SAMPLE INDEX AND COLLECTIONLOCATOR

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INTRODUCTION

To provide material and data to researchers efficiently, biobanks have to implement means of searching for collections that contain the data needed for research.

The problem with such a search is that

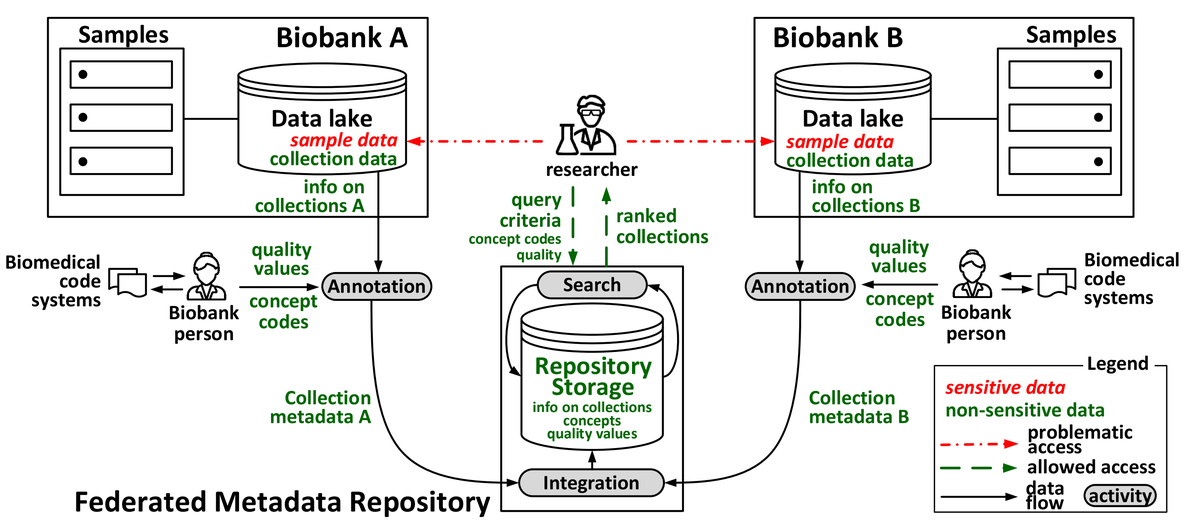
1. The sources of data in biobanks are heterogeneous - so no common schema is available
2. General direct access to the sample data impossible due to privacy restrictions.

The privacy problem leads to the following consequences:

- there is no publicly available central repository to perform biobank search taking into account privacy restrictions
- so the researchers could encounter problems with finding the resources they need to conduct their work.

CONCEPT

The proposed solution is to search in a **central repository of collection metadata** augmented with indexes. This search returns collections meeting certain metadata-based criteria.



COLLECTIONLOCATOR ARCHITECTURE

Goal: supporting the search for suitable collections within indexes consisting of

- **preprocessed non-sensitive data** (anonymized, aggregated data)
- **collection metadata** (quality values, concept identifiers).

The tool architecture contains:

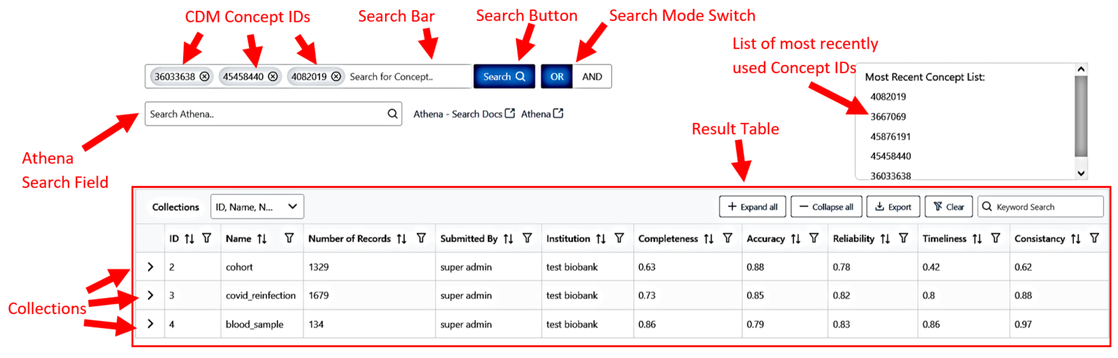
1. **The data anonymization component** converting the biobank data into a non-sensitive form
2. **The means for annotating collections** with semantic concepts and quality values
3. **The repository storage component** holding preprocessed non-sensitive data and collection metadata, namely semantic concepts and quality values
4. **The search component** running queries against the repository and returning requested collections.

COLLECTIONLOCATOR USER INTERFACE

Search Functionality: The tool user interface supports the following search modes:

- Search for collections annotated with certain LOINC (later generalized as OMOP CDM) concepts
- Search for collections possessing specific values for aggregated and anonymized data
- Search for collections possessing specific quality values

The solution was validated with data from the BBMRI Colorectal Cancer Cohort.



DISCUSSION

Compliance with the accessibility principle for biobank data:

- By offering the possibility to search within non-sensitive data and metadata when the original data is not accessible.

Novelty of the tool:

- Support for semantic data annotation together with its quality-based annotation, aggregation and anonymization
- As a result, the central repository can offer rather fine grain information about collections and their associated data sets without any potential compromise of the privacy of the donors.
- Complements BBMRI tools Directory and Sample Locator, Sample Finder

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REFERENCES

1. Eder, J., Shekhovtsov, V.A. Managing the quality of data and metadata for biobanks. In FDSE 2022. CCIS, vol. 1688, Springer, 2022, pp. 52-69.
2. Shekhovtsov, V.A., Eder, J. Metadata quality for biobanks. *Applied Sciences.* 12(19), 2022, 9578.
3. Shekhovtsov, V.A., Eder, J. Data item quality for biobanks. *Trans. on Large-Scale Data-and Knowledge-Centered Systems* L. LNCS. vol. 12930, 2021, pp. 77–115.
4. Eder, J., Shekhovtsov, V.A. Data quality for federated medical data lakes. *International Journal of Web Information Systems*. 17(5), 2021, 407-426.
5. Eder, J., Shekhovtsov, V.A. Data quality for medical data lakelands. In: FDSE 2020. LNCS, vol. 12466, Springer, 2020, pp. 28–43.
6. Eder, J., Dabringer, C., Schicho, M., & Stark, K. Information systems for federated biobanks. *TLDKS I*, LNCS, 2009, pp. 156-190.

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