

Underactuated mechanical finger with return actuation

This invention provides a finger with three phalanges and three degrees of freedom for a flexible and versatile mechanical gripper which uses only a limited number of actuators. The finger is robust, can provide large grasping forces and can perform power grasps as well as pinch grasps.

The mechanism used in the finger has an additional mechanism maintaining the last phalanx orthogonal to the palm in order to allow the gripper to perform pinch grasps on objects of different sizes. For purposes of fine control, tactile sensors as well as potentiometers are included in the finger. The mechanical gripper designed using these fingers allows the stable grasping of a wide class of objects while specifying only two coordinates (the force or position for closing the whole finger and the orientation of the finger) for each of the fingers. The mechanical gripper has three fingers and three phalanges per finger. When performing a grasp, the fingers will progressively envelope the object to be grasped and eventually reach a static equilibrium. Underactuation between the fingers of the gripper is also possible.
