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A Computational Media Metaphor

Abstract

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The notion of a medium and with it the concepts of representation, accumulation and dissemination of knowledge have been changing, fostered by the medium computer as a new carrier of information. The computer as a medium breaks up the traditional mostly static notion of a medium, since it is able to collect information, to interact with users and to solve problems presented to it. The Internet as a channel to disseminate information has unique technical characteristics, with reference to accessibility of information in space and time.

Thus, the information technology has influenced media in an unprecedented way. We employ the notation, concepts and theory of computer science to model media and we explore hereby a new metaphor for medium, the computational media metaphor.

Our Model of Media

We model a medium as multi-agent system.

Active agents collect and represent information as their knowledge. They are able to learn, to reason about their knowledge and to adapt themselves. Agents represent humans as well as other carriers of information and thus the agents' abilities differ. The behavior of agents is determined by their roles describing rights and obligations. Agents have locations that differ in time and space.

Channels connect the locations and facilitate communication. For communication, knowledge is externalized, represented by a code and stored on a meme, a transportable carrier of information.

Protocols regulate the communication between agents.

The formal basis of a medium is a logical system, comprising the language for modeling the multi-agent system, as well as the language in which the agents represent their knowledge. The logical system determines the formal relation between the representation of information objects, and the world, partially represented in the medium. It comprises also the notion of deduction of knowledge from the knowledge bases of agents and the way, a medium with its agents evolves. We consider the memotype of a medium as well as the processes of selection of mems the memotypes of agents and the process of adaptation and learning.

Particular to this notion of medium is that it is dynamic and active. The dynamic processes of accumulating, representing, disseminating and managing knowledge on a medium are an integral part of the media metaphor, the medium comprises different kinds of active agents as its parts.

Our Goals

This metaphor enables us

- (1) to analyze and understand media,
- (2) to organize the processes of collection, accumulation, dissemination and management of information and
- (3) to build media and their technical infrastructure. Due to the formal basis of this metaphor, the model of a medium is the specification of the technical infrastructure of a medium.

Applications and Implementations

We have implemented this concept of a knowledge medium in several tools. One of them is the NetAcademy, a medium for scientific online publishing. A NetAcademy serves as a platform for a scientific community employing for the representation the terminology and theory of the community. It fosters new ways of scientific publications as well as processes of information retrieval, of organizing and managing the knowledge represented in the knowledge medium.

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