CONFERENCE ABSTRACT

A Model-Based Approach with Tool Support to Facilitate the Cancer Registration Process in Cancer Registry of Norway

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Purpose: The objective of this work is to present a model-based approach with user-friendly tool support for facilitating the cancer registration process in Cancer Registry of Norway (CRN)[1].

Context: The CRN collects cancer patients' information from different medical entities (e.g., clinic hospitals, pathology laboratories) and ensures the quality of collected cancer data [1, 2] so that the data can be used for medical research and statistics. Three key activities are performed in CRN: 1) *Cancer Message Validation*: check validity of collected cancer data (organized as cancer messages) 2) *Cancer Message Aggregation*: aggregate relevant cancer messages into a cancer case; and 3) *Cancer Case Validation*: check validity of aggregated cancer cases. All these activities require employing a large number of cancer coding rules. However, the existing rules are scattered, represented and applied in several ways, e.g., applications, database and look-up tables, which present big challenges for maintaining and updating these rules.

Methods: This work presents a model-based approach with tool support for facilitating the process of the above-mentioned activities in a systematic and automated way [3]. More specifically, our approach 1) employs Unified Modeling Language (UML) [2] to systematically capture the domain knowledge of CRN (e.g., cancer messages, cancer cases and cancer coding rules); 2) uses Object Constraint Language (OCL)[3] to formally specify cancer coding rules as constraints and 3) associates tags to each constraint to map with corresponding elements of UML models to enable automated selection of rules. Based on the approach, we designed and implemented a tool named *GURI* which can support 1) an automated process for validation and aggregation of cancer messages, and validation of cancer cases; 2) result checking for validation and aggregation with a user-friendly front-end; and 3) systematically management and maintenance of a large number of cancer coding rules.

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[1] Cancer Registry of Norway: http://www.kreftregisteret.no

[2] Unified Modeling Language (UML), http://www.uml.org/

[3] Object Management Group (OMG), http://www.omg.org/spec/OCL/2.2/

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Results and discussion: We evaluated our approach with *GURI* using a case study that consists of 287 cancer coding rules, 42 cancer messages and 28 cancer cases. The results show that our approach has a good capability for reducing the maintenance effort of cancer coding rules with an acceptable performance. Thus, the current process of cancer registration in CRN can be facilitated with our approach in a systematic and automated manner.

References:

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3. Wang S, Lu H, Yue T, Ali S and Nygård J F. MBF4CR: A Model-Based Framework for Supporting An Automated Cancer Registry System. In the 12th European Conference on Modelling Foundations and Applications (ECMFA), pp. 191-204, 2016.