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A web based graphical user interface for X-ray computed tomography imaging

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The high-performance fourth-generation synchrotron radiation light source, e.g., the High Energy Photon Source (HEPS) has been proposed and built successively. The advent of beamlines at fourth-generation synchrotron sources and the advanced detector has made significant progress that push the demand for computing resource at the edge of current workstation capabilities. On the other hand, the vast data volume produced by specific experiments makes it difficult for users to take data away. In this case, on-site data analysis services are necessary both during and after experiments. On top of this, most synchrotron light source has shifted to prolonged remote operation because of the outbreak of a global pandemic, with the need for remote access to the online instrumental system during the experiments.

A data analysis platform with a graphical user interface (GUI) accessible via the browser-based Jupyter notebook framework was developed to address the above requirements. It aims to provide an interactive and user-friendly tool for the analysis of X-ray synchrotron radiation CT data collected during experiments. This platform allows remote access and quick reconstruction of large datasets from synchrotron radiation CT experiments. Various techniques to subtract background, normalize signal, reconstruct slice, and post-process the image have been made available. Through containerization and container orchestration techniques, it allows the platform to operate on heterogeneous and different scale computing resources.

This presentation will describe the design and status of the web-based data analysis platform for the CT imaging beamline of HEPS, as well as the future plan for this platform.

Significance

This paper details the work behind the new solution for data analysis of X-ray synchrotron radiation CT imaging. This platform is the first web-based CT data analysis software according to the existing literature.

References

1.Hu, Y., Li, L., Tian, H.L., Liu, Z.B., Huang, Q.L., Zhang, Y., Hu, H. and Qi, F.Z., 2021b. Daisy:Data analysis integrated software system for x-ray experiments. Epj web conf., 251, p.04020

Experiment context, if any

High Energy Photon Source (HEPS)

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Session Classification: Poster session with coffee break

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