DISCUSSION

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Roger Bamkin: An earlier speaker (Anderson) concluded that a compromise between database systems and expert systems seems desirable, Do hypertext and hypermedia provide this compromise ?

Marc Vancoille (author's response): Hypertext and hypermedia systems have been (until now) mostly non-intelligence based systems. As such they exhibit none of the characteristics of expert systems. Whereas databases can be easily searched, hypertext systems are normally text/graphics based systems where the context in which a certain phrase appears is important but not obvious to the user until he/she has read the document. Therefore it is easier to extract e.g. materials properties from databases (if the facts are known) or expert systems (if the query requires some reasoning). Nevertheless, hypertext and hypermedia systems can be valuable in linking both databases and expert systems and provide additional background information. When hypertext and hypermedia can be made to act in an intelligent manner (ie the navigation strategy is not hard coded by the developer but determined at run time by the system that takes into account the user's points of interest and competence) a much closer synergy between hypertext, expert systems and databases seems possible, because at that point, the hypertext system itself becomes knowledge based and the information contained in the hypertext can be treated as such, rather than just pieces of information that have to be linked non-intelligently.

Anthony Barrett: In relation to the problem of contradictory evidence and experts in conflict, I support Mr Vancoille in drawing attention to the dangers of *taking averages* among contradictory evidence and the hazards of *pooling* datasets without proper concern for their origins and the conditions under which they were generated. If a proposition has been unambiguously specified, conflict over that proposition is often a sign that one of the conflicting views is unsound   or that both are unsound. Management techniques for dealing with these situations exist and have been used for many years by several organisations concerned with the provision of high value added data.

Marc Vancoille (author's response): Conflicting information is not necessarily the same as an unsound view. It is our experience that is it is relatively easy to make people agree on data; as a last resort one can always measure the property again under generally accepted conditions or according to standardized test procedures. However, when interviewing experts we have noticed that many of them formulate what they consider to be the *truth* though it often reflects only their own experience and the particular circumstances under which the experience was compiled. Especially when interviewing experts from similar but different process plants, it was noticed to what an extent minute process differences may result in a completely different assessment of data. When incorporating this knowledge in an expert system, different rule sets should be generated each reflecting the particular experience, and each rule should state in great detail the conditions under which the conclusions are valid. This is not the way an expert system is normally built. One tries to formulate different experiences in general terms (knowledge abstraction) so that they can be used in similar, yet different circumstances. This process

necessarily entails that some nuances are lost. The process of generalization does not prefer one rule above the other but nor does it say that one of the views is wrong, and thus using techniques to deal with conflicting information may not always be applicable. Expert systems are not always suitable for capturing human expert expertise but neural networks might be more appropriate because they are trained from data and can generalize from specific examples.