Integration of Acquisition and Performance Systems

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Rappaport, A. T. and Gaines, B. R. (1988). integration of acquisition and performance systems. In Proceedings of the First AAAI Integration of Knowledge Acquisition and Performance Systems Workshop, Rappaport, A. T., Gaines, B. R. and Boose, J. H., eds. AAAI, Menlo Park.

Abstract

Knowledge base building environments must be progressing along two important directions: *(i)* an increased participation of the domain experts in the knowledge design process, due to new computational models and effective man-machine interfaces and *(ii)* automated knowledge acquisition tools to facilitate the formalization of knowledge. This paper presents the integration of a knowledge acquisition methodology (KSS0, Gaines 1987) with a performance system (NEXPERT OBJECT, Rappaport 1987) . The resulting architecture represents an important combination of techniques from psychology, cognitive sciences and artificial intelligence. New dimensions emerge from this implementation and integration both at the theoretical and practical levels. Beyond the integration of the two knowledge acquisition and performance systems, the architecture can also be integrated with databases and hypertext technologies, as well as text analysis. The performance system allows one to validate the output of the knowledge acquisition tool. Moreover, use of this environment provides information on the nature of the elements (rules and objects) to be generated by any given algorithm.

The three figures provide a schematic view of the architecture. Figure 1 shows the architecture of KSS0, the knowledge support system. Figure 2 shows the overall architecture of the NEXPERT OBJECT performance system and figure 3 is a simplified view of the overall interaction between the knowledge acquisition module, the performance system and the knowledge designer. By interacting with KSS0's graphical interface, the designer can work at the level or relevant entities and dimensions without having to directly formalize hierarchical or logical relationships as with the expert system's editors. Refinement and elaboration of the outputs of KSS0 can be made via its own editors. KSS0 generates the formalization of knowledge in terms of rules and object structures. Transfered into the expert system, these structures can be evaluated from the performance viewpoint, and edited directly by the expert.

Both modules have a highly graphic interface and incremental capabilities allowing continous refinement and creation of chunks of knowledge. Moreover, the possibility to work with multiple experts is

expressed in both tools (SOCIO algorithm and multiple knowledge bases).

The development of tools and techniques for knowledge acquisition is fundamental to current knowledge base systems research. As illustrated here, the tools developed must be integrated with the overall system and not treated as separate components. The variety of sources of knowledge, representations and applications makes such integration complex. The complexity raises many issues not generally thought of as part of knowledge acquisition. The authors will discuss those issues using real world examples and will demonstrate this architecture.

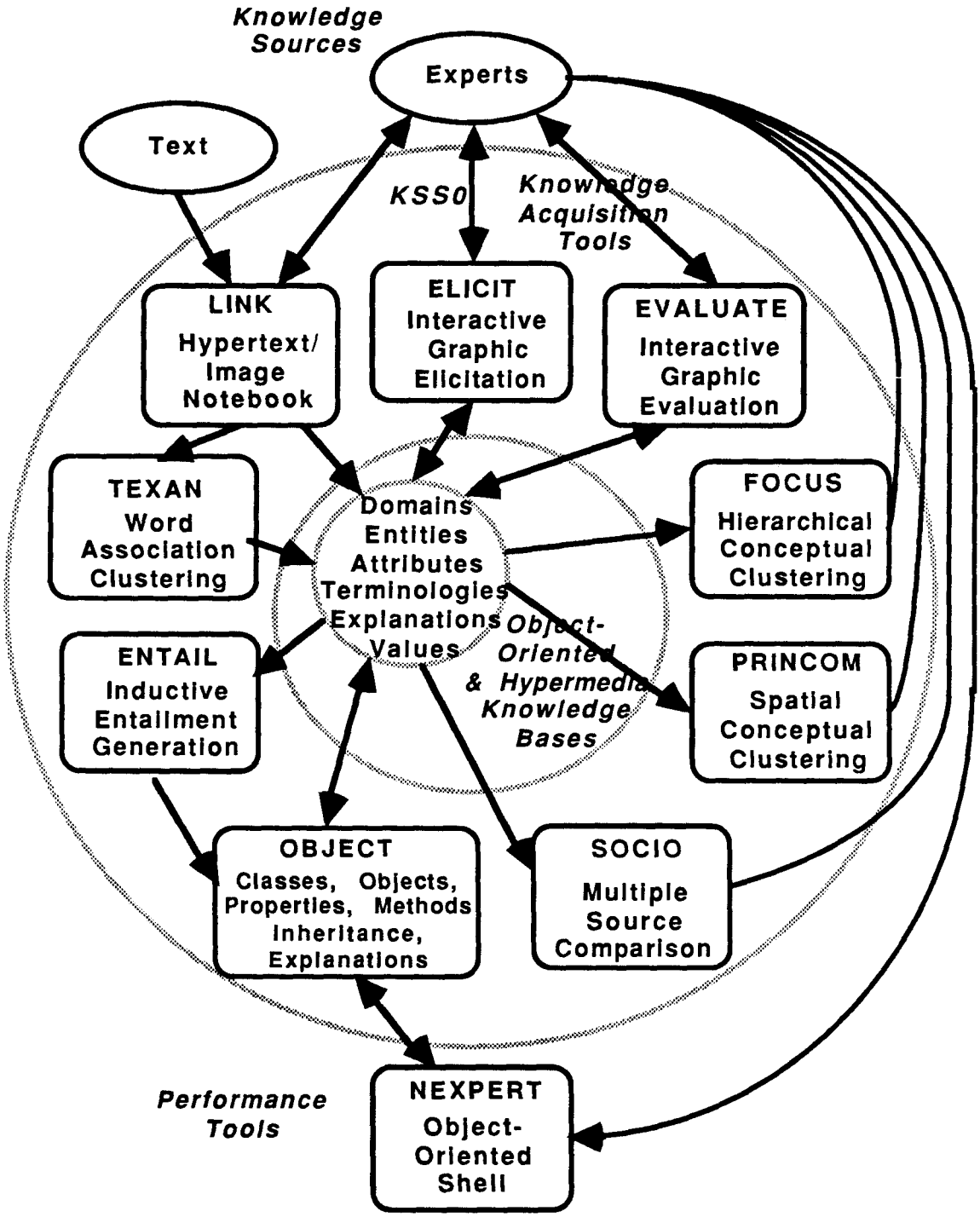

Figure 1. The Knowledge Support System Architecture.

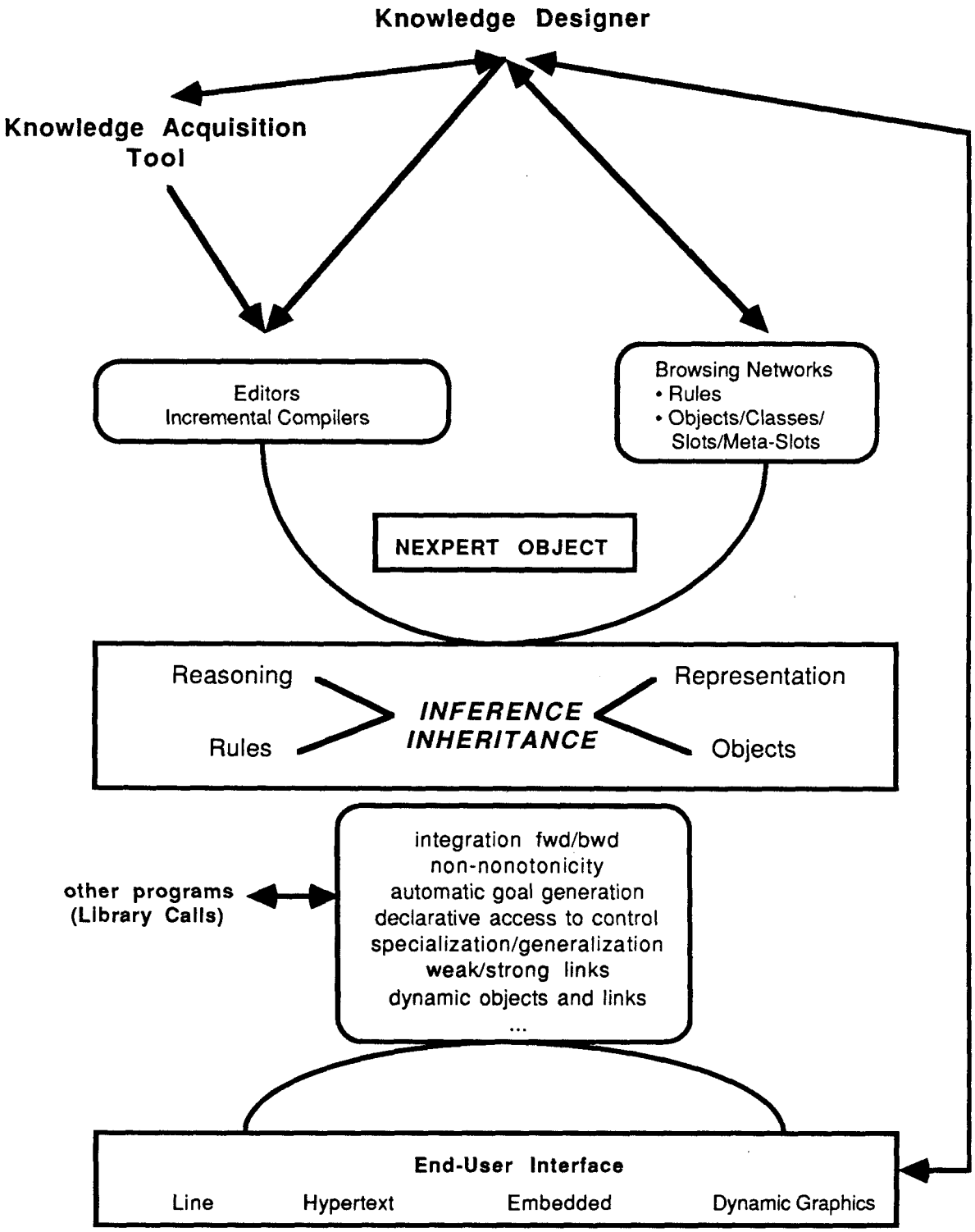

Figure 2. The overall performance system architecture.

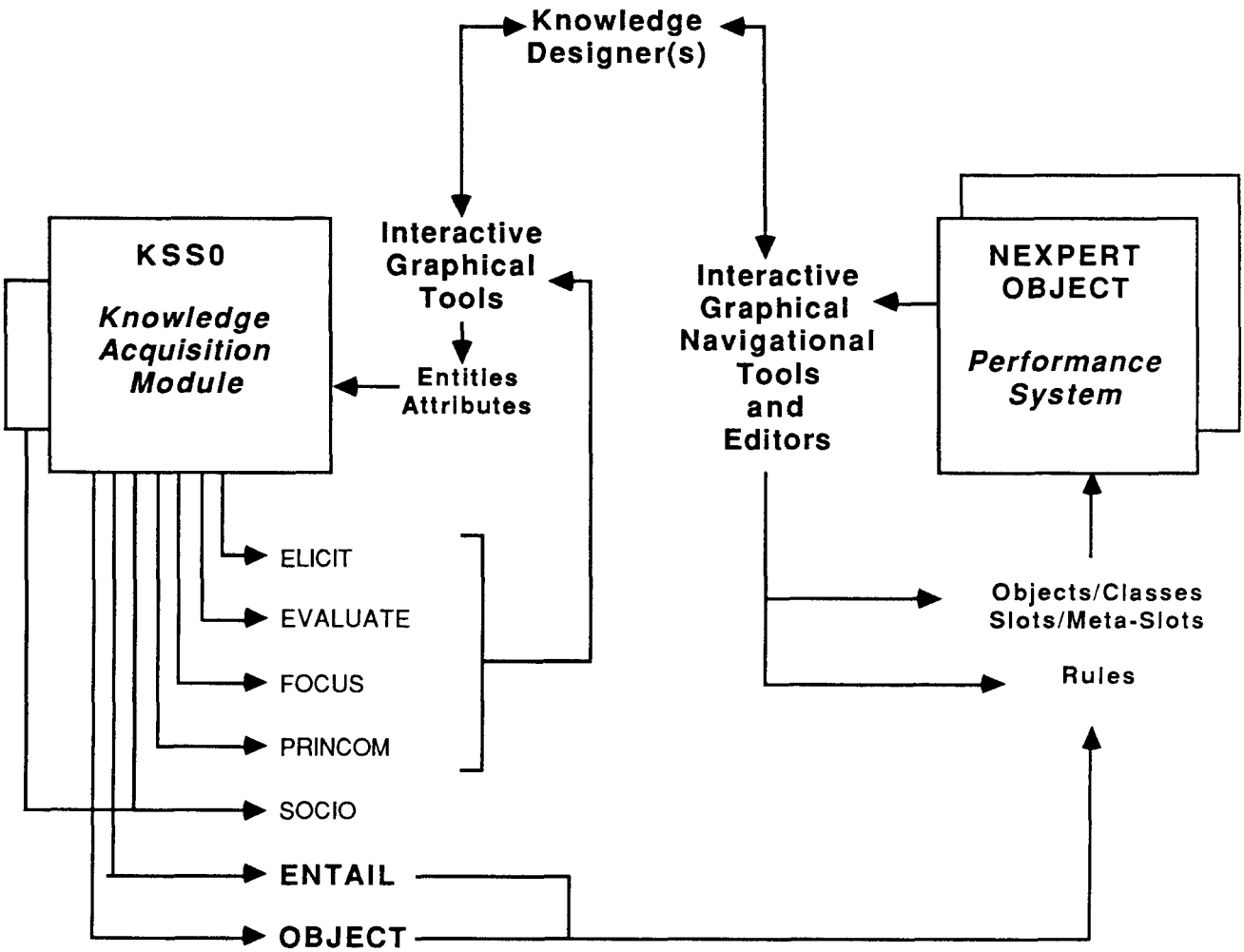

Figure 3. Integration of the Knowledge Acquisition and Performance Systems (overview).