Collaborative and Distributed Guideline Modeling in the Dementia Domain: An Evaluation Study of ACKTUS

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Abstract

The task of transforming informal knowledge residing in individual experts and in domain knowledge sources to formal structures in clinical decision-support systems (CDSS) is addressed in this work. The system ACKTUS is currently being developed for informing the design of the user interface of a web-based CDSS for dementia care, and for functioning as a tool for development and updating of the integrated knowledge in an international collaborative setting [1].

Keywords:

Knowledge acquisition, Knowledge management, Evaluation, Dementia, Clinical practice guideline, Argumentation, Clinical decision-support systems

Introduction

In the development of ACKTUS, intermediate interpretations of clinical knowledge have been created in the novel approach of using argumentation schemes in a knowledge acquisition process [2, 3]. The interpretations can be evaluated and used in the creation of rules and tested in patient cases. The main purpose of the evaluation study presented in this paper was to investigate whether the conceptualization used in the system for the purpose is intuitive and to what extent expert physicians are able to use the system for the purpose intended. Furthermore, the range of different ways of interpreting well-known clinical practice guidelines was investigated in the process of capturing the intention of the guideline, with one of the authors included in the study for verification [4, 5].

Conclusion

The six participants included in the study were experts in the dementia domain and active researchers, contributing to the development of the evidence-based medical domain knowledge. The study design was qualitative, with observations of physicians completing the assigned tasks supplemented with interviews. The experts were given different tasks that are included in the process of formalizing clinical guidelines and validating the results. In addition, interviews were conducted to investigate issues concerning integrating meta-knowledge in a clinical decision support system.

The results indicate that ACKTUS is useful as a tool for developing a rule-based and mixed-initiative clinical decision system for dementia care for collaborative and distributed use on the semantic web. In particular, the system is useful for capturing sources of potential misinterpretations of clinical domain knowledge, possible alternative interpretations, capturing ambiguities in the domain knowledge and mediating this to the user for the purpose of increasing knowledge in the user and providing decision support in the process of knowledge acquisition. Furthermore, the results show that physicians tend to create rules stricter than the intention of the guidelines when committing to semi-formal interpretations before creating rules. However, further evaluation is needed of usability issues and evaluation studies organized in more natural settings over a longer period of time, which include also the integration of "meta"-knowledge concerning the qualities of guidelines, rule-of-thumbs and preferences.

References

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