Quori 2.0: Uniting, Broadening, and Sustaining a Research Community Around a Modular Social Robot Platform

Award 2235042 (UPenn) / 2235043 (OSU)

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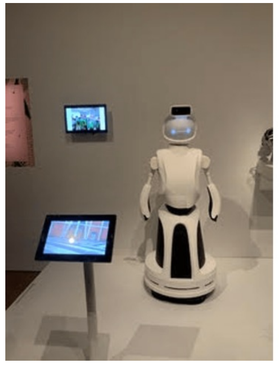
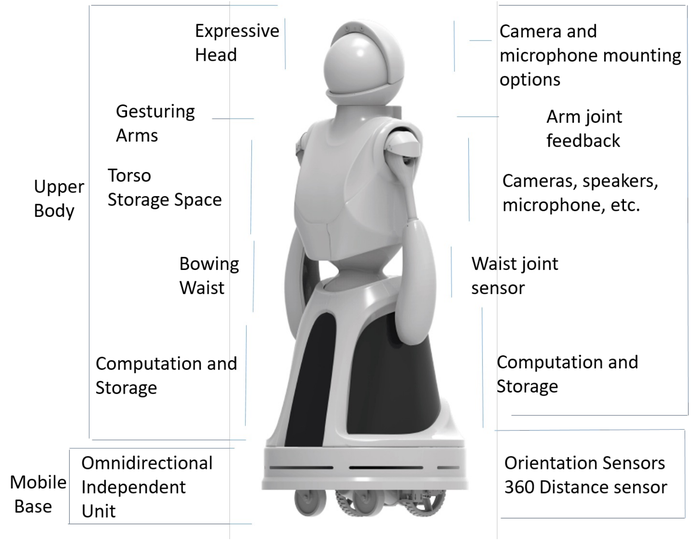
Goal: Building on a prior NSF CRI award (CNS-1513108, "A Modular Robot Platform for Enabling Computing Research in Socially Intelligent Human-Robot Interaction") that designed, constructed, and distributed ten Quori robots to the HRI research community, we propose enhancements to both Quori hardware and software to establish a standard for the HRI research community. This includes manufacturing and distribution of 50 new Quori robots, with robot costs subsidized based on the needs of the community. Importantly, this enables the establishment of a critical mass of researchers (both senior and junior) with the ability to compare, contrast, and repeat experiments between each other. Starting and nurturing this HRI community using the successful model that the PR2 program created in the 2010's ensures a high likelihood of success.

Background: The first version of the Quori robot has been distributed to ten collaborative teams around the country, where 35 faculty members and their students are conducting a wide variety of human-robot interaction (HRI) research. For example, Quori has been successfully deployed in nursing homes in experiments interacting with elders for COVID-checking, to aid in health monitoring, and as an encouragement for walking. Quori also autonomously interacted with museum visitors as part of a six-month exhibit that attracted over 183K visitors, showing the potential for Quori as a robust platform for HRI research.





Technical Impact: A standardized social robot platform will enable the replication of experiments in the HRI community and help move the field from engineering-based to science-based. Currently, due to lack of standardized hardware and software, it is hard to replicate published studies with enough fidelity to be useful. Quori 2.0 infrastructure will address this, but, more importantly, it will unify, broaden, and sustain a community of researchers and encourage them to *actually do* these replication experiments, and to carefully document them in our replication study repository. As new teams acquire a Quori, we will intentionally pair them up with an existing team as onboarding buddies. The original researchers will help with the replications, and a replication study repository will facilitate their implementation.

HRI Community Impact: A common hardware and software platform will allow us to build a nationwide community of researchers that can share experiments, software, and hardware modifications. We will host workshops twice a year, bringing together faculty and students from the Quori sites to not only discuss technical material, but to network and build a cohort of HRI researchers. In doing this, we will apply lessons learned from the PR2 Beta Program, which established a community of researchers around the PR2 robot and ROS software ecosystem that still exists more than a decade later. Ultimately, we aim to create a community where the barriers to collaboration and sharing are dramatically lowered, and where replication of results is the norm.

Status:

- We have begun the redesign process for Quori and have been working with the original sites to gather feedback and insights from their experiences with the platform.
- We have identified manufacturing partners to help with the design for manufacturing (DfM) process and for producing the run of 50 robots.
- We are working to assemble an advisor board for the project.
- We are planning a Quori workshop at the upcoming Technological Advances in HRI conference.
- We're updating the web site: `quori.org`