Multimodal Human Input —Final Presentation

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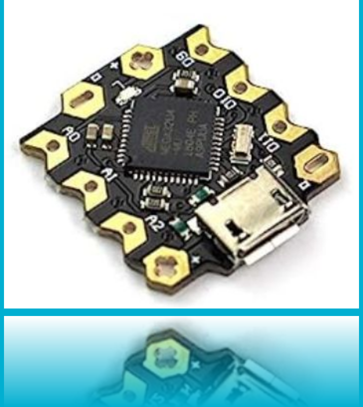
Project Context

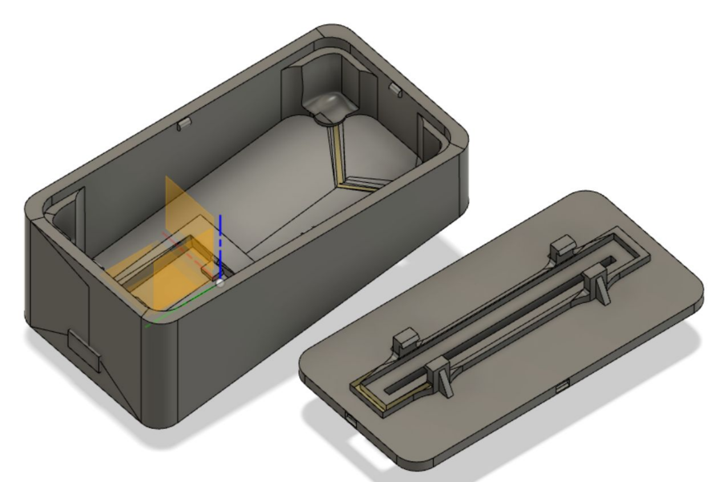
- Facilitating research through the development and experimentation of artificial seabed environments with a robotic arm.
- Design and creation of a self-reporting device that enhances research by maintaining data from each participant session.
- Bravo arm manipulation using motion capture.

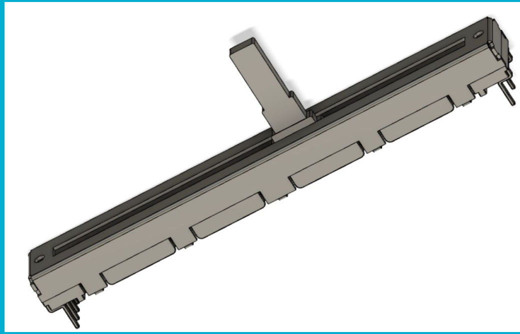
Seabed Floor

- Reliability and repeatability:
  Consistent spatial alignment of objects required for each trial.
- Three pre-identified positions needed for spatial localization.
- Recreation of a sandy seafloor bottom environment.

Continuous Self-report Device

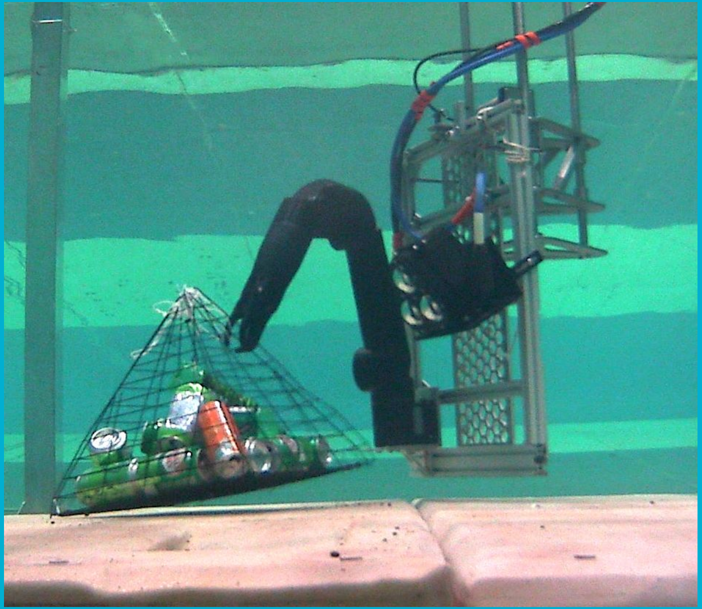




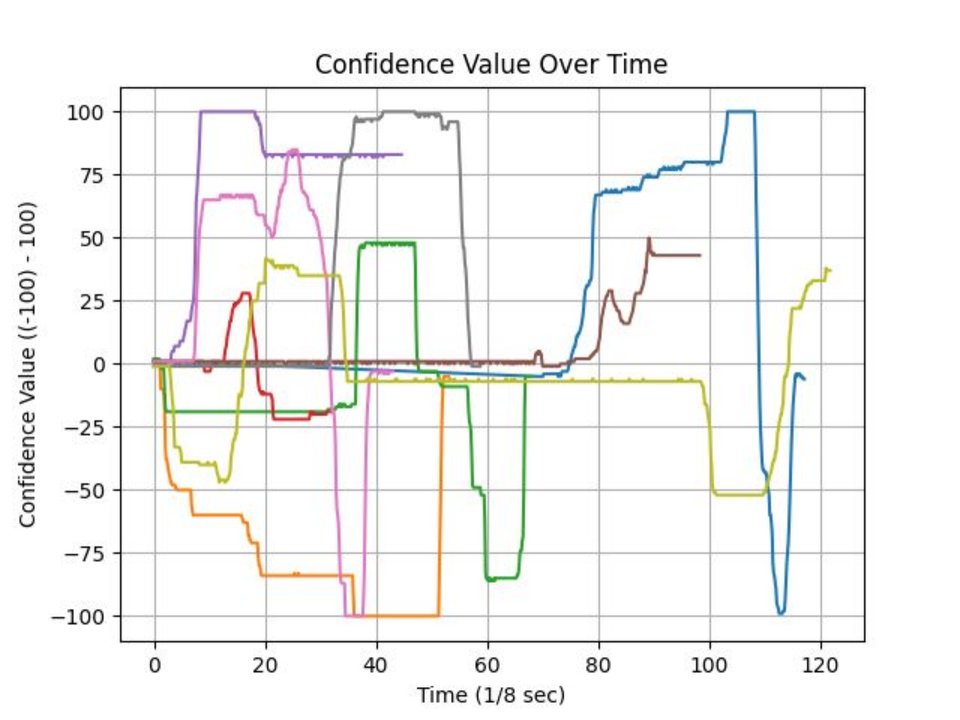


Confidence Data Reporting

- Select a grasp to execute using user interface.
- Report confidence values during grasp execution using Continuous Self-report Device.
- Values are saved into csv (Comma Separated Value) files.

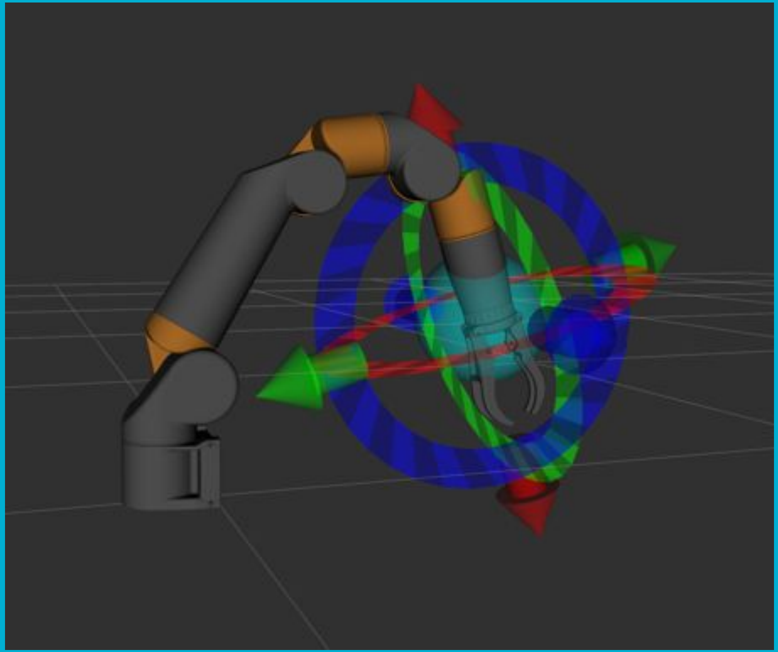


Results and Confidence Values



Bravo Arm Teleoperation

- Establishing the simulated environment.
- Incorporate Bravo 7 Arm URDF (Unified Robotics Description Format) along with necessary files to facilitate simulation.
- Control arm within Rviz with Moveit plugin.



Motion Capture Integration (WIP)

- Control arm positioning.
- Integrate with Xsens motion capture software.

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Challenges

- Obtaining precise dimensions and positioning for the artificial seafloor.
- Suitable microcontroller tailored to the Continuous Self-report Device's purpose.
- Constructing an enclosure for the Continuous Self-report Device.
- Developing code to store data from the Continuous Self-report Device.
- Deploying ROS and configuring its integration with the Bravo 7 arm simulation.
- Establishing a linkage between the Bravo 7 arm and Xsens software (WIP).

Lessons Learned

- Comprehensive team communication.
- Acquiring proficiency in Arduino microcontroller operation.
- Attaining proficiency in Python programming skills.
- Creating 3D objects within a modeling environment followed by printing them using a 3D printer.
- Installing Linux, ROS, and utilizing Moevit for Bravo 7 arm simulation.
- Enabling Bravo 7 arm motion through Xsens integration (WIP).

Conclusion

- Enhanced research through artificial seabed environments and continuous data flow.
- Effective team communication fostered successful project collaboration.
- Enhanced Bravo 7 arm manipulation using motion capture technology is a work in progress.

Questions?