Knowledge Acquisition and Automation –
Expert Systems for the 21st Century

The Web may well contain the “when, where and how” information, but making use of it requires finding multiple cases, understanding, analyzing and combining them, determining which are relevant and accurate, validating that your data is complete, and combining it all to come to a conclusion about a specific situation. That’s a lot to ask of most people just to get an answer.

The Web may contain the information needed to become an expert, but people don’t have the time to become an expert every time they need to make a decision. They just want an answer and they want it now. Expert systems provide the way to directly deliver answers to complex questions and situations. As soon as a question requires a logical decision making process based on multiple factors to select among possible answers, it is a candidate for an expert system. Expert system development tools provide a way to codify the decision-making logic into a form that can be delivered over the Web. Systems can make probabilistic recommendations among competing options. Backward chaining dynamically combines many small decision making steps to solve large and complex problems. The results are tailored to the user’s specific situation.

The expert system runtime programs dynamically create Web pages, or run as a Java applet, to ask the user questions and display results. In a sense, the expert system is another way to dynamically generate Web content, but the fundamental difference is the inference engine. That is what drives the system and enables it to ask questions in a focused manner based on user input – much the same way as a consultation with an expert. No unnecessary questions are asked, but where needed, the questions can drill down for details required to make the correct decision.

Some very simple tree structured logic can be done in linked HTML pages, but any degree of complexity requires an inference engine of one sort or another. Hard coding logic in HTML, or other languages, is very difficult to maintain or enhance. Expert system shells and inference engines are the only effective way to build maintainable and deliverable systems with runtime programs that integrate into the Web in a seamless way.

Companies now routinely interact with their customers via a computer interface. That is a major paradigm switch from just a few years ago. In many cases it is now almost impossible to talk to a human to get an answer – the Web site is the only interface to the world. To make Web sites interactive, able to answer complex questions, and to make them emulate virtual sales and support people requires expert system technology.
There is no other technology currently available that emulates an interactive session with an expert to get detailed, reasoned recommendations specific to the user. Someday there may be, but for now expert systems are the best, and really the only way, to automatically deliver knowledge to customers and staff on-line.

Expert systems have been around since the early 1980s. The underlying technology is well proven. Tens of thousands of systems have been built and are in daily use for diagnostics, process control, customer support, regulatory compliance, and all the other areas where complex questions need to be answered. They maybe integrated with other programs or stand-alone. They may be invisibly embedded or highly interactive. The only real change is that now they communicate with the user via a Web browser.

Most companies were caught somewhat off guard by the surprisingly rapid growth of the Web, and have been playing catch up just to get a Web site up. That phase is now over. All major companies now have a Web presence – now the question is what to do with it. The benefits and ROI of delivering knowledge are tremendous in increased efficiency, reduced errors and more satisfied customers. The companies that have historically made the greatest uses of expert systems were among the first to put them on-line. But most IS groups are just starting to think about this and how it can be done.

Many companies such as Dupont, Cessna, Cisco, Nestle’s, and military and government agencies are already seeing the benefit of delivering knowledge via expert systems on-line. When others see how easily and effectively knowledge can be delivered, I believe there will be a widespread demand for this capability. The benefits are great, and the cost small. Global knowledge delivery will be a key part of the next phase of Web – and expert systems are the only realistic way to do it. The Web will not cause the extinction of expert systems, but will cause unprecedented growth.

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