

Semantic Foundations for Digital Health

Summary

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Supervisors: Prof. Dr. Stefan Schulz
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Availability: This position is available.

Offered by: Medical University of Graz

Application deadline: Applications are accepted between March 24, 2021 00:00 and May 05, 2021 23:59 (Europe/Zurich)

Description

Background:

PGHD – Patient-Generated Health Data for health care and research is in a promising and expanding stage [1].

DH-Convener is a project that aims to integrate PGHD with the Austrian electronic health record (ELGA) [2]. This interoperability is a prerequisite for the digital innovations envisioned for future trends in health care. In May 2020, the LBI-DHP participated and won with the DH-Convener concept in the Nexus Digital Health Innovation Challenge, under the use case "Dealing with future health data organization" [3]. This national competition was organized by the Federal Ministry for Climate Protection, Environment, Energy, Mobility, Innovation, and Technology (BMK).

Hypothesis and Objectives:

In the framework of DH-Convener, the supervisors will collaborate with the CBmed Center for Biomarker Research to hire a PhD student for building the required interoperability modules at a semantic level. Ultimately, the DH-Convener project aims to provide interoperability and privacy as a service, to:

- connect digital health services, through integrating PGHD with electronic health records
- support delivery of integrated care, through supporting clinical care along with mobile health and wellness services
- exchange data with global and public health registries, through participating in global epidemic control and surveillance programs

Methodology:

The PhD student will be involved in investigating the semantic foundations of the state of the art of PGHD interoperability. The PhD student will focus on the interoperability frameworks. To overcome the identified problems, the student will utilize current technologies that force interoperability in addition to existing technical infrastructure, as follows:

- Terminology standards (SNOMED CT and LOINC) [4]
- German-language Interface Terminologies linked to standard terminologies [5]
- Biomedical Ontologies and Upper-level models [6]
- Clinical information models: Health Level 7 (HL7) Fast Healthcare Interoperability Resources (FHIR) [7]
- The Austrian Personalised Electronic Health Record (ELGA) [8]

Finally, the lessons learned on addressing existing gaps of semantic interoperability of health data exchange will be communicated with the health informatics bodies and researchers for further consideration.

References:

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3. Deloitte Insights Forces of Change - The future of health | Life Science and Health | Deloitte [Internet]. Available from: <https://www2.deloitte.com/us/en/insights/industry/health-care/forces-of-change-health-care.html>
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5. Schulz S, Rodrigues JM, Rector A, Chute CG. Interface Terminologies, Reference Terminologies and Aggregation Terminologies: A Strategy for Better Integration. *Stud Health Technol Inform.* 2017;245:940-944. PMID: 29295238.
6. Schulz S, Jansen L. Formal ontologies in biomedical knowledge representation. *Yearb Med Inform.* 2013;8:132-46. PMID: 23974561.
7. Saripalle R, Runyan C, Russell M. Using HL7 FHIR to achieve interoperability in patient health record. *J Biomed Inform.* 2019 Jun;94:103188. doi: 10.1016/j.jbi.2019.103188. Epub 2019 May 4. PMID: 31063828.
8. Dorda W, Duftschmid G, Gerhold L, Gall W, Gambal J. Introducing the electronic health record in austria. *Stud Health Technol Inform.* 2005;116:119-24. PMID: 16160246.



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