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Artificial Intelligence
Laboratory

Optimization of prosthetic finger design
Project type: BSc/MSc Thesis, Collaboration, Semester Project

Description
An increasing volume of research exists regarding upper-limb prosthetics and specifically prosthetic hand designs and implementations. However, the design choices taken are mostly arbitrary and do not take into account the biomechanics of the human hand. We argue that one can identify and exploit a number of optimization criteria already present in the biomechanics of the human hand. Using such criteria to "evolve" and optimize a model of a robotic finger, we can then compare the resulting design with existing ones found in literature for a variety of tasks.

Tasks
You are to use Finite Element Analysis (FEA) software to identify appropriate parameters and fitness criteria you can use for optimization. You will need to perform a mesh convergence study and validate your model against a control. Based on your results an optimized robotic finger structure will then be "evolved" with the potential of creating and testing a hardware prototype.

Applicant
The applicant should be a mechanical engineering student/graduate, with a good background in CAD software (Solidworks preferred) and FEM analysis (ANSYS, ABAQUS, other), with an interest in robotic/prosthetic applications. The thesis is to be written in English.

Supervisor
Your contact for this project is Konstantinos Dermitzakis from the AI Lab Zurich (http://ailab.ch/dermitza). You can best reach him by email (dermitza@ifi.uzh.ch).