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GELLO – A Practical Implementation through the Application of Real World Examples

Peter R. Tattam [a], Andrew McIntyre [b]

[a] *Medical-Objects Pty Ltd, Hobart, Tasmania, Australia,*
[b] *Medical-Objects Pty Ltd, Buderim, Queensland, Australia*

Abstract and objective

The computing language GELLO has been designed by the HL7 community as a standardized way of expressing complex clinical data queries, yet few implementations exist publicly to explore the practical aspects of such a language and its application towards real clinical information systems. We present a GELLO language implementation and detail the challenges and obstacles encountered without a reference implementation of the language or many suitable real examples of GELLO usage available. The compiler was developed as a component in a GLIF guideline for the treatment of Lymphoma. We conclude that GELLO is a language worthy of use by the medical information community and that effective development of the language through the active implementation of practical examples will allow it to achieve its full potential.

Keywords:
GELLO, GLIF, ARDEN, vEMR, USAM, CDS

Introduction

As part of a project to build advanced decision support and registry reporting tools for the treatment of Lymphoma a decision was made to use GELLO encoded logic. It was originally envisaged that Arden would be the vehicle, however further investigation suggested that GELLO would be a better candidate to evaluate the clinical data to assist relevant decisions, in particular its rich querying facilities. We set about to implement what we believe to be one of the first practical implementations of GELLO worldwide.

Methods

For our compiler tools, we used a standard LALR(1) parser embedded within an existing HL7 V2 framework written in the Delphi programming language. A vEMR (Virtual Electronic Medical Record) interface to the existing data was written as part of the project. The lack of any available implementations of GELLO to refer to required us to work directly from the latest GELLO and HL7 specifications. As GELLO is a work in progress, some changes were required to aspects of the formal grammar. Since GELLO is based on OCLv2 we referred back to the OCLv2 specifications to clarify some of the finer points. We made cosmetic changes to the lexical rules of the grammar, allowing for either " or ' as a string delimiter, and allowing tokens to be case-insensitive. Other changes made comprised of minor syntactic changes to the language. The LET statement and other similar constructs were extended to make the type of the variable optional since in most cases the type of the expression can be inferred. The grammar was reworked to resolve ambiguities in the IF-THEN-ELSE-ENDIF constructs of the original GELLO grammar by introducing a Block construct comprising of a list of Declaratives followed by a final GELLO expression, and also reworking the IF statement to contain a Block rather than a Statement. Other minor extensions included allowing for the final GELLO expression to be optional, and fleshing out several incomplete syntactic structures in the original GELLO specification. We have also progressed with further extensions to the GELLO grammar such as class and type definitions to facilitate building standard GELLO libraries, however these are subject to further research and fall outside the scope of the current GELLO project. The accompanying GELLO grammar as implemented provides a concise record of our current implementation.

Conclusion

GELLO is a powerful decision support tool capable of supporting highly complex querying of medical data in a very concise but readable manner. Its application to decision support is highly productive and with the relevant necessary extensions for practical use, we believe that is entirely suitable to the purpose for which it is designed.

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