From patient data to use cases of health AI application and integration

Von Patientendaten bis hin zu Anwendungsfällen für den Einsatz und die Integration von KI im Gesundheitswesen

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Editorial

This special issue combines six papers that were submitted to the joint ISCB and GMDS conference 2026 in Freiburg [1] and got accepted in the combined review process for the conference plus the MIBE journal. Following the conference theme “BIG DATA, small data, Your Data – transitions in the age of biomedical AI” one paper addresses health data modelling that allows for technical, syntactic and semantic data re-usability. The other five papers focus on the application of AI methods and their integration to support patient care and research use cases.

The study of Elgert et al. [2] shows that health data modelling for improved interoperability requires a thorough strategic model planning and implementation that cover the entire data lifecycle including data re-use. Profound domain and standards knowledge supported by guidelines such as eHealth European Interoperability Framework (ReEIF) could aid project planners and data stewards the authors argue.

While patient data re-usage plays an undoubted role in AI model training, AI model application needs to be explored and evaluated to demonstrate its feasibility and the conditions under which AI applications can work properly.

Reichenpfader and Dennstädt [3] tested Semantic Retrieval-Augmented Translation (S-RAT) for translating clinical texts from radiology. The ontology-guided framework applied in the study made use of concept retrieval from the Unified Medical Language System (UMLS) and SNOMED CT to improve large language model prompts. The authors conclude that S-RAT demonstrated the potential as a locally deployed, privacy preserving methodology given the multilingual limitations of the ontologies integrated were overcome.

Diaz [4] explored the feasibility of coding texts for qualitative data analysis with the help of ChatGPT employing prompting strategies of increasing complexity. She found the less structured the text was the better more complex prompting performed. She recommended a combination of AI-based and classical tools to achieve the best results.

Yüzüncüoglu and co-authors [5] developed an information extraction pipeline for unstructured documentation of liver cancer cases to support decision making in tumour board discussions. The performance of rule-based methods (regular expressions), transformer-based models, and an exploratory large language model (LLM) were contrasted. The findings hint at a hybrid approach – so the authors – combining transformer-based and rule-based methods to yield the best results.

Pelka and colleagues presented results from two studies on integrating AI into clinical workflows. In the first study, Pelka, Kamzol and colleagues [6] employed two different methods to mediate between heterogeneous clinical PACS implementations and federated AI services. Tested in a clinical environment, they concluded that a mediation layer integrating standards was necessary to bridge the gap between the different systems sufficiently well. Addressing the need for transparency and traceability according to the EU AI Act, Pelka, Eil and colleagues [7] tested the Open Medical Inference (OMI) Gateway for FHIR and DICOM environments to connect with AI inference backends. They argued that the OMI integrated governance mechanism and the audit trail generated via the FHIR based validation pipeline provide an AI Act compatible infrastructure for medical AI inference.

These studies highlight the opportunities, conditions and current limitations of approaches harnessing AI to improve patient care and research. While technical barriers still need to be overcome, questions on tangible benefits for

patients and healthcare providers remain to be investigated.

Note

Competing interests

The author declares that she has no competing interests.

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