Get in Touch: Fabricating a Soft Prosthetic

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Soft robotics is the field of study looking at compliant robotic mechanisms which has promising applications in the field of prosthetics, with current designs in desperate need of lower costs and greater ability in control. This study proposes the design of a soft prosthetic finger as a proof of concept for larger manufacturing settings with a relatively low cost, that actuates pneumatically. Using molds made from cardboard with branching inner channels that when inflated or deflated would cause a change in the shape of the finger. This deformation was measured in the change in the bending angle of the finger and the displacement, or measurement of the change in distance along the axis perpendicular to the length of the finger, and these values were compared to the change in volume of the internal channels of the finger. These measurements did show a strong, positive, linear correlation between the change in volume and the deformation metrics as seen in high R2 values. These values were not very robust though, as each of the total trials showed a decreasing factor of 1.5 to 2 in the amount by which the deformation metrics changes for change in the volume by one cubic centimeter, as yielded by the trendlines for the trials. The design proposed cost less than $50 USD at the time of writing and showed an accessible design which could be used in prosthetic hand systems or grippers.

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1. As a part of this research project, the student directly handled, manipulated, or interacted with (check all that apply):

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4. This project is a continuation of previous research.
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