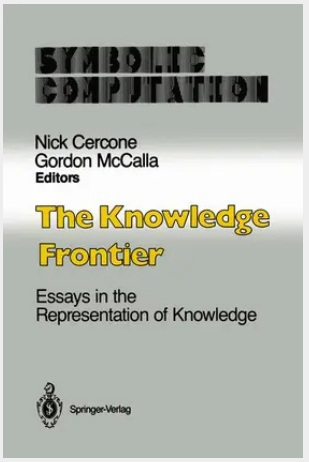
Cercone / McCalla

The Knowledge Frontier

Essays in the Representation of Knowledge



Knowledge representation is perhaps the most central problem confronting artificial intelligence. Expert systems need knowledge of their domain of expertise in order to function properly. Computer vlslOn systems need to know characteristics of what they are "seeing" in order to be able to fully interpret scenes. Natural language systems are invaluably aided by knowledge of the subject of the natural language discourse and knowledge of the participants in the discourse. Knowledge can guide learning systems towards better understanding and can aid problem solving systems in creating plans to solve various problems. Applications such as intelligent tutoring. computer-aided VLSl design. game playing. automatic programming. medical reasoning. diagnosis in various domains. and speech recogOltlOn. to name a few. are all currently experimenting with knowledge-based approaches. The problem of knowledge representation breaks down into several subsidiary problems including what knowledge to represent in a particular application. how to extract or create that knowledge. how to represent the knowledge efficiently and effectively. how to implement the knowledge representation scheme chosen. how to modify the knowledge in the face of a changing world. how to reason with the knowledge. and how tc use the knowledge appropriately in the creation of the application solution. This volume contains an elaboration of many of these basic issues from a variety of perspectives.

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