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System architecture for semantic annotation and adaptation in content sharing environments

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Abstract This paper describes a system architecture, which enables the automatic semantic annotation and adaptation of multimedia content in context-aware content sharing environments. The discussed architecture is the result of research done in the EU FP6 IST INTERMEDIA project. Generating a common vision on user-centric multimedia services in shared content environments to provide users with content personalized to their user preferences and usage environment is one of the objectives of the project. The work presented in this paper describes how media formats with their related metadata are automatically annotated and dynamically adapted. Based on the architecture, a full-featured demonstrator is built.

Keywords Semantic annotation and adaptation · Description-driven adaptation · System architecture · Content sharing environment

1 Introduction

The heterogeneity of networks, devices, protocols, and multimedia formats continuously fosters the ever-growing need for novel multimedia services. This plethora endangers the development of dynamic interoperable multimedia facilities. Dealing with such a degree of complexity is a major technical and economical challenge, which affects network operators, content and service providers, and users. The architecture described in this paper addresses the delivery and consumption of adaptable multimedia content in a context-aware content sharing environment. The architecture facilitates the construction of user-centric multimedia services.

The research described in this paper is the result of research performed in the scope of the EU FP6 IST project Interactive Media with Personal Networked Devices (INTERMEDIA) [9]. One of the objectives is to generate a common vision on user-centric multimedia services in shared content environments to provide users with content personalized to their (semantic) user preferences and usage environments. In order to achieve this goal, we have specified the integrated components of a system architecture for automatic content annotation, dynamic content adaptation, and flexible content delivery and consumption. A demonstrator for semantic annotation and adaptation has been developed to illustrate the user-centric multimedia service concepts made possible by the proposed architecture. The resulting technology enhances the overall user experience by providing service quality customized to given semantic user preferences. Providing content for shared environments, which needs to be adapted to dynamic context information is a significant challenge. Unfortunately, most content collections lack any metadata for efficient browsing, retrieval, and adaptation. Manual annotation is very resource consuming, if not also technically unfeasible for the user. Therefore, to extract the semantics from the content, automatic content analysis and annotation are of imperative importance. Content adaptation should happen independently of the