A Plug-in to Boost the Behaviour of a Rule-Based Expert System More Like a Human

W.A.C. Weerakoon[1], A.S. Karunananda[2], N.G.J. Dias[3]

Artificial Intelligence (AI) is one major aspect of Computer Science. Among the applications of AI, expert systems are predominant. There are expert systems built for variety of subject domains such as education, medicine, and engineering, and were built by imitating the human experts with the ability to make accurate decisions by resolving the proper set of rules and facts stored in a knowledgebase to solve more complex problems. When it comes to systems, it is expected to be more accurate, reliable, efficient and complete. The current expert systems consists of many facilities such as user interfaces, reasoning of the system, knowledgebase, working memory, making inferences, prioritizing and an automatic way for the user to enter knowledge, with compared to the human experts. Even though, the expert systems are still behind and much specific in some aspect such as the abilities in generalizing concepts, drawing associations among knowledge entities depending on the causal relationships, adding new knowledge, removing irrelevant knowledge, prioritizing knowledge entities for the execution as per the input to gain improvements over generations of execution as human experts do. Among the technical categories of the expert systems such as rule-based, frame-based and induction-based, our concern is to improve the rule-based expert systems by solving the said problem by constructing a processing model which consists of the processing states such as Origin, Classified, Pre-State, Resolve and Terminate with newly introduced multiple sub-processes such as Input/Identify knowledge entities, Classify facts/rules depending on the causal relationships crafting the generalizing facility and Termination. When the system executes over generations, it produces outputs and gains improvements using the above mentioned processing model as per the input/queries. For this processing model, newly introduced sub-processes will be implemented using C programming language and will integrate to the current expert systems written in 'C Language Integrated Production System' as a plug-in. The system will be able to evaluate by comparing its states With-Plug-In and Without-Plug-In for the quality using a non-parametric test such as Mann-Whitney-U-test and for the time using a paired-t-test. As a result we are capable of providing an expert system which is more like a human expert.

Key words: Processing Model, Improvements gain through the Execution over Generations, Plug-in

---

[1] Department of Statistics & Computer Science, Faculty of Sciences, University of Kelaniya, Sri Lanka. chinthanie@kln.ac.lk

[2] Department of Computational Mathematics, Faculty of Information Technology, University of Moratuwa, Sri Lanka. asoka@itfac.mrt.ac.lk

[3] Department of Statistics & Computer Science, Faculty of Sciences, University of Kelaniya, Sri Lanka. ngjdias@kln.ac.lk