3Digity
Algorithms for healthy hands

21. Juli 2022

Student position
Verification Engineer

Title:	**Virtual Testing & Real-World Testing: development of verification tools for medical product certification**
Field:	SOLIDWORKS, CAD Simulation, Engineering, Certification
Position type:	Student position (Internship / Final project, or similar)
Duration:	Flexible, from 10 weeks
Starting from:	Flexible, from October 2022
Location:	ART-Lab, Universitätsmedizin Göttingen (UMG) Göttingen, Germany
Working model:	Flexible, combined remote/presential work
Language:	English (main), German (beneficial)
Contact:	contact@3digity.com

Introduction

Within the context of the *EXIST-Forschungstransfer* program, the 3Digity project aims to develop a "workflow" technology that automatically generates patient-specific finger and hand orthoses, and prepare such technology to enter the medical market. As part of the device configuration, we aim to provide both anatomical fitting and also customization of the mobilization of the finger. The ultimate goal of these features is to make possible creating orthotic devices tailored to the patient in every aspect that might affect the rehabilitation process.

In terms of bringing a medical product to the market, one of the biggest challenges for teams is to achieve the certification of such device. This ensures that the device behaves as expected and that its use does not entail any danger for the patient. Part of this process consist on proving that the mechanical performance of the orthosis suffices for the task. Ensuring that the mechanism can withstand the forces involved in the mobilization of an injured finger is a fundamental aspect that plays a major role throughout the complete development, as it serves as reference for the iterative mechanical design of the product. While the use of finite element analysis techniques (FEA) is standardized, the output of such virtual tests must be verified with real-world tests to determine the suitability of the simulation in this specific context.

Objective

The objective of this position is to simulate different virtual performance tests via Finite Element Analysis (FEA), including designing the simulation study, and verifying the results with real-world tests to determine the suitability of the former as a reference throughout the design process.

In this position, the main topics to be covered are:

- Problem statement and literature review. Suitable performance test/s, closely related to the certification test/s, are to be identified.

- Assessment of FEA within the SOLIDWORKS software, designing and implementing the identified performance test/s within the Simulation package of such tool.
- Generation of data in real-world testing environments for validation of the results obtained in virtual testing.