

Customized Prosthetics by 3D Printing

Information:

Charlie C.L. Wang (c.c.wang@tudelft.nl)

Rob Scharff (r.b.n.scharff@tudelft.nl)

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Introduction

In this project, students will work on the design and fabrication of low-cost robotic hand. This low-cost robotic prosthetic hand aims to replicate advanced functionality for under US\$1,000. The student will focus on using 3D printing techniques (e.g., FDM) to fabricate the well assembled components and how it can be integrated with the sensor and the actuator parts.

One example can be found as the 2nd place of last year's *Make it Wearable* competition of Intel:

<https://www.youtube.com/watch?v=FR1t-SK3Rtw>



(<http://imgur.com/gallery/HBZVyyf>)

Context

The major challenge in this project is to realize a function of shape customization according to scanned model. The cross-parameterization technique [1] and the deformation with standardized components [2] will be adopted in this project to overcome the above challenge with the help of a PhD student as the mentor of the project. This project is part of research taken in the *advanced manufacturing* group in DE department.

Your Assignment

To realize the design and fabrication of 3D printed prosthetic hands and explore the methodology to make a customized hand according to scanned models. For detail information, please contact Rob Scharff or Charlie Wang directly.

References

[1] Tsz-Ho Kwok, Yunbo Zhang, and Charlie C.L. Wang, "Efficient optimization of common base domains for cross-parameterization", *IEEE Transactions on Visualization and Computer Graphics*, vol.18, no.10, pp.1678-1692, October 2012.

[2] Tsz-Ho Kwok, and Charlie C.L. Wang, "Shape optimization for human-centric product with standardized components", *Computer-Aided Design*, vol.52, pp.40-50, July 2014.