

Chapter X

DeepaMehta: Another Computer is Possible

Jörg Richter

DeepaMehta Company, Germany

Jurij Poelchau

fx-Institute, Germany

INTRODUCTION

Machine Dreams

A crucial experience during my time at university—computer science (with focus on AI) and linguistics—was the documentary “Maschinen-träume” (1988) by Peter Krieg. It features the long-term AI project “Cyc,” in which Doug Lenat and his team try to represent common sense knowledge in a computer. When Cyc started, in 1984, it was already known that many AI projects failed due to the machine’s lack of common sense knowledge. Common sense knowledge includes,

for example, that two things cannot be in the same place at the same time, or that people die, or what happens at a children’s birthday party. During the night, while the researchers are sleeping, Cyc tries to create new knowledge from its programmed facts and rules. One morning the researchers were surprised by one of Cyc’s new findings: “Most people are famous.” Well, this was simply a result of the researchers having entered, besides themselves, only celebrities like, for example, Einstein, Gandhi, and the U.S. presidents. The machine-dreaming researchers, however, were in no way despondent about this obviously wrong finding, because they figured they would only

have to enter the rest of the population, too. The underlying principle behind this thought is that it is possible to model the whole world in the form of ontologies. The *meaning* of the world can be captured in its entirety in the computer. From that moment the computer can know everything that humans know and can produce unlimited new insights. At the end of the film Peter Krieg nevertheless asks: “If one day the knowledge of the whole world is represented in a machine, what can humans *do* with it, the machine having never seen the world.”

The Potential of Ontologies

In order to create computer applications that suit the human way of thinking and working, one needs to think about ontologies. There are ontologies, for example, for molecular biologists, for news editors, for tourist agents, or for connoisseurs of wine. By developing an ontology people agree on the meaning (semantics) of certain computer codes. Every community of interest is free to create their own ontology or to cowork with like-minded people on the development of a shared ontology. This development process—the ontogenesis—is at least as important as the resulting ontology itself.

An ontology of the entire world will never exist because the meaning of terms depends on their usage context. A wine merchant probably has different priorities than a wine connoisseur which will be reflected in their ontologies. When developing an ontology, local or global communities of interest focus on that parts of the reality that are relevant to their intended usage context. The authors see the prior potential of ontologies not in creating an one-to-one representation of reality, in order to enable automatic reasoning, but in “learn[ing] to think together by building shared structures of meaning” (Murray, 2003, p. 11). That is not in automation, but in collaboration.

We can accept that invitation not only to think about application domains and usage contexts

but also to rethink the underlying concepts of the computer itself, especially the human-computer-interface. It is interesting to bring to mind that ontologies are firmly molded into every software system—long before the Semantic Web effort. These ontologies are made up of the concepts and their relations defined by the software architect, and according to which the user is supposed to think when using the software. So, the concepts of, for example, “presentation,” “slide,” and “masterslide” and their relations are as firmly molded into the software “Powerpoint” as the concepts “application,” “window,” “file,” and “folder” in the software “user interface.”

It would be significantly easier for the computer user if the user could work semantically not only in a single application but if the entire computer were designed as a semantic work environment. In such an environment, the user would no longer work in applications, or store files in folders, but would be confronted with the terms of his/her way of thinking and working directly. At the lowest level such an environment could provide the concepts “more or less structured information unit,” “relation between information units,” “view of a information context,” “shared workspace,” and “private sphere.” At the next higher level more specific concepts of yet general usage like “contact info,” “appointment,” “task,” and “project” could be provided. And at the highest level the user would find the concepts of its individual work and leisure domains, for example, a molecular biologist and movie fan would work with the concepts “chromosome,” “gene,” “protein,” as well as “movie,” “actor,” and “cinema.”

The Trouble with Computers and their Solutions

When learning how to use a computer nowadays, one understands quickly that for every purpose one needs a specific application. To write a text, one uses a word processor. E-mails are dealt with using an e-mail application. To surf the Internet

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