Title: A unified structured process model for health analytics

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Abstract:

Health Analytics (HA) is the use of statistical, predictive, quantitative and various other models on healthcare data in informed healthcare decision making. The progress in HA has been curtailed due to issues such as user resistance, essential dependence on the skills and experience of a data analyst and approaching HA in an ad hoc manner. These problems could be addressed through a well-designed analytic process model tested specifically in healthcare context. Such a process model will facilitate the performance of all the relevant projects as a structured process, with clearly defined objectives, proper project planning and with systematically documented prior knowledge, data, methodologies and results. Numerous examples and possible best approaches could be drawn from data mining (DM) and software engineering (SE) projects. Most of the existing methodological approaches of data mining such as CRISP-DM, SEMMA etc. are not been popularly utilized by users.

Thus, a unified structured analytics model is proposed in this research which could be easily adopted even by analysts with limited skills. The model was developed by synergising prior knowledge from literature and predetermined requirements of the users in healthcare context. The ultimate objective was to assist the novice data analysts to develop a strong sense of the nature of the target HA task as well as to provide them with a clear effective strategy to perform the analytic process. The proposed process model is developed based on four dimensions, namely, (1) process management, (2) project management, (3) knowledge management and (4) communication management where, the latter three dimensions are considered as supporting dimensions for process management. With the elements of the input/output and tasks of each stage in the process model, visual diagrams using UML are proposed from domain understanding to deployment of the HA project.

Available published literature on behavioural and software engineering research was examined to conceptualize the problem. Initially, a survey was carried out to determine the factors affecting novice user’s intentions to use a methodology for analytics. The core of the project is the construction of the process model (as a method). It is presented as the design
artefact of this Design Science Research (DSR) based study. Finally, the application of the model is validated using the action case research approach. The development of the process model for HA and proposing a methodology for constructing and evaluating the process model can be considered as the major contributions of this study.