

Position paper for the workshop “*Potential of Cognitive Semantics for Ontologies*” - FOIS2004 Torino, Italy, November 3rd, 2004

A collaborative ontology for ‘spatialised communication’

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0.1 Introduction

The objective of this position paper is to present my research interest in participating in the workshop of the FOIS2004 and secondly, to systematise the reasoning process I undertook so far during the literature review for my PhD work. Hence, the claims raised in this text may be accidentally fuzzy or not supported by proper references.

Current research in Computer Supported Collaborative Learning (CSCL) is oriented towards a definition of systems able to sustain human collaboration through two main philosophies: mirroring and guiding systems [Jermann et al.2001]. The former attitude involves the detection of the user activity and the constitution of some forms of visual representation of this activity. Through this feedback offered by the system, a change of attitude of the user is expected and measured. The latter attitude, implies the existence of a cognitive theory which should relate the measured data with a model of collaboration. From here, the system should be able to address critical aspect of the interaction that need to be corrected to maximise the outcome of the user experience (i.e., [Barros and Verdejo2000]).

Both approaches present structural and actual limits. The former is biased by the way the user can understand the visual representation and if s/he

possesses the ability to switch attitude using this information. The latter is strongly challenged by the lack of computer models able to compete with the complexity of human reasoning. Examples using complex AI approaches are still missing.

A third way is needed between these two approaches described above, which can propel the research on the cognitive models at first and then in the translations of these models into computer algorithms (see [Dillenbourg et al.1996]). This is one of the objective of my study, described in this position paper. My idea is to use a light AI approach, where the intelligence is not relied to be completely in the system. On the contrary, my approach argument in distributing the intelligence in a system constituted by the users plus the computational media.

In this regard, I started looking at ontologies as the natural ground on top of which developing my philosophy. By definition ([Gruber, Mizoguchi2003]), an ontology is an “explicit specification of a conceptualisation”, therefore able to render the complexity of human meanings and formulations. The advantage I can see in using such systems to encode human collaboration acts, rely in the fact that, being the ontologies agreements about a shared world, these are socially constructed and therefore able to take into account the variability of human reasoning. Hence, using ontologies we can support collaborative learning/work (see [Barros et al.2002]).

0.2 Research interest

The second theme which characterise this paper is this concept of ‘spatialised’ communication. Using this term I mean a system in which two or more persons communicate making explicit usage of the space to contextualise the exchanged messages, resulting in an economy of the communication process. I choose this particular context as an example where to contextualise the philosophy described above.

Pervasive computation and Location awareness enables for new kind of interaction and collaboration over distance not possible before. Particularly I was interested in the idea of attaching virtual notes to physical context for sharing information in the group of peers [Espinoza et al.2001]. In turn, the availability of these new form of interaction, enables for new usage of the city space which reflect on the mental representation of the city ([Tuters2004, Lane2003, Nova2003]). This psychological dimension of the city space is addressed by Stanley Milgram, which states that [Milgram1976,

6]: *the perception of the city is a social fact and as such in needs to be studied in its collective and individual aspects.*

Recent changes in the communication systems enables from forms of communication that are so fluid because detached from the physical constraints of the place. Nonetheless, people still need to have such references while talking to shape the communication and to make it more effective. Recent studies in the filed of CSCL [Nova et al.2003] demonstrate how awareness tools in virtual environment was influencing the mutual modeling process. In the same extent my goal is to reintroduce specifically space in virtual communications, aiming to propel and support collaborative work/learning.

0.3 Contribution to the workshop

My personal contribution to the workshop is not supported by strong arguments. Nonetheless, I am trying to offering my personal answer to some of the workshop questions, describing my personal approach which consists of mixing cognitive psychological approaches with computer science and the ontology theory. To the question: “How do the ontologies become meaningful?”, I answer: “When they are socially constructed and shared”.

One of the main argument to this claim is that meaning is not independent of perception [Gärdenfors2000], meaning that the cognitive structures are connected with perceptual mechanisms, mainly what we see and hear. Additionally, in accord with [Putnam1975], I believe that there is a social structure in language and that this social meanings are determined from the individual meanings together with the linguistic power of the community. Therefore we need to give more weight to the social construction of language, which reflect to the construction of personal meaning.

My approach consist in giving privilege to the collaborative aspect of the construction of the ontology, in trying to give to connect more these information systems with human activities (see [Kuhn2001]).

0.4 Research questions

Q1. What are the cognitive processes by which people infer elements of the communication, subsequently economizing the process, only considering the history of the receiver/emitter position and the connected communication content?

Sub1. Can we build an Agent that will build a semantic description of the

communication content based on an algorithm constructed on these cognitive processes?

Sub2. Is this autonomous agent able to maximize contextual spatial cues through providing this semantic description of the spatialized communication between peers?

Sub3. How is this description/knowledge reflecting in the way people use the space in their daily life?

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