Generating RELAX-NG Schemas for Radiology Reporting Templates

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Abstract

The objective of this work is to develop RELAX-NG schemas for representing radiology report templates that can be used in creation and validation of XML-encoded structured radiology reports.

Keywords:

RELAX-NG, Radiology, Structured Reporting

Introduction

Structured reporting (SR) allows radiology report information to be recorded so that it can be retrieved and reused for quality improvement, clinical research, and education. Several radiology societies have undertaken an effort to identify and promote "best practices" reporting templates to provide predefined formats and terms for creating structured reports. A structured radiology report, ideally, is divided into meaningful, consistently ordered sections and contains standardized language [1, 2].

We sought to employ a knowledge representation for SR that is based on open, standardized web technologies such as XML. The contents of report templates can be expressed using one of the numerous XML schema languages. After comparing the most popular schema languages, we selected the "Regular Languages for XML – Next Generation" (RELAX-NG) XML-based schema language for transformation of report templates. RELAX-NG has several advantages such as limited complexity, ease of use, and flexibility. RELAX-NG is a World Wide Web Consortium standard.

Methods

Report templates were encoded manually into RELAX-NG. A semi-automated tool was used to discover and encode terms from the RSNA RadLex® ontology of radiology concepts. During the phase of transformation and validation the oXygen XML Editor v10.3 was used. Final schemas were reviewed and approved by a small group of radiologists and imaging informatics experts. Figure 1 shows a graphical illustration of the RELAX-NG encoding of a reporting template.

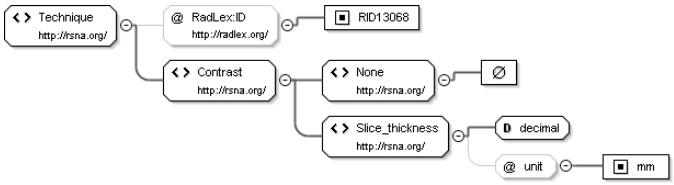

Figure 1-Graphical illustration of part of a RELAX-NG report template schema.

Results

Seventy RELAX NG radiology report templates were created and validated. All of the templates were added to a report template library (currently under development) for future retrieval and use.

Conclusion

The RELAX-NG platform provides the needed flexibility and expressive power to model reporting templates successfully. The report templates serve as a basis for XML-based reporting to allow interoperability among vendors and incorporate standardized lexicons such as RadLex and SNOMED-CT. XML-based methods and applications have the potential to promote development of radiology reporting systems. Efforts are underway to integrate this XML-based approach with the HL7 Clinical Document Architecture (CDA), which also is based on XML. RELAX-NG also serves as the basis for "synoptic reporting" efforts by the College of American Pathologists; the common platform holds promise to help integrate radiology-pathology report information.

References

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