Editor's Comment

Decision Support Systems, Artificial Intelligence, and Expert Systems

Decision support systems (DSS) has been a popular concept in the literature in MIS for more than a decade. Notions of artificial intelligence (AI) and expert systems (ES) have become very popular in the more recent past.

In 1973, I published a paper entitled "Intelligent Management Information Systems" [5] that described a variety of levels of "intelligence" that might be incorporated into information systems. At the most advanced level, I suggested that artificial intelligence and expert systems technology might well be incorporated into such systems, and I described an AI-based expert system that was then under development in the medical diagnosis context.

Now that AI and expert systems have become popular, even faddish, it is useful to review the progress that has been achieved in the last decade in developing that variety of decision support systems possessing intelligence.

DSS', to distinguish them from other sorts of information systems to which the term may be misapplied, have the objective of supporting managers in making relatively unstructured decisions. The systems may well aid in the *structuring* of the decision rather than in the *selection* of an alternative from a range of available ones. Thus, "true" DSS' relate to Simon's intelligence and design phases of the decision-making process as well as to the choice phase.

Expert systems may be thought of as those in which the knowledge base on which the system draws is developed using the explicated judgement and hueristics that human experts use. The best illustration of such a system is the CADUCEUS system for medical diagnosis [10] which uses AI concepts and in which the knowledge base is being created based on the judgement of expert medical diagnosticians.

In order to conduct a progress review, I found it to be useful to delineate the sorts of "intelligent support" that might be provided to aid in the structuring of relatively unstructured problems. Then I searched for published reports of such systems. Interestingly, there are such systems in existence, although many of them are prototypal and some are not even fully computerized.

The varieties of intelligent support that I identified are listed and referenced below. Such systems can amplify our decision-making power by:
   - permitting the selective retrieval of information that is particularly relevant to a decision situation [6],
   - integrating knowledge through interpretation, inference, etc. [9],
   - "filtering" data inputs to enhance the manager's ability to assess the current environmental situation [9],
   - aiding in the structuring of decisions [8],
   - "suggesting" alternative strategies that may not be obvious to the manager [2, 7], and
   - evaluating the consequences of proposed strategies in ways that are integrated with the prior stages of the decision-making process [7].

Although my search was surely not comprehensive, I could find no examples of operational expert systems that would meet the criteria of serious AI researchers, as opposed to the optimistic promises and descriptions of their developers. In fact, the AI-based expert system that I described in 1973 is still under development, and while there is every reason to be optimistic about its eventual success, the decade of work that is yet unfulfilled is suggestive of the difficulties that are inherent in developing such systems [10].

Thus, a retrospective view of the past decade in this area shows some progress, but a good deal more in the way of verbage — insubstantial claims rather than effective operational systems. I conclude that the "jury is still out" on the long-run viability and impact of DSS' that possess intelligence.

Now that these ideas have become popular, they are getting much attention, and significant resources are being devoted to research and development in these areas. This will likely result either in substantial progress or in the demise of the popularity of the ideas.

One well-known and knowledgeable MIS academic has referred to expert systems as the "snake oil of the 1980s" and I believe that the overselling that has been taking place lends credence to that view. These ideas will go through the typical life cycle from faddishness to the negative over-reaction that results from exaggerated claims. As usual, their true worth probably lies somewhere between these extremes.

Thus, I think we would all be well advised to treat DSS, AI, and ES with care. Having intensively studied AI and ES in the early 1970's I concluded that research work in the area would require a much greater commitment than I was willing to make. I believe that the same is true today, for me as well as for many others who might be considering these very popular, high-potential areas [4].

In any event, before another decade has elapsed we will undoubtedly be in a much better position to judge these areas. I hope that we will find that progress has fulfilled the great potential and that it has also overshadowed the "snake oil."

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References

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