

Report #1

2. Discuss the elementary components presented in the paper that are used to develop soft actuators. Describe their materials, characteristics, types of motion, and applications.

Soft actuators give soft robots their unique structure. They help soft robots adapt their structure based on several factors, including but not limited to heat and light. Soft actuators come in several forms, are made from different materials, and are used to carry out a task according to their structure. For example, soft robots may include a bladder which in theory will help it generate the necessary impulse for specific actions. This bladder can be built from anisotropic films and they can be inflated with air or certain fluids to carry out unique tasks. Using these pressurized fluids can create both expansion and contraction motions which mimic the biological muscle. On the contrary, soft actuators with fluids can be very expensive and also may be bulky. Another widely studied form of soft actuator includes a bending, beam-shaped actuator. The obtained actuators may exhibit a large range of motion in one or more directions depending on the number of internal chambers, their topology and the actuation method. The stiffness of the material used directly affects the bendability of the actuator. Another possible way to generate a bending motion is to create a pneumatic network, which creates a snake or fish-like motion. The majority of soft structures are made from catalyzed polymers such as silicone rubbers which are a result of the molding. Due to recent development in soft actuators, soft machines are able to sustain both high forces and soft behaviors. They can come in several styles and can carry out different tasks depending on their structure and function.