The Conflict Between Quality and Expert System Technology

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The conflict between quality and expert system technology is becoming increasingly important in industry. This paper describes the dichotomy between the concept of quality and the application of expert system technology in an industrial environment. The paper also demonstrates how the conflict arose and offers suggestions for the management of this conflict, in order to encourage the growth of technology and benefit the careers of the people involved. Sample projects are included to provide practical illustrations of the conflict.

Introduction

Expert system technology is doomed to fail in the present environment. Without a way to make quality a part of knowledge engineering, there is little chance for a knowledge engineer to succeed. This article will explore the conflict between the focus on quality and the definition of knowledge-based expert systems.

Quality is very important at IBM. Externally, our history embodies high-quality products along with service to our customer. Internally, our development cycle emphasizes quality at every step: design, build, test, installation, and service. Quality posters in the halls remind us to DO It Right the First Time. Quality circles dissect problems and offer solutions to improve the quality of our products, processes, and workplace. User friendliness is implied, if not specified, in every product objective. Developers are reminded constantly that usability should be designed in, not added on at the end (Vogt, 1987, p.WE-103).

What does this mean to the knowledge engineer? Knowledge-based expert system technology was designed to build computer programs that contain heuristic and incomplete knowledge. The evolutionary process of captur-
ing knowledge about a particular domain, transferring it to a computer program, and adding to it when new knowledge becomes available means expert systems will never be done, let alone done right the first time. New knowledge may contradict previous knowledge in the knowledge base.

How can managers appraise the quality of knowledge engineering? Traditionally, an incomplete project means an unfavorable appraisal. If an expert system is incomplete, does the knowledge engineering team deserve an unfavorable appraisal? This concept is explored in this paper, and some suggestions are offered to help expert systems and knowledge engineers succeed. Two example projects illustrating the dichotomy between quality and expert system technology are described.

Building Sample Project One

The first sample project concerned an expert system that met the specifications and received much acclaim from potential users. Some observers thought the system was marketable. The field test was positive but a marketing analysis was negative (Davis, 1987, p. 76).

The system was an experiment to demonstrate that expert systems could improve the usability of information. A hard-copy manual was mapped into an expert system shell producing smart soft copy. The manual was used by help desk people to solve problems in a computer network. The expert system was demonstrated to product owners with the intent of using the technology to produce documentation for other products.

The job was done too well, however; instead of viewing the system for what it was, some observers viewed the application as a solution to a problem in the marketplace. They viewed it as a network trouble shooter. The fact that it was an expert system raised false expectations of what the program could do. The source book was meant to be a primer for help desk people, not a total solution to fixing problems in a network.

At this point, marketing analysts were brought in to evaluate the system for release. The evaluation resulted in the product not being marketed because it would be competing with another product that was targeted for the same audience and had a conventional product team supporting it. Also, the product might not have fulfilled the customer’s expectations of an expert system because its knowledge base was so limited.

During this evaluation, a separate human factors test recommended changes to the panel layouts, panel navigation, and message content. These recommendations, coupled with the marketing analysis, indicated that the expert system would confuse rather than help our customers. What started out as a successful experiment ended up being perceived as a failed project.

Evaluating Project One

Evaluating the quality of this project posed a conflict, because both positive and negative perceptions were formed about the same piece of work. Which perception should prevail? How should the knowledge engineering team be appraised for this project? Some managers would give them a high rating because the system met the goals of providing an expert system equivalent to the subject manual and showing that it is technologically feasible to provide soft copy using expert system technology. In addition, the experiment demonstrated that expert system technology improves the us-

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