An Enterprise “Problem Picker” for Capturing Clinical Problem Data

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When not captured at the point-of-care, data generated by health care providers is generally lost to the enterprise for the purpose of aggregate analysis. At the Beth Israel Deaconess Medical Center, approximately 60% of ambulatory diagnoses are capturable via a dictionary of 1270 terms; an additional 8% would be capturable if UMLS was used as the terminology reference.1 Unfortunately, the OMR (Online Medical Record System) problem dictionary has several notable deficiencies in that 1) it is a local product which does not benefit from emerging shareable terminologies; 2) it was not implemented in a principled manner so that maintenance and updates are difficult to perform; 3) it is embedded in an M-based legacy system and can not provide services to an increasing number of external applications and external systems.

We and other informatics laboratories have collaborated with Lexical Technology Inc. in the development of the Metaphrase Toolkit, which provides general terminology services based on the UMLS knowledge sources.2 Using the Metaphrase Toolkit, we have been developing a set of components including a “Problem Picker” to serve as a universal user interface for capturing clinical problems within a number of systems.

SYSTEM DESCRIPTION

The Problem Picker is currently implemented as a Java applet which communicates with the web-server-based Metaphrase terminology server over HTTP. The applet has been designed to be platform-independent in order to be compatible with a variety of external applications and systems. On top of Metaphrase, we have added “clinical problem specific” functionality, such as the filtering of terms not considered to be clinical problem terms or relations not leading to other clinical problems. Additionally, we have implemented other components that work in conjunction with the Problem Picker to implement a complete Problem List subsystem. The Problem List subsystem is comprised of separable components that can be separately reused as desired by other applications.

The goal of the Problem Picker interface is to create an appropriate “semantic neighborhood” for a given search term in order to maximize the likelihood that a desired problem term can be found within a few clicks of the original query. Currently, the interface uses a tree metaphor in order to display parents, children, synonyms, and relevant relationships stemming from the search term. Definitions, if available in UMLS, can be displayed if desired. A UMLS concept identifier (CUI) is returned to calling applications.

The quality of the Problem Picker interface is very dependent on the richness of the lexicon and relationships contained in the Metathesaurus. We have completed an initial integration of the OMR problem dictionary as a new, local UMLS vocabulary source (B196), and have begun to add clinical relationships which are generally absent in UMLS. Future work on the interface will include guidance to locally preferred problem labels as well as “most specific” problem labels in order to enhance the capture of high-fidelity, finely granular clinical data.

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