Statement of Interest

Yeona Jang

September 20, 2001

The concept-based knowledge representation system is based on the epistemological representation of knowledge so that the structure of a domain may be naturally and effectively embedded into a knowledge based computational model. In addition, the bipartition of the view to the knowledge representation system—one for conceptual and the other for assertional, would make it easier to develop, use, maintain, and update a knowledge base consistently.

So far, however, the attention in this field of knowledge representation is almost exclusively paid on its theoretical aspects. No attempt has been made to test and improve its usability in a real-world problem. The development of theories on representation, especially, for vast domains consisting of incomplete knowledge involves assumptions implicitly and explicitly. Consequently, it should not be surprising that, while translating a real world knowledge into a formal language description, a knowledge engineer may confront a situation of being unable to represent knowledge in a way it should be represented.

The experiences from the practical use of a representation system enables limitations that otherwise could be overlooked to be detected. The design and implementation of KOLA by the author was motivated by the limitations perceived while representing medical knowledge in the concept-based knowledge representation language NIKL. Several observations have been made in the application of a concept-based knowledge representation system to a real problem, and KOLA attempted to solve them. Briefly put, KOLA allows the distinction between definitional and nondefinitional necessary conditions of a concept, the explicit representation of properties of a necessary condition such as transitivity and symmetry, and the efficient representation of incidental and instance-specific properties. The classifier of KOLA is augmented so
that it effectively uses such extensions in classifying concepts. In terms of architecture, KOLA consists of three major subsystems: C-World, I-World, and Question-Answerer. C-World and I-World roughly correspond to TBox and ABox in KI-ONE family, respectively. Question-Answerer provides a functional interface between a knowledge base and a user similar to that proposed by Levesque[1]. The details of KOLA may be found in [2] and [3].

Currently, I am working on the development of the knowledge-based system to facilitate the software reuseability at Tektronix. The knowledge engineering approach to the problem of software reusability is being explored. Given a problem, the system is to give a meaningful and useful advice on what softwares are available, where to use, how to use, and so on. KOLA is used as the development tool. Concepts describing the domain are defined in KOLA. It seems to me that this is the good opportunity to experience the applicability of KOLA to the real world problem and find its limitations. Until now, no negative response to the decision of using KOLA as the development tool has been raised. Rather, the impression is perceived that the group is actually satisfied with the decision after I demonstrated the potentials of a concept-based knowledge representation system.

What I would like to hear from the workshop includes how the properties of necessary conditions such as transitivity can be dealt with, their impacts on the classification, the applicability of a concept-based knowledge system to a real world problem, the strength and limitations of the concept-based knowledge representation systems in the application, and, if any, how to overcome the limitations.

References:

