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BRAVa: improving the quality of RIAP data through automated validation

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Introduction

The quality of data is a key issue for any healthcare registry. RIAP data, about the surgeries of hip, knee, shoulder and ankle, is described by a set of variables (MDS – Minimum Data Set), each one with its own domain and dependencies from other variables (business rules). High-quality data relies on records whose values respect both the domain and the business rules for the variables. BRAVa (Business Rules Automatic Validator) is a service that automatically applies the required validity checks to data and generates detailed reports to allow detection of quality issues.

Materials and Methods

BRAVa validates registry data against its XML schemas and content-specific rules as soon as it is collected in XML format from the sources. Content-specific rules describe domains and business rules for variables in each record. Records are checked for both syntactic and semantic correctness and a report containing all anomalies found is output. The report allows detection and resolution of quality issues to ensure that all further data processing steps rely on correct data.

Results

Preliminary tests on RNPM (National Breast Implants Registry) data allowed to correct many (~800) incoherently collected records, while tests carried on RIAP data allowed to improve the quality of machine learning models by training them with better data.

Discussion/Conclusion

BRAVa is implemented as a web service and is a key component in the new microservice-based architecture behind the quality-oriented data collection platform we are developing. In future, BRAVa will also support development of external data-collection systems.

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