UNIVERSITI TEKNOLOGI MARA

ENHANCEMENT OF COMMONKADS ASSESSMENT TASK FOR DOMAIN EXPERT MAINTAINABLE KNOWLEDGE-BASED SYSTEM

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PhD

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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Modelling and specifying the knowledge components for future use allow the Knowledge-based System (KBS) to continuously generate an accurate result and sustain the competency, efficiency and effectiveness of its problem-solving capabilities. Knowledge modelling conceptual the knowledge-intensive activities which include task and domain knowledge while knowledge specification specifies the inference knowledge that is required to facilitate the KBS reasoning process. Inference knowledge describes the steps or rules used to perform a task inference, i.e. making reference to the domain knowledge that is used. This knowledge is typically acquired by knowledge engineer from the domain experts and communicated to the system developers during knowledge gathering and system maintenance phase. Although the involvements of the knowledge engineers and system developers' team during the maintenance phase is important, one of the main issues that remain is the increasing of KBS development cost when both teams are no longer available to mediate the maintenance task. Hiring new teams, on the other hand, might cause inconsistency and unreliability of the KBS. Therefore, this research opts the domain expert to support the extension and reduction of knowledge within the KBS by focusing on the explicit representation of inference knowledge. The knowledge within the hospital emergency triage assessment decision making is selected as a case study. To develop the KBS that able to be maintained by a domain expert, a European *de facto* standard for knowledge modelling, the CommonKADS knowledge engineering methodology is regarded. The generality of terms and problem-solving methods offered by this methodology nevertheless requires much effort thus becomes an adaption issue by knowledge engineers and developers. Hence, this research contributes an adaption guideline and subsequently enhance the methodology in developing a KBS that enables it to be maintained by the domain expert. The enhancement was validated by adapting the guideline into two knowledge-intensive tasks, i.e. classification and diagnosing with two case studies for each task. The validation attained more than 85% of positive response in adapting the guideline to model the task and domain knowledge. Next, to validate the ability of the domain expert to maintain the KBS, the time taken to annotate the inference knowledge showed that 75% of domain experts able to do annotation with less than five minutes. The results show that the enhancement provided domain expert with the ability to maintain a specific Knowledge-based System. As a future work, the user's experience should be involved as a part of the validation aspects and the explicit representation of inference knowledge should be extended into another type knowledge-intensive task.

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