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KI4D4E: Machine Learning Approach for Digital Volume Correlation in 4D Computed Tomography Data at Synchrotron Radiation Beamlines

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The Helmholtz-Zentrum Hereon is operating imaging beamlines for X-ray tomography (P05 IBL, P07 HEMS) for academic and industrial users at the synchrotron radiation source PETRA III at DESY in Hamburg, Germany. The high X-ray flux density and coherence of synchrotron radiation enable high-resolution in situ/operando tomography experiments. Here, large amounts of 4D data are collected from a wide variety of samples, which is challenging to reconstruct, process, and analyze. In this multi-disciplinary project - KI4D4E, we utilize modern machine learning methods for the data processing of synchrotron-radiation tomography experiments, such as micro- and nano-CT simulation, denoising and artifact removal, phase retrieval, and digital volume correlation.
In this talk, we will present the methodologies and challenges to apply state-of-arts machine learning methods to digital volume correlation for the data analysis of biodegradable implant materials based on the high-resolution micro-CT datasets.

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