

NRI: INT: Collaborative Research: Buoyancy-assisted Collaborative Robots That are Cheap, Safe, and Never Fall Down.

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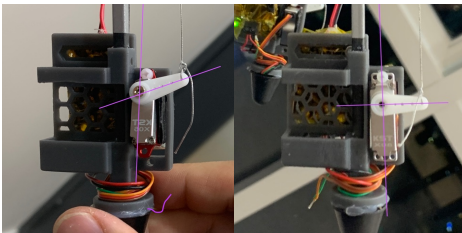
Objective

Develop novel buoyancy-assisted robots (BAR) that are inherently safe in everyday environments.

Develop compact but capable Balloon-based robots and control using deep reinforcement learning.

Progress

First, we upgrade hardware to improve the reachability (UCLA).

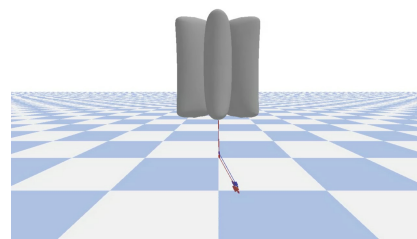


Progress (cont')

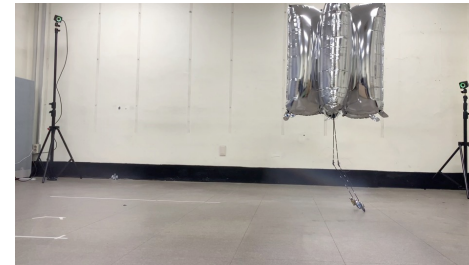
A deep RL algorithm that consists of planning and imitation stages to solve challenging problems (GT).

Differentiable quality diversity algorithm to train a set of policies that can adapt to damage (USC).

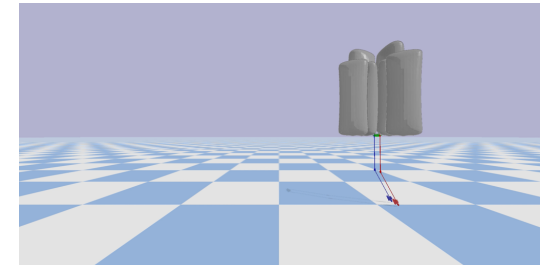
Develop simulation framework and reduce the sim-to-real gap (all).



Initial Failure of Real-to-sim.



Hardware Data Collection



Reduced Sim-to-real Gap.

Scientific Impact

Design fundamentally cheap and safe robots.
Novel control algorithms for low-fidelity, high-sensitive system.

Broader Impact

Safe human interactions in various scenarios.
Low-cost and safe STEM platform.