

The feasibility of distributed web based expert systems

JULIE A. ADAMS

**Department of Computer Science
Rochester Institute of Technology, Rochester, NY. USA**

Society has become more technology oriented while at the same time more distributed, therefore creating a potential need to provide remote access to expert systems. As corporations and military installments expand around the world, it is less likely that an expert can be present at every required location. It is increasingly expensive to transport an expert to the location where they are required. Additionally, if multiple locations require the expertise at the same time, there may not exist enough experts to provide the required assistance. Given these facts it is becoming increasingly important to rely on technology to provide such expertise. One possible solution for providing distributed expert systems is the World Wide Web (WWW). The WWW permits the expert's knowledge to be provided at such distributed locations.

Once a development team decides that the WWW is a possible solution, the question then becomes: "is it feasible to employ the WWW for distributing expert information"? The answer is: "it depends". There are many factors that can affect the decision to use the WWW as a delivery mechanism for expert knowledge.

First, does the information need to be protected? If the expert system web page is password protected, does this secure the system content? If the expert system is required for a corporation's main technology or for a military task, then the answer will very likely be no. Such situations require highly secured transmission media, which the WWW is unable to provide. On the other hand, if the system provides general information that will not compromise the corporation or the military, then employing the WWW as a transmission media is a lower cost alternative.

Second, can the WWW provide the transmission speed for the particular situation? For the case in which an expert system is employed to control a large chemical processing machine, the answer is likely to be no. In such a

situation, the operators require real-time reliable information concerning the machine's processing. Recently, the WWW communications to Asia were severely impaired when an underwater cable was severed. In this case, the communication capabilities via the WWW were slowed or simply unavailable. If the operators of a large chemical processing machine required access to an expert system (and were located in Asia) via the WWW, there would be many potential problems in this situation. Depending upon the design of such a system, the operators may be unable to control their machine (presumably no one would design such a system). It may also be the case, that the information required to interpret the behavior of the machine would be unavailable therefore, defeating the purpose of providing the expert system information. On the other hand, in the case where the expert system is employed as a training tool, the information content may take precedence over transmission speed. The expert system in this case is not tied to a potentially expensive and dangerous machine. The user of such a system simply would be unable to obtain the training via this mechanism.

Third, what are the special considerations for the expert system design that need to be considered when the system will be used via the WWW? Do any exist? Should the data be stored at remote locations for faster access? Does the system require translation capability for foreign languages? Or simply, is the expert system applied at one location appropriate for a similar process at a remote location? Do the designers need to be concerned with the content transfer? For example, if images are used, do they transfer at a rapid enough speed? If they do not transfer quickly, does the user still obtain the same benefit?

There are many considerations when determining the feasibility of an expert system for solving a particular problem. The number of considerations rises when the decision becomes

In Proceedings of the 2001 IEEE International Conference on Systems, Man, and Cybernetics, Tucson, AZ. Oct 2001.

one of providing a distributed expert system and the potential delivery mechanism to the distributed sites. The above discussion mentions a few of these considerations. In short, the feasibility of providing expert system capabilities over the World Wide Web depends upon the particular situation for which the expert

system is developed. There are numerous examples of expert systems on the web, but many of these systems are small, non-critical systems.