

Bachelor's Thesis, Term Project

Pick and Place Soft Robotic Actuator/Gripper with the Robot Operating System

Supervisor (s): (Assist. Prof. Dr. Eng. Amir Roushdy)

Soft robotic systems present a variety of new opportunities for solving complex problems. The use of soft robotic grippers, for example, can simplify the complexity in tasks such as the grasping of irregular and delicate objects. Adoption of soft robotics by the informatics community and industry, however, has been slow and this is, in-part, due to the amount of hardware and software that must be developed from scratch for each use of soft system components. **There is a Lab Engineer from the ARATRONICS Laboratory, guiding and directing the student with Assist. Prof. Dr. Eng. Amir Roushdy.**

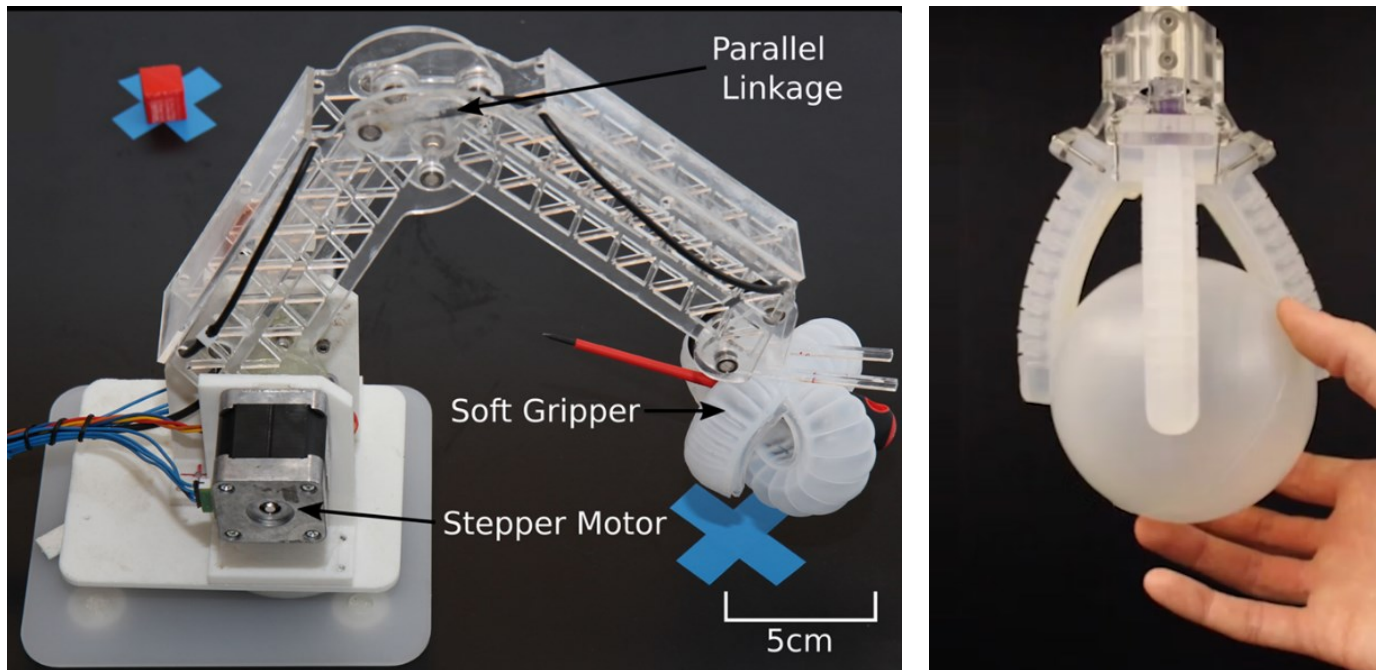


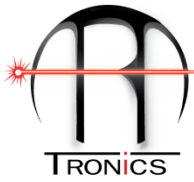
Fig.: A Soft Robotic actuator / Gripper

Project description and objective:

Traditional rigid robotic grippers are widely used in industry, but gentle and adaptive manipulation is limited. Scientists found the bioinspired way to create multi-degree-of-freedom soft actuators with appropriate sensory capabilities. Authors produced soft mechatronic fingers

For more details please contact:

Assist. Prof. Dr. Eng. Amir Roushdy, Room: C7.108, E-mail: amir.ali@guc.edu.eg, Web site: www.aratronics.com



using embedded 3D printing and use integrated ionogel soft sensors. The manipulator consists of three fingers in a triangular orientation, which allows different grasping poses. They are comprised of an organic ionogel that provides reliable sensory feedback without hysteresis in conductivity. Sensors and actuators are embedded into fingers.

Research focus of this project:

- Literature review on the project should be studied properly.
- Not only, creating a software control system for the project but also the hardware.
- Experiments using the gadget and control system should be built properly.
- The outcomes must be documented.

Requirements:

- Passionate to learn more about, Soft Robotics, 3D Printing design, Robotics and control.
- Prior mechatronic design expertise is desired like “SolidWork and Arduino”.
- Enthusiasm for completing actual practical work with 3D printing staff (design fabrication and construction).
- A method of working that is both structured and self-contained.

General tasks of the project:

- The complete methodology is already available in the ARATRONICS Lab, so we will discuss it from the first day to start the automation process for it
- Fabricate the machine/system using 3D printer/CNC machine (small parts).
- Assembly all parts of the Robot.
- Changing the working variables and see the effect on the locomotion of the robot.

Other notes:

- A weekly meeting with the advisors will be required for this project, as well as weekly progress updates (*The meeting could be more than once during the week based on your progress and based on your achievements*).
- You should to be in the Lab two days per week (*It could be more than two days based on your progress and based on your achievements*).
- All reports must be prepared in the style of a research paper.
- The outcome of this research will be published in one of the coming international Conferences and , or Journal