Development of a Guideline-Based Decision Support System Prototype for Collaborative Primary Healthcare

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Abstract

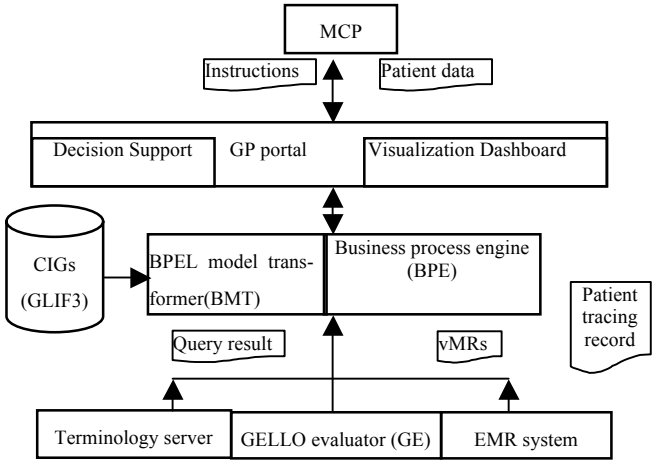
Delivering effective and efficient primary healthcare services is crucial as it requires knowledgeable physicians who treat a wide range of diseases and periodical monitoring of patients. We propose to make the task easier by the collaboration of a guideline-based decision support system and a mobile communication platform through which the monitored patient data could be processed instantly. In particular, we focus on the demonstration of executing guidelines for long-lasting care process using a standard-based business process engine. As a result, we have implemented a system prototype which proves the effectiveness of our approach by running an exemplary guideline.

Keywords:

Decision support system, Clinical guideline, Primary care, Mobile healthcare

Method

We focus on how computer interpretable guidelines (CIGs) e.g. GLIF3 [1], can be effectively executed with local EMR in its proprietary form using a standard-based business process engine (BPE) along with the primary healthcare process. Figure 1 shows the architecture of the proposed system iGLADIUS to accomplish the task. BMT transforms different CIG models into standard-based representation form in BPEL language which is well supported by existing BPEs. BPE is responsible for orchestrating the collaborating services needed by the process running, and interacts with general practitioner (GP) portal to receive GP instructions and return guideline recommendations to GPs. Besides managing patient care process for GP through interacting with BPE, the GP portal receives the monitored patient data from a mobile communication platform (MCP) and sending the physician instructions to MCP accordingly. The system provides decision support capability by employing a GELLO evaluator and a terminology server which evaluate decision criteria encoded in GELLO language where underlying patient data is represented based on a virtual Medical record (vMR) model, and local EMR provides mapping service between vMR and its own data representation.



Results and Discussions

We have implemented the system prototype that assists GPs in making decisions during a maternity care process confined to a specific guideline. We made several major contributions:

- BPEL model transformer makes it easier to develop general guideline-based decision support systems that could be reused in different institutions.
- We implemented a GELLO evaluator that is able to evaluate GELLO expressions in real time during the execution of CIGs.
- We developed a terminology server that has advanced reasoning capability and lays the solid foundation for integrating guidelines with local EMR and evaluating GELLO expressions.

References

[1] Ten Teije A et al. Computer-based medical guidelines and protocols: a primer and current trends. IOS Press, 2008.

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