Abstract: Joint Imaging Platform for Federated Clinical Data Analytics

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Image analysis is one of the most promising applications of artificial intelligence (AI) in healthcare, potentially improving prediction, diagnosis and treatment of diseases. While scientific advances in this area critically depend on the accessibility of large-volume and high-quality data, sharing data between institutions faces various ethical and legal constraints as well as organizational and technical obstacles. The Joint Imaging Platform (JIP) of the German Cancer Consortium (DKTK) addresses these issues by providing federated data analysis technology in a secure and compliant way [1]. Using the JIP, medical image data remains in the originator institutions, but analysis and AI algorithms are shared and jointly used. Common standards and interfaces to local systems ensure permanent data sovereignty of participating institutions. The JIP is established in the radiology and nuclear medicine departments of 10 university hospitals in Germany (DKTK partner sites). In multiple complementary use cases we show that the platform fulfills all relevant requirements to serve as a foundation for multicenter medical imaging trials and research on large cohorts: the harmonization and integration of data, interactive analysis, automatic analysis, federated machine learning as well as extensibility and maintenance processes, which are elementary for the sustainability of such a platform. The results demonstrate the feasibility of employing the JIP as a federated data analytics platform in heterogeneous clinical IT and software landscapes, solving an important bottleneck for the application of AI to large-scale clinical imaging data.

References

1. Scherer J, Nolden M, Kleesiek J, et al. Joint imaging platform for federated clinical data analytics. JCO Clinical Cancer Informatics. 2020;(4):1027–1038.