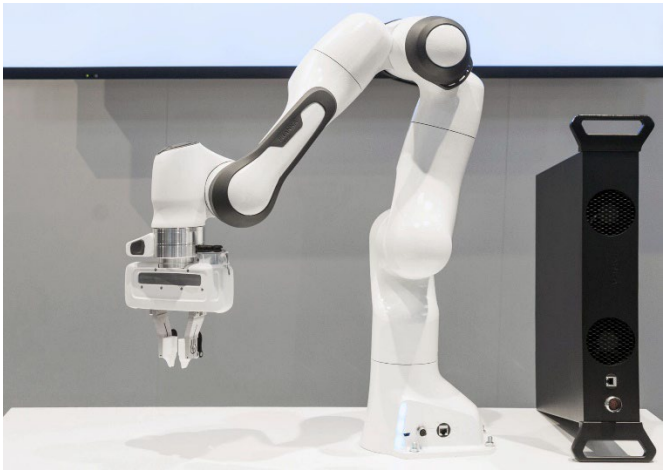
HAPTIC RENDERING WITH FRANKA ROBOT



Are you ready to dive into the cutting-edge world of haptic technology? Join us in an exciting capstone project where you will harness the power of the Franka Research 3 robot to create immersive haptic experiences. This is your chance to blend computer science with practical robotics engineering, pushing the boundaries of how we interact with machines!

In this research-grade project, we want to use the FR3 robot in physical human-robot interaction studies. The goal of “haptic rendering” is to recreate the feeling of touch in a virtual environment. We want the robot to recreate force effects when we touch the virtual objects in a simulated environment.

Project Overview
In this capstone project, students will develop a robust backend code using the FR3 robot's C++ API to interface seamlessly with the CHAI3D package, which is a simulation package made for haptic rendering. This integration will enable the robot to provide realistic haptic feedback, allowing users to "feel" virtual objects in a tangible way.

Key Components

- **Backend Development:** Utilize the C++ API of the Franka Research 3 robot to create a responsive and efficient backend that communicates with the CHAI3D haptic rendering engine.
- **Frontend Data Collection:** Design a user-friendly frontend in Python to collect and analyze data from haptic interactions, enhancing the user experience and providing valuable insights.
- **Haptic Scene Design:** Build virtual environments and “games” where the user interacts with the objects.

Learning Outcomes

- Gain hands-on experience with advanced robotics and haptic technology.
- Develop proficiency in C++ and Python programming languages.
- Collaborate with other researchers to solve complex engineering challenges.
- Create a portfolio-worthy project that showcases your skills in robotics and software development.

Client: Raz Lab (Dr. Razavian) in Mechanical Engineering