GELLO: An Object-Oriented Query and Expression Language for Clinical Decision Support

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ABSTRACT

GELLO is a purpose-specific, object-oriented (OO) query and expression language [1]. GELLO is the result of a concerted effort of the Decision Systems Group (DSG) working with the HL7 Clinical Decision Support Technical Committee (CDSTC) to provide the HL7 community with a common format for data encoding and manipulation. GELLO will soon be submitted for ballot to the HL7 CDSTC for consideration as a standard.

DESCRIPTION

Decision support in clinical systems is often expressed in terms of rules, e.g., in alerts or reminders, in guidelines, in order entry, in adverse event monitoring, in form-based data entry. GELLO is the expression language we developed for GLIF [2] as part of the InterMed project. Because of the ubiquity of the need for a means to carry out query and evaluate expressions, not only in GLIF but in other guideline modeling environments as well as other decision support activities, we have been working with the HL7 Clinical Decision Support Technical Committee (CDSTC) to refine GELLO to meet a variety of needs that would enable it to be considered for standardization. Because this process is now underway, we report here on the design of GELLO.

The query language has been designed in the context of a guideline execution model proposed in the HL7 DSTC. This model proposes the use of a virtual medical record (vMR) [1] that provides a standard interface to heterogeneous medical record systems. The vMR model is derived from the HL7 RIM. While the query language does not depend on the specific classes or tables in the vMR, it does rely on the general framework of an OO data model, and GELLO provides platform-independent support for mapping to an OO data model. Therefore, in combination with the vMR it eliminates the need for curly braces (as used in Arden Syntax [4]) or other implementation-specific encoding methods for information retrieval as part of the decision support specification. It simplifies the creation and updating of clinical data objects, and their evaluation, and facilitates sharing of decision logic and other computer expressions.

The expression language can be used for specifying decision criteria, and abstracting or deriving summary values. The object-oriented approach for the language has the *flexibility* and *extensibility* that is needed for implementation in a broad range of applications. The expression language is strongly typed and object-oriented. In order to facilitate the process of encoding and evaluation of expressions and more importantly, to maximize the *sharability* of such queries and expressions, GELLO provides basic built-in data types, while providing the necessary mechanisms to access an underlying data model with all its associated classes and methods. This is especially important in enabling guidelines to successfully support different data models, as classes and relationships specified could vary from one data model to another. GELLO is based on the Object Constraint Language (OCL) from the Object Management Group [1].

Future work will be devoted to implementation of a parser, an interpreter, and a user interface design tool for authoring and editing of GELLO queries and expressions.

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