

Beat the Baseline

Midterm Project for Robotic Caregivers 2021

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You are part of a research and development (R&D) team tasked with creating a robotic caregiver that provides meaningful physical assistance. As a starting point, you have been provided with simulated robotic caregivers with controllers trained using standard reinforcement learning (RL) methods. These simulated robotic caregivers provide baseline examples that your team is expected to improve upon.

Your team is expected to provide a complete picture of how your robotic caregiver would function in everyday life in conjunction with a simulated implementation. The simulated implementation should provide evidence for the feasibility of your approach and you should use it to perform an evaluation that demonstrates the superiority of your approach over the baseline examples.

Your robotic caregiver design should provide physical assistance to a well-defined population for which the assistance would be valued. You should justify your approach using the scientific literature and video conference interactions with members of the population you expect to benefit from your robotic caregiver.

Your first deadline is a project status presentation on Thursday, February 4, 2021. You will have 20 minutes to present your project status followed by 15 minutes to answer questions from a panel of experts. For this presentation, you should clearly define your population, the task, and your technical approach. You should clearly communicate why your approach will improve upon the baseline examples, including preliminary results. You should also provide a work plan for the remainder of the project, including milestones and the expected roles of your team members.

On Tuesday, February 23, 2021, you will have 20 minutes to present your final design for your robotic caregiver followed by 15 minutes to answer questions from a panel of experts. You will be expected to provide strong evidence for the superiority of your approach over baseline examples.

An example of a plausible progression in your project follows:

- Define the population
- Define the task
- Select a robot
- Teleoperate the robot to perform the task
- Identify weaknesses in the baseline controller
- Investigate and propose improvements
- Define quantitative evaluation methods

Present project status (Feb 4)

- Implement improvements
- Evaluate improvements
- Revise improvements
- Iterate

Present completed project (Feb 23)