Karlsruher Institut für Technologie

Institut für Automation und angewandte Informatik (IAI)

Master's Thesis

Methodology for Flexible Robotic Testing of 3D Printed Components in Self Driving Labs

Self-driving labs (SDL) have become a common paradigm in automating research and development processes in disciplines like biology, chemistry and material science. Similar approaches have been implemented to optimize manufacturing processes and mechanical design. In additive manufacturing, for example, components can be optimized by iterative cycles of printing, testing and predicting printing parameters.
Characterization of components however is mostly limited to standardized mechanical properties and uniform samples. Such setups are difficult to integrate into automated experimental loops and are often unsuitable for testing arbitrary geometries.
To enable more flexible and automated testing in SDLs, new methods for mechanical characterization are required.

This thesis has the goal to develop a methodology for robotic mechanical testing of 3D printed components using collaborative robotic arms. In particular, the work will investigate how mechanical tests can be derived from the geometry and a given load case. Two to four robotic arms will be used to apply controlled forces and moments to the component in order to evaluate its mechanical response.

Does this sound exciting? Then get in touch with us!
We are happy to answer any questions you might have. If you are interested, please send us an email including your current transcript of records and academic CV.

Advisor:
M.Sc. Martin Krüger,
Prof. Dr.-Ing. Markus Reischl

Requirements:
- Basic experience with programming in Python or C++
- Experience or interest in Robotics
- Experience or interest in Additive Manufacturing

Language(s):
German, English

Starting date:
As soon as possible

For more information, please contact:
Martin Krüger
Phone: +49 721 608 23453
E-Mail: martin.krueger2@kit.edu

Institut für Automation und angewandte Informatik (IAI)
Karlsruher Institut für Technologie
Campus Nord
Hermann-von-Helmholtz-Platz 1
76344 Eggenstein-Leopoldshafen