Intelligent Collaborative Educational Systems and Knowledge Representation

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Abstract

In this paper, the concept of collaborative intelligent educational system is presented. Different knowledge representation models are compared in the context of their use in collaborative intelligent educational systems. Advantages of semantic networks for knowledge representation in such systems are described. Main advantages of extended semantic networks are shown and a set of basic operations regarding them is drawn up.

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Keywords: Intelligent collaborative educational system; Knowledge worker; Extended semantic network

1. Introduction

In today's world, a shift has taken place from technology based on energy investing to technologies based on knowledge and information. Knowledge plays a special role in post-industrial evolution. Leading experts in the field of practical implementation of the basic principles of sustainable development strategy – Peter Drucker, Alvin Toffler, James Brian Quinn – independently proclaimed human entry into a new economy society known as the knowledge society, in which knowledge is the basic economic resource. Thus, regeneration of this resource has great

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2. Knowledge workers and intelligent collaborative educational systems

The leading social groups of the knowledge society will be 'knowledge workers'. These are knowledge executives who know how to allocate knowledge to productive use. Knowledge work includes the work of all participants of the production process to achieve optimal results through combination of each employee’s individual skills. A knowledge worker must constantly learn innovative knowledge to be competitive; on the other hand, he or she cannot do without teaching. This makes employee training functionality one of the priorities of staff management functions within modern organizations. A large problem with global virtual organizations, though, employees are scattered around the world, making this functionality difficult to implement.

Frequently occurring changes and the complexity of the electronic technological society using new types of electronic communication devices have resulted in continued growth in the amount, diversity, and service activities carried out in all fields. Thus, in today’s society, the concept of collaborative systems is emerging.

A collaborative system is a system in which many users or agents are engaged in a shared activity, often in distanced locations. In a large family of distributed applications, collaborative systems are distinguished by the fact that the agents work together to achieve a common goal and have a great need to interact with each other in the sense that they share information, change requests, etc. This is shown on Fig. 1.

An educational system is a set of interrelated educational and innovative processes, as well as the management of these processes. Several general laws of educational systems development exist. These include (1) focus on the ultimate objective, (2) development of measures for precise system functioning, (3) compliance of the sub-objectives with the ultimate objective, (4) availability of resources, (5) consistency, and (6) safety.

Collaborative systems are applied in the educational field and focused on evaluating and enhancing the performance of educational processes. Collaborative learning helps knowledge workers carry on deeper conversations, create multiple perspectives, and develop reliable arguments. This is the main reason why collaborative groups facilitate greater cognitive development than individuals can achieve while studying alone.
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