



Chapter XV

On Future Work

Abstract

This chapter concludes the book by stating open questions and directions for further research. Some of the topics that we focus on here are the interaction between the human and nonhuman agents, interactions of the human in heterogeneous environments, and alternative representations of environments. We also present Izbushka, a context-0 interactive environment, and discuss our immediate future research expectations from its implementation, as well as its implication to multiple application areas.

Heterogeneous Agents

In this section we will briefly observe some of the problems that occur in environments inhabited by heterogeneous agents and some of the problems of modeling of these phenomena.

In environments inhabited by heterogeneous agents, the key problem is the problem of interagent communication. Due to the different construction and perceptual abilities, and in our interpretation, due to the different inborn schemas, it is very unlikely that a common protolanguage would emerge.

From the biological viewpoint, examples of interagent communication, close to the one previously mentioned, is the phenomenon of multilingual agents that can serve as translators. The bilingualism phenomenon itself (Fiero-Cobas & Chan, 2001), on the other hand, imposes a whole avalanche of questions, and it is being widely researched.

But, can we construct a translational function? What preconditions should hold in order for such a function to be possible? What is the reason for bilingualism?

Another aspect of the previous questions is the question of communication and interaction between the agent (or the whole society of agents) and the designer. How should the designer interpret the protolanguage in his/her language, and what is he/she to expect to learn about the environment from the agents?

The existence of an interface for communication can be generalized in terms of interagent communication, and then the communication between the humans and the computers (human-computer interaction [HCI]) can be observed as its special case (Lewis, 2000; Raskin, 2000).

What is an interface? How can we generate an interface between two homogenous agents? How can we generate an interface for two heterogeneous agents?

Without the existence of a way of communication between the agents, the multi-agent environment reduces to a simple set of uniagent environments. One agent perceives the others as a part (predominantly as obstacles) of a dynamic environment. If the emotional context of the rows of the contingency table does not decrease fast enough, in a densely populated environment with agents of no linguistic competence, an agent will quickly and easily become disoriented.

Representations

The interest for alternative schemes of representation in artificial intelligence (AI), robotics, as well as in the sciences of the mind rose when, first the classical AI and then the behavior-based robotic systems faced problems of complex real environments. The solutions offered for small, problem-tailored and well-structured lab environments proved to be virtually unusable for real-life environments. Moreover, they could not account for plausible explanations of various

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