

Harmonizing Microneurography Metadata with Local Data Hubs: A Concept

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Abstract. This work aims to improve FAIR-ness of the microneurography research by integrating the local (meta)data to existing research data infrastructures. In the previous work, we developed an odML based solution for local metadata storage of microneurography data. However, this solution is limited to a narrow community. As a next step, we propose the integration into the Local Data Hubs, data-sharing services within NFDI4Health infrastructure. We outline a first concept, that streams chosen data from the established odMLtables GUI.

Keywords. FAIR, microneurography, odML, local data hubs, metadata, biosignals

1. Introduction

In the past years, our team has established a FAIR local data infrastructure for microneurography data [1]. Microneurography is an electrophysiology method to study peripheral nerve activity in awake humans, critical in pain and itch research [2]. The Local Data Hubs (LDH) [3] were founded within the framework of NFDI4Health, an important German initiative for data infrastructure development, to establish a FAIR data sharing structure for healthcare and can be used efficiently for external data sharing. However, the process of transferring the data can be cumbersome, particularly under the condition of ongoing research and frequent needs for updates. Hence, there is a need for a solution, which can collaborate with the existing odMLtables [1, 4] GUI on a controlled and anonymized export to the LDH infrastructure.

2. Methods

Firstly, we did a requirements analysis of the workflow for the data owners and data seekers, via an interview with two experts. Next, we reviewed the data model at the core

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of the LDH. Based on the results, an initial workflow for metadata sharing and searching via the LDH was conceptualized.

3. Results

The resulting requirements put a strong emphasis on integrating the workflow for the data owner as in the already established odMLtables GUI and giving maximal control on choosing the parts of the information for sharing. For the seekers, a structured overview and data viewing within the LDH interface were important. Based on this feedback, we proposed a concept for sharing microneurography metadata, where the user can perform all steps comfortably from the GUI. The extension will allow: a) to choose the appropriate access type, b) to fill in the structured descriptive information, c) to select the odML fields to publish for the defined recipient group d) to create a overview table from the chosen odML subset, e) to upload to the LDH.

On the side of LDH, the descriptive information will match the structure of *Project*, *Study*, or *Investigation*. The GUI will support its optimal choice, creation, and editing. The data owner may upload the selected fields of the tables in odML format using the existing *DataFile* structure of the LDHs. The upload of an anonymized raw signal data in NIX format [5] can be added as an additional feature. To facilitate the search, text will be generated from the odML overview table and published in the free-text fields of related LDH entities of all layers. Also, the odML overview table, it will be published as a *DataFile*, and will be viewable and searchable in the LDHs web interface.

4. Discussion and Conclusion

Based on the requirements from medical partners, we propose a concept for a harmonization process between microneurography metadata and sharing nodes hosted via the LDHs. The concept is in further development as an open-source Python package² and will be extended to further biosignal data use cases.

References

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² [nfdi4health/odmltables-for-ldh](https://nfdi4health.github.io/odmltables-for-ldh/): GMDS paper (github.com)