Enhanced Concept Selection Using SNOMED CT Primitives

Ryan Butcher, MS, Ramkiran Gouripeddi, MS, MBBS, Julio C. Facelli, PhD, University Of Utah, Salt Lake City UT

Audience

Clinical researchers and informaticists that desire to affirm the validity of selected concepts for their use cases as well as have additional relevant terms highlighted so that the user can include them if desired.

Objectives

To demonstrate the usefulness of analysing SNOMED CT concept primitives when selecting concepts for data source query criteria.

Abstract

Searching for desired data in heterogeneous data sources is challenging due to the semantic variations of clinical concepts. In general, any clinical representation needs to support inheritance [1]. For example, a disorder of a heart valve is a disorder of the heart; a fracture of the Tibial plateau is a fracture of the tibia etc. With this pattern in mind, the primitive roles and associated relationships can be analysed by an algorithm to validate that the concepts selected have the desired elements. In the case of a heart valve disorder, the concept "Heart valve stenosis (disorder)" contains a primitive element of "Cardiac valve structure (body structure)", which in turn contains a primitive role to "Chronic rheumatic valvulitis" which can be characterized by stenosis and/or regurgitation. Continued analysis of the primitives of "Chronic rheumatic valvulitis" by the algorithm may suggest that concepts related to Streptococcus pyogenes infection may also be relevant to the researchers query.

The University Of Utah plans to put this approach into practice with the Federated Utah Research and Translational Health electronic Repository (FURTHeR)[2]. The FURTHeR software is used to submit federated queries using standards based search terms to disparate data sources. A proposed new user interface will leverage the intelligent concept searching described when the researcher is selecting the concepts to build the desired federated query.

SNOMED CT concepts contain a vast amount of information by the nature of their relationships to each other concepts and primitive roles. Developing an algorithm that can tap into the usefulness of these concept connections, as well as an intuitive user interface, can help users in assess the relevancy of the concepts they choose as well as suggest other concepts that the user may not have considered beforehand.

References

1. Rector AL, Brandt S. Why Do It the Hard Way? The Case for an Expressive Description Logic for SNOMED. Journal of the American Medical Informatics Association. 2008;15(6):744–751. doi: 10.1197/jamia.M2797. http://jamia.bmj.com/content/15/6/744.abstract
2. Livne OE, Schultz ND, Narus SP. Federated querying architecture for clinical & translational health IT. In Veinot T (Ed.), IHI '10: 1st ACM International Health Informatics Symposium, Washington, D.C.: ACM, 250-6.