



# **open\_iA: A Framework for Analyzing Industrial Computed Tomography Data**

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## **Abstract**

The open source software *open\_iA* is presented, which facilitates non-destructive testing tasks such as feature extraction, quantification and visualization involving industrial computed tomography datasets. *open\_iA* provides a general framework for visualizing and processing volumetric datasets, including a 3D view, axis-aligned slicers, as well as a wide variety of image processing algorithms for pre-processing of the data for the subsequent analysis. Pluggable modules provide tailored analysis tools for specific scenarios. In this work the structure of the tool *open\_iA* itself and a selection of its modules are outlined.

## **1. Introduction**

*open\_iA* is a platform for visual analysis and processing of volumetric datasets, with a focus on industrial computed tomography datasets. The main driver behind its original development was to generate a common framework for data analysis pipelines and techniques of the research group Computed Tomography at the University of Applied Sciences Upper Austria, Campus Wels. It now provides a variety of image processing filters, for example for noise reduction, segmentation, datatype conversion, convolution, geometric transformations, morphological operations. It also includes support for cone beam reconstruction via the ASTRA toolbox (1). *open\_iA* is written in C++ using Qt, VTK and ITK, as well as some other open source libraries. *open\_iA* is continuously improved and extended. It is open source and available on GitHub (2). *open\_iA* provides functionality for loading and displaying volumetric datasets in several file formats, as well as support for loading polygonal datasets. A comparison of volumes is facilitated through a magic lens as well as optional position indicators in all open child windows. In addition, it provides a view for showing the image histogram, there also the transfer function used for the slicer views and the 3D renderer is configured.

## **2. Specialized Analysis Modules**

As *open\_iA* is intended as a platform for research prototypes and tools, it is highly extensible through so-called *modules*. These modules can contain anything from simple image processing filters to complex visual analytics tools. *open\_iA* includes many modules containing image processing filters and visual analytics tools for specific analysis scenarios. One such tool for the analysis of the properties of features in fiber-reinforced polymers, the *FeatureScout* (3), can be seen in Figure 1. The poster includes more examples of analysis tools in the *open\_iA* framework.

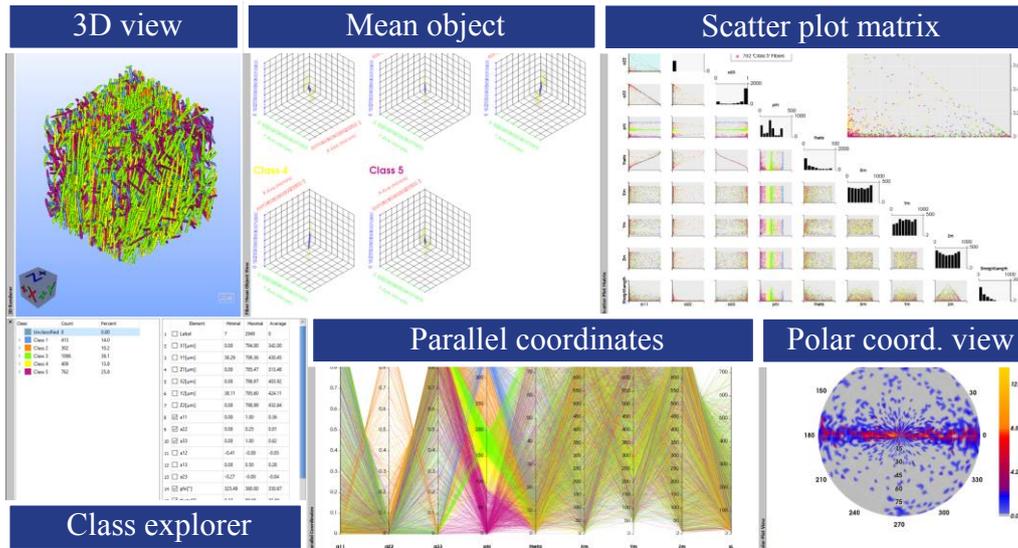


Figure 1: FeatureScout, a visual analysis tool for features in fiber-reinforced polymers.

### 3. Conclusions

The *open\_iA* framework for processing and analysis of datasets acquired through industrial computed tomography was presented. It was shown that the framework is highly extensible and can serve as a basis for a wide variety of modules for different analysis scenarios for industrial computed tomography data.

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### References and footnotes

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