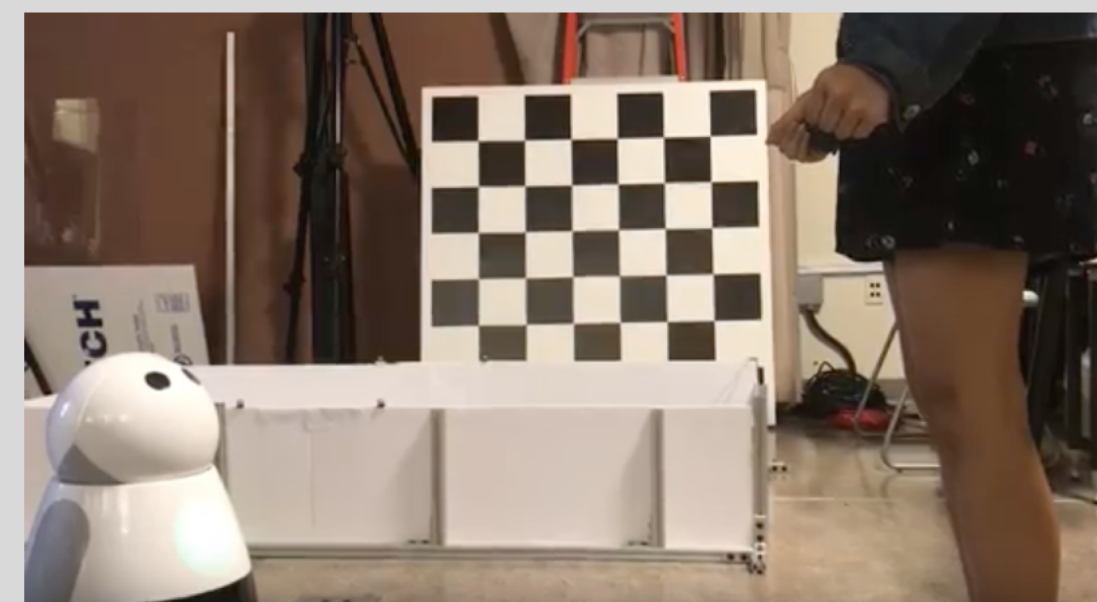


Figure 10. Kuri's face detection program locates user's face and approaches them
PC: İpek Gökten

Advice for Future SHINE Students and Future Steps

Try to learn and grow from your SHINE experience as much as possible. Ask other SHINE students about their work and talk with the different Ph.D and undergraduate students in your lab to learn about the various types of research being done. Make sure to ask them for their advice on college admissions and their experiences with research.

I will be applying to colleges this fall, and I want to major in Computer Science in the future. I would love to attend a school where I will be able to pursue my interest in research.

References

- [1] Feil-Seifer, D., & Matarić, M. (2005). Socially Assistive Robotics. 9th International Conference on Rehabilitation Robotics, 2005. ICORR 2005. doi:10.1109/icorr.2005.1501143
[2] Groechel, T., Shi, Z., Pakkar, R., & Matarić, M. J. (2019). Using Socially Expressive Mixed Reality Arms for Enhancing Low-Expressivity Robots.

Scan this QR
code on your
phone to watch
a compilation
of Kuri's
packages!



Figure 11. Video Compilation of Kuri's Movements
PC: İpek Gökten & Mena Hassan

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