TECHNISCHE UNIVERSITÄT DRESDEN

Fakultät Maschinenwesen Institut für Mechatronischen Maschinenbau
Professur für Werkzeugmaschinenentwicklung und adaptive Steuerungen

Task for a SHK activity
Hiwi-work on Computer Vision

The use of additive manufacturing processes allows significant cost and efficiency advantages to be realized for the production of individual components in comparison to conventional manufacturing processes. In the transition of additive manufacturing from prototyping to industrial production, the direction-dependent impairment of toughness, impact strength and anisotropy that occurs during 3D printing remains a challenge compared to conventional processes. The aim is to develop a sensor-based system for tomographic in-situ analysis of the material bond between layers of generative FDM processes. A novel and ambitious aspect is the development of a holistic data and workflow management of machine, measurement, process and metadata in a user-friendly software package.
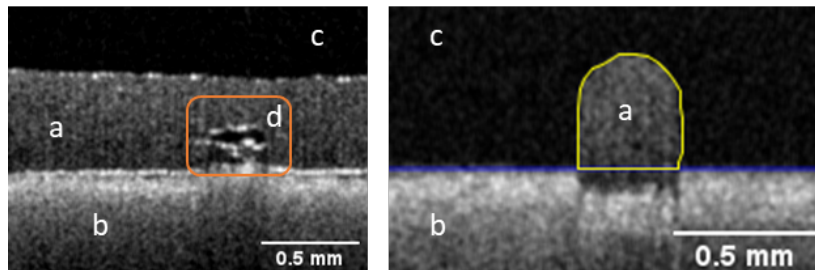
Images: Tomogram of a printed strand with (a) material strand, (b) print bed, (c) air and d) pore inclusion left): as a longitudinal section and right): as a cross-section [Porstmann, 2020]

Required skills of the student

- Programming (Python)
- Basics of image processing
- Basics of machine learning and deep learning
- Basics of Git version management tools and Git online services (GitLab/GitHub)

Main tasks

- Programming of automatic image processing in Python
  - automatic edge detection
  - automatic cutting of images
  - Deriving intensity profiles from the lines of the images
  - Deriving statistical values from the derived intensity profiles
- Creating a simple graphical user interface for selecting the source and parameterizing the analysis steps

Contact person

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**PROFESSUR FÜR
WERKZEUGMASCHINENENTWICKLUNG
UND ADAPTIVE STEUERUNGEN**