Development of the Structured Expert System Development Methods

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ABSTRACT

This work is devoted to finding new ways to improve the efficiency of expert systems' development and maintenance. To achieve these goals, three new ideas: Expert Systems Development Life Cycle (ESDLC) method, Module Dictionary (MD) and Variable Dictionary (VD) are proposed. First, ESDLC method is a normative approach to expert systems development, and it tries to combine current prototyping method into a traditional System Development Life Cycle method to extract maximum benefits from the two methods while reflecting the unique characteristics of expert systems. This normative ESDLC method will give standards (or guidelines) to both professional and non-professional developers to follow, and consequently, will increase the quality of developed system and will alleviate many anticipated future problems. Second, when knowledge of a human expert is added, modified or deleted, this is done in a unit called a chunk. A chunk may invoke other chunks, and so forth

so that a decision can be reached. We define a set of expert system's application rules to implement this single chunk approach to storing human knowledge as a module, and MD tries to collect all the maintenance related information for this module. VD is prepared for each of variable in the expert system, and tries to collect all the facts about the variable. MD and VD will enhance traceability, will increase the possibility of simultaneous modifications of all related parts of the knowledge base, will help prevent the concept [illegible] phenomenon, and will increase the potential for useful documentation in both development and maintenance period. Third, to validate our claims and to collect broad-based opinions on expert systems practices (current and future), we implemented a survey to selected leading organizations in the expert system area. Various topics, such as current and future development trends, maintenance, anticipated future problems, key factors for successful expert systems implementation, etc., were surveyed and analyzed. As a final effort, to test and demonstrate the efficiency of three proposed ideas, a prototype of an actual expert system was developed, and performance was evaluated based on four criteria using real test cases that were available.