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Proposal of an Architecture for Terminology Management in a Research Project

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Abstract. Clinical and medical knowledge evolve and this causes changes in concepts and terms that describe them. The objective of this work is to formally present an ontology-based standard architecture that will be used in the scenario of neurodegeneration research to maintain terminologies and their relations updated and coherent over the time. The proposed structure is composed by three elements that will allow the user to do a list of operations on the terminology resources explicitly contemplated by the *Common Terminology Service Release 2* (CTS2).

Keywords. CTS2, ontologies harmonization.

1. Introduction

As in all scientific domains, clinical and medical knowledge evolve over time. In a scenario of multiscale and multimodal data integration it is mandatory to use shared semantics because of the need to deal with heterogeneous datasets [1]. In order to correctly manage this type of semantic framework, it is important to consider that the medical knowledge evolution causes the change of concepts and of the terms used to define them. For this reason, it is necessary to manage historical evolution and versioning [2]. So, in the scenario of collaboration projects, it is essential to use both controlled vocabularies and standard infrastructures to guarantee both high-quality data collection and interoperability between partners.

2. Methods

As defined in [3], ontologies have been originally developed from the need to represent and to communicate a domain's knowledge unambiguously. As the project is linked to neurodegeneration research, a group of specific ontologies have been selected. This will not only guarantee the correct dialogue between homogeneous datasets, but it will also support the information extraction workflows for "cause-and-effect"-type relationships. Ontologies are not isolated; indeed, it is possible to define links between them in a process of ontologies harmonization. The four ways to reach this goal are: matching, mapping, alignment and merging. In the context of this work, it will be

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necessary to guarantee the correct mapping between the ontologies. As detailed in [4], the objective of CTS2 is to provide technical and functional specifications for the development of service interfaces based on the *Service Oriented Architecture* (SOA) that allow the management, search and reading of terminological content defined both locally and internationally. The CTS2 standard provides a list of terminology resources and, for each of them, a list of functional profiles has been defined.

3. Results

The proposed architecture is composed by three elements: a relational database, where all the ontologies and information about them will be stored (already developed and not part of this project); a CTS2 compliant Windows Communication Foundation (WCF) service whose interface exposes all the operation contracts expected by the CTS2 standard (already developed and not part of this project); a CTS2 compliant web application, client of the WCF service. This web platform will give the user the possibility to easily use the functionalities of the CTS2 compliant Service, for example: create, update, delete a terminology resource; read a terminology resource in a specific context; search the terminology resources with specific features in a certain context and get the list of all the changes applied to a particular terminology resource. Moreover, the use of controlled vocabularies, defined in different countries, will help the data extraction and integration from different sources containing notes, reports and referrals written in the original languages of the countries involved in the present project.

4. Discussion & Conclusions

The proposed architecture allows the correct management of mappings between different ontologies over the time and to monitor the evolution of a terminology resource through different versions. Future works will be the development of the web application cited above and the possibility of using a non-SQL database instead of a relational one.

Acknowledgements

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