Mantas Naris

DISSERTATION DEFENSE

Parallelizing the Control of Electrostatic Robotic Muscle

Abstract

Living things are capable of incredible dexterity, agility, robustness, and elegance in their interactions with their environment. For far longer than the field of robotics has even existed, humanity has aspired to capture even a fragment of that dynamic elegance. Not only out of curiosity, but also to inform the design of the artificial systems we hope to construct ourselves.

The field of soft robotics hypothesizes that by engineering comparably compliant, dynamically complex systems, some of this elegance can be translated to robotics. Thanks to recent strides in materials and fabrication, electrostatic actuators have emerged as a promising core technology for the field.

These electrically-driven robotic muscles are powerful, fast, and can be made numerous geometries using a wide range of materials. However, electrostatic actuators are not without their own challenges. They operate at thousands of volts, but low currents... a niche where few technologies exist.

My work aims to address a fundamental problem for any electrostatic actuator-based soft robot, and for the future of our field: how to translate between the theoretical and computational tools needed to study system dynamics and synthesize global control laws, and the high voltage signals needed to independently drive these robotic muscles - not one, or ten, but hundreds to thousands of them.

An answer to this question will open the door to the construction of highly performant soft robots with complex, coordinated motion, taking us one step closer to the elegance of living things.

Biography

Mantas received his B.Eng. degree in Biomedical Engineering from Case Western Reserve University. He is currently pursuing his PhD under the guidance of Prof. Sean Humbert in the Bio-inspired Perception and Robotics Laboratory.

After graduating as CU Boulder's very first Robotics PhD, he plans to join Artimus Robotics and work towards commercializing the technology he has developed.

Tuesday Dec 12th, 8:15am
CASE E422
(Doors open 8am)

Zoom link:
https://cuboulder.zoom.us/j/98693251686
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