

A Biologically Inspired Fingertip Design for Compliance and Strength

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Abstract

The future of robotics is in being able to successfully make the move out of the factory and into the unstructured and uncontrolled world in which we live. Such an environment places great emphasis on our ability to sense and interact with the world around us. Touch is a physical interaction and as such it places great importance on the mechanical properties of the skin. The glabrous skin of the palms of our hands is both highly compliant and strong in grip and manipulation of objects. Current robot skin designs are generally based on the use of a soft silicone, with a level of hardness chosen from compromise between the level compliance and mechanical strength. This paper highlights some key features of human fingertip physiology and presents a biologically inspired fingertip design that achieves both high levels of compliance and mechanical strength.