Chapter 3

Context-Aware Recommendations using Topic Maps Technology for the Enhancement of the Creativity Process

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ABSTRACT

Learning can be observed in the creativity process. When this process is supported by a Creativity Support Tool (CST), considering the context in which ideas are developed, as well as the context around the user himself and the task he is carrying out can potentially enhance creativity. The tool’s awareness of such context can be exploited in the offering of useful context-aware recommendations to the users on topics such as relevant resources, people, ideas, projects, et cetera. These recommendations can help users during the creativity process and the learning involved, by providing productive stimuli. In the work presented in this chapter we focus on describing a method for enhancing the creativity process through context-aware recommendations. The method uses ontologies for the knowledge representation of context and the topic maps technology for storing, managing, and delivering content used as recommendations. Furthermore we present the software system that has been developed to support this method in a particular collaborative CST, as well as its evaluation.

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INTRODUCTION

Creativity is recognized as a psychological term and is usually measured using psychological methods. The transition of creativity from a psychological term to a computer related term was achieved by modelling it through several creativity techniques and simulating these techniques in Creativity Support Tools (CSTs). A creativity process on the other hand is a sequence of steps, during which context dynamically changes: different contextual factors can influence the process according to the stage of the process.

The current work aims to facilitate the creativity process through the integration of a context aware recommender system within a CST. It is in our belief that the use of context awareness within CSTs will be able to enhance the creativity process by offering the user useful recommendations. A first step towards the establishment of this task is the definition of the context awareness ontology related to creativity. Defining the contextual elements of creativity and modelling them as an individual ontology offers the flexibility to use the Topic Maps technology. The ontology that has been designed for a specific CST is described in detail.

The context of a CST was modelled by defining and describing the most important contextual entities and their role in the creative process. Following context modelling, the context reasoning procedure is described, a method that reasons upon context in order to provide the most relevant recommendations based on the user and the task he is carrying out at that point in time. In the next section we will introduce areas and background work relevant to our work.

BACKGROUND

According to Dey’s definition (Dey, Abowd, & Salber, 2001), “context is any information that can be used to characterize the situation of an entity. An entity is a person, place, or object that is considered relevant to the interaction between a user and an application including the user and applications themselves”. (Jun-Zhao & Sauvola, 2003) mentions that context entities can be structured into three domains: the user domain, the computer domain and the environment domain. Modeling the context considering these three domains, it is important to ensure that they interact with each other. In this way it is ensured that the context data can be collected as an ensemble of the context data for an entity. According to (Jun-Zhao & Sauvola, 2003) the representation of context is a description of the internal and external features that constitute the context information. Internal features describe characteristics that exist inside an entity or its domain. External features are those which describe the context information that can be retrieved from the interaction of an entity with other entities. (Brown, Bovey & Chen, 1997) use the Standard Generic Markup Language (SGML) for the representation of context information, aiming to prove that the representation of context information can be achieved as easy as the development of a web page in HTML. In the same work they give emphasis on the syntax of the languages that are commonly used for context representation.

In the existing literature several methods and techniques for modelling context can be found (Key-value models, Mark-up schemes, Graphical models, Object oriented models, Logic Based models and Ontological based models). Based on an evaluation of context modeling in the work of Strang and Linnhoff-Popien (2004), ontologies are the most expressive models and fulfill most of the requirements for context modeling such as simplicity, flexibility, extensibility, generality and expressiveness. For the purpose of the work presented in this chapter, ontological modelling is assumed to be the most suitable method for context modelling of creativity. The proposed context model constitutes an ontology schema supported by the Topic Maps concepts.
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