

Using a New Object Oriented Expression Language (GELLO) to Encode Arden Syntax's Medical Logic Modules

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Background

The Decision Support Technical Committee of HL7 is creating standards to facilitate implementation of clinical guidelines. One of the specifications being developed is that for a Virtual Medical Record (VMR)¹. A standard for a VMR would provide an interface that decision support tools could use to access patient data in a standard manner. This would address the problem of platform-specific encoding for accessing patient data in Arden Syntax's Medical Logic Modules (MLMs)². This is also referred to as the "curly braces" problem. The VMR specification is being implemented as a refinement of HL7's Reference

Information Model (RIM). The RIM is an object-oriented data model that describes health care data and relationships among the data. In comparison to the object-oriented model of the RIM, the data model implicit in Arden Syntax is simpler, and its logic grammar is not compatible with the RIM and the VMR.

In our previous work on the GLIF guideline model, an expression language, GEL, was developed in an effort to reconcile incompatibilities between the data models of Arden Syntax and the HL7 RIM³. However, it became evident that a move to a full-fledged object-oriented language would be necessary. To further the harmonization with ongoing HL7 efforts, an object-oriented expression language was developed - GELLO. This language is fully compatible with the HL7 RIM. It supports complex data structures as well as basic types. It also allows methods to be associated with classes in addition to attributes.

This object-oriented language provides the flexibility and extensibility that are needed for implementation of a broad range of applications. In addition to support for logical and temporal expressions, GELLO provides query language features that support retrieval of data from the VMR.

Methods

The aim of our study was to assess the adequacy of GELLO for encoding Arden Syntax's MLMs. We encoded the data and knowledge slots of 12 MLMs that we obtained from Columbia Presbyterian Medical Center's online MLMs library. For purposes of this experiment, we used the UMLS metathesaurus to resolve

terms, because of ease of access. We recognize that rather than the UMLS, its source vocabularies are more widely used for coding clinical data.

Results

We have found that GELLO could be used for encoding queries, expressions and statements in Arden Syntax's MLM data and knowledge slots. Definitions of a few classes in GELLO had to be modified. While we could encode much of the platform-specific code in the data slot as queries in GELLO, in some instances this could not be done because of limitations of the VMR. For example, an MLM for NSAID (Non Steroidal Anti Inflammatory Drug) and Renal Failure checked whether previous alerts for the same condition and patient had been sent. The current VMR specification does not contain concrete classes for representing alerts.

Discussion

The process enabled us to determine the necessary modifications and adjustments that were needed in GELLO and to identify some properties that would be required in a VMR that facilitates encoding of the data and knowledge slots.

We conclude that GELLO may be used to reconcile the incompatibilities between Arden Syntax and the HL7 RIM. Based upon these findings we intend to further refine GELLO so it can serve as a bridge between the HL7 RIM and other systems in order to enable sharing of guidelines and medical rules.

References

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