

Lighthouse Group – AI & Bioinformatics

The Lighthouse Project builds up a Competence Unit for federated AI-Modelling & Bioinformatics Analysis (KIBCU). We establish IT infrastructures and methodological competencies to leverage the value of the distributed oncological data treasures.

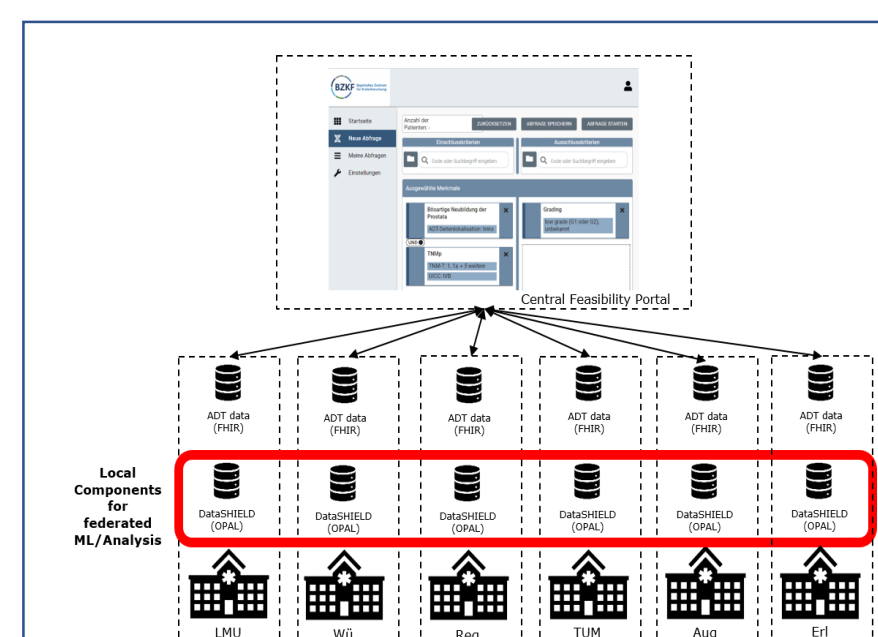
Speaker: Prof. Dr. Hans-Ulrich Prokosch, Erlangen

Concept & Achievements

BZKF IT Strategy

The BZKF IT strategy builds on concepts from the German Medical Informatics Initiative aiming at keeping real world data (documented during patient care processes) locally at the university hospitals and bringing analysis to the data (federated analysis and federated machine learning). Thus, we closely cooperate with the data integration centers (DIC) already established at the six BZKF sites and the standardized FHIR data on patient diagnosis, procedures, laboratory results and medication. In order to enhance and broaden those data stores different IT subprojects have been initiated in the BZKF:

- » **Real World Oncology Data Integration Platform**
- » **IT support for Molecular Tumor Boards**
- » **Structured Radiology Reports**



KIBCU Concept & Workpackages

- Build up **technical infrastructure** (DataSHIELD, Joint Imaging Platform (JIP)) for federated Machine Learning at all BZKF sites ✓
- **Transfer data** from DIC FHIR servers into the DataSHIELD environment ✓
- **Cooperate with BZKF study groups:** Evaluate needs for bioinformatics analysis and AI development support ✓ (ongoing)
- **Building up a knowledge base** for federated machine learning ✓ (step 1: Summer School)

Achievements:

1. Local **IT infrastructures** (DataSHIELD) for federated machine learning and analysis have been **successfully established**
2. Erlangen has developed a **data transfer, pseudonymisation and mapping routine** to bring basic oncology data from DIC FHIR server into DataSHIELD DB; this routine was provided to all BZKF sites
3. **Basic oncology data** from tumor registry **loaded** into DataSHIELD in three sites; other sites will load data until October 2023; further data types (e.g. molecular data, image information) and JIP implementation will be added in 2024
4. Continuous **contact with BZKF study groups** (e.g. concept presentation, requirements survey) has been established
5. **Establish expertise:**
Summer School - 21 participants
 - DataSHIELD theory and practical exercises
 - Personal Health Train (PrivateAIM)
 - JIP, Cecilia, EasySMPC, ...
6. Excellent **exchange and connection with other German experts** in federated Machine Learning established



Future Milestones

- » **Establish a governance structure for data use and data sharing attuned with the BZKF directorium**
- » **Data quality analysis and continuous feedback for data improvement**
- » **Support study groups and medical researchers in bioinformatics analysis and AI developments**
- » **Pursue federated AI model developments and analysis based on the established infrastructure**
- » **Develop new algorithms for federated machine learning on various data types**
- » **Continuous BZKF wide education and training in federated machine learning methodologies**

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