ORAL PAPER

Geographic event conceptualization

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Dynamic processes on the geographic scale and their monitoring are a growing topic in spatial sciences. Along with the technical advances, the need for a basic understanding of the conceptualization of dynamic processes in cognitive agents is required. The formal characterization of these conceptualizations is necessary to automate the identification and characterization of conceptual structures that discretize continuous dynamic processes into conceptual units. This research allows for transducing data, such as recorded by sensor networks, into conceptual knowledge. While research on the characterization of cognitive events has a long history within several sciences (Casati & Varzi 1996), we still lack a good understanding of the conceptualization of geographic events. Our research, therefore, aims at the core of conceptual structures of geographic events by employing a grouping paradigm to elicit conceptual knowledge. The research we report here does not aim to identify event boundaries, as, for example, reported in research on the perception on the structure of events (Zacks & Tversky 2001). In contrast, our research presupposes the existence of event classes as they can be identified by formal characterization of geometric transformations (and corresponding parameters), as well as the characterization of the behavior of regions, for example, the RCC calculi (e.g., Randell et al. 1992). For static relations, the RCC calculus has shown cognitive adequacy (Knauff et al. 1997). Grouping tasks are traditionally one of the most important methods to investigate conceptual knowledge in psychology (e.g., Cooke 1999). The main idea of such tasks is that conceptual knowledge plays the central role in rating the similarity of a given stimuli: stimuli are assessed as similar if they are instances of the same concepts. They are assessed as dissimilar if they are instances of different concepts. If other aspects of presentation are controlled, like in our experiment, such grouping experiments can provide important insight into the internal structure of conceptual knowledge. To realize our event experiment, we are using a purpose built software tool (cf. Knauff et al. 1997; Klippel et al. 2004) that allows for sorting animated icons that represent different event characteristics displayed on a computer screen. In contrast to other card sort-ing/grouping tools (e.g., Harper et al., 2003), it will be especially designed to use animated pictorial stimuli and is therefore well suited for modality diverse event conceptualization research. The icons show different geometric figures and geometric transformation representing behavior of single regions or transformations of regions on the basis of conceptual neighborhoods as defined by Freksa (1992) and Worboys and Duckham (2006, under review).

The grouping experiment will finish with two further tasks: 1) The groups created by the participants have to be labelled; 2.) The groups with the dynamic elements have to be sythesized into a static symbol.

The last part of the experiment will shed light on the relation between conceptual structures in interaction with different modalities, here, graphics and langugage. The identification of these relatons is necessary for the design of multimodal information systems. Thereby, we also will elaborate on the relation between language and graphics through a common conceptual structure (Tversky and Lee 1999; Klippel 2003).

An additional aspect (for future research) is the relation of a static medium and the requirements to represent dynamic processes. Not as a snapshot, but distilled to their very essence of the underlying conceptual structure.

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