

Report for soft end effectors

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Assignment Soft Robotics Home Assignment #6

Problem statement - Difficult object to handle

In Japan, there is a traditional game called "Kingyo Sukui" which is to catch golden fishes with a paper scoop. The game is very hard for humans, and it is also difficult for robots. Golden fishes are difficult to handle by conventional end effectors (EEs) due to their soft and slippery body. The conventional EEs are designed to handle rigid objects, and they are not suitable for handling soft objects, especially living creatures. Here are the reasons why golden



Figure 1: Travelers are playing "Kingyo Sukui" in Japan.

fishes are difficult to grasp:

- Slippery and soft body: Golden fishes have a protective mucus layer on their body, which makes them slippery.
- Living creatures: Golden fishes are living creatures with high mobility, sensitivity, and active behaviors.
- Fragile: Golden fishes are fragile, which mean the robotic EE should handle them gently to avoid hurting them.

Proposed solution - A net-like soft robotic EE

Inspired by the soft end effector in the lecture, I propose a net-like soft robotic EE to handle the golden fishes.

The net-like soft robotics EE is made by 3 parts, a handle with an air pipe, a soft actuator, and a net. The soft actuator is on the net to open/close the net. The net is made by soft and flexible materials, which can adapt to the shape of the golden fishes. The soft actuator is made by soft pneumatic actuators, which can provide a gentle force to open/close the net.

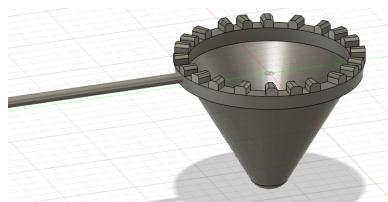


Figure 2: **CAD design of the net-like soft robotic EE.** The net-like soft robotic EE is made by 3 parts, a net, a soft actuator, and a handle with an air pipe.