

Virtual Campfire – A Mobile Social Software for Cross-Media Communities

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Abstract: Multimedia creation, annotation and sharing are challenging tasks especially of interdisciplinary, intercultural and intergenerational communities. We present the mobile social software *Virtual Campfire* to provide cross-media and cross-community support for de- and re-contextualization of multimedia content, employing Web Services, the MPEG-7 standard and Web 2.0 technologies etc. Virtual Campfire can enable communities to set up and maintain multimedia community information systems quickly and easily.

Key Words: Information system, Multimedia, MPEG-7, Web Service, Social Software, Web 2.0, Mobile computing, Community of Practice.

Categories: H5.1 Multimedia Information Systems, H2.4 Systems.

1 Introduction

Virtual Campfire is an approach to providing cross-media and cross-community support for the de- and re-contextualization of multimedia content. Virtual Campfire serves as a framework for various web services enabling communities to share knowledge on the Web 2.0. It employs advanced multimedia technologies in order to professionally support interdisciplinary, intercultural as well as intergenerational communities. We present a selection of services on the basis of the Lightweight Application Server (LAS) serving as the backbone of the Virtual Campfire framework to show its applicability in various application scenarios.

2 Objectives

Our research is framed by three distinct projects covering the many facets of multimedia processing for communities of practice:

- The Aachen based research cluster established under the excellence initiative of the German government "Ultra High-Speed Mobile Information and Communication (UMIC)" (www.unic.rwth-aachen.de)
- The interdisciplinary collaborative research center of the German Science Foundation on "Media and Cultural Communication" (www.fk-427.de)
- The EU IST Network of Excellence in Professional learning focusing on technology enhanced learning PROLEARN (www.prolearn-project.org).

In Virtual Campfire, we focus on two specific aspects in multimedia processing. First, we incorporate multimedia content interoperability by employing the MPEG-7

multimedia metadata standard. Second, we provide a framework for multimedia-centric services that help professionals create community information systems in order to foster multimedia enhanced knowledge sharing in communities.

3 What Will Visitors See?

We present the following MPEG-7 compliant multimedia services of Virtual Campfire based on LAS [cf. Figure 1]:

- Interdisciplinary, intercultural and intergenerational learning support by geographical hypermedia services [Klamma et al. 06].
- MPEG-7 compliant tagging fostering the management and access of multimedia content by semantic tagging [Spaniol et al. 06a].
- Media integrated storytelling to support learning from digital stories in communities of practice [Spaniol et al. 06b].



Figure 1: Scenario of Multimedia Service usage in Virtual Campfire

In detail, Virtual Campfire enables communities like cultural heritage communities, multimedia communities, learning communities, and geospatial communities to create, annotate and share multimedia content. Virtual Campfire provides a set of services including mainly the user and role access management service, the FTP service, the geo-tagging service, the feature extraction service, the multiple database connector service, the MPEG-7 service and the story service.

All these services are deployed on LAS, which is a platform-independent lightweight middleware server implemented in Java. It has been developed for the purpose of providing web services which can be shared among various tools in order to support the work of communities in practice. The LAS architecture is based on the

LAS Connectors using HTTP and SOAP, the LAS Components as the minimal functionality units, and the LAS Services easily and directly used by the client side. The LAS Java API and its concepts can be easily used to extend the server functionality.

To summarize, within Virtual Campfire communities are able to produce images, audios and videos by mobile devices with the relevant location information. The multimedia content could be annotated by MPEG-7 compliant tagging services. Stories can be created by selected pre-annotated multimedia content. These stories are suitable and interesting learning contents for the cross-media communities on various platforms e.g. the Apple iPod.

4 What Is Innovative About This Exhibit?

Virtual Campfire offers an open architecture that helps professionals flexibly create information systems in versatile application domains. On the basis of LAS it combines advanced multimedia standards and database technologies like spatial databases and XML databases facilitating the creation and maintenance of state-of-the-art (mobile) information systems for MPEG-7 compliant multimedia support. Furthermore, Virtual Campfire shows a new way to bridge between Web 2.0 tagging as well as folksonomy-based approaches and advanced multimedia standards such as MPEG-7 and Dublin Core approaches leading to location-based semantic multimedia annotations. Meanwhile, it provides communities more opportunities to create, access, share and even reuse multimedia content in the Web 2.0 era.

Acknowledgements

This work was supported by the excellence initiative of the German government within the research cluster “Ultra High-Speed Mobile Information and Communication (UMIC)”, by the German National Science Foundation (DFG) within the collaborative research center SFB/FK 427 “Media and Cultural Communication”, and by the 6th Framework IST programme of the EC through the NoE on Professional Learning (PROLEARN) IST-2003-507310. We thank our students Dimitrios Andrikopoulos, Pham Manh Cuong, Andreas Hahne, Holger Janßen, and Monika Pienkos for the system development.

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Spatial Applications as Social Knowledge Provider. An Approach for Regional Virtual Communities

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Abstract: Existing applications in visualization of blogs and online conversations have largely focused on the discovery of social networks and knowledge flows in the online space. At the same time, another class of visual spatial applications allows us to uncover the relationships between people and real space. This can be used to infer how individual and collective behaviour is not only a function of social contexts but also spatially situated in real physical environments. This paper presents a socio-technical approach and a prototype public tool integrating these two aspects in a synergetic way: (1) using social software to facilitate community forming in specific regional, spatial application scenarios and (2) eliciting new knowledge from community-based interaction processes in spatial settings. The prototypical implementation in a case-study in Upper Austria demonstrates how the developed socio-technical tool enables new forms of cross-municipal communication and interaction which blend together physical, informational and social dimension of space.

Keywords: Social Software, Spatial Applications, Digital Communities, Conversation Visualization, Digital Cartography, Collaborative Mapping, Cross-Municipal Communication

Categories: H.5, H.5.2, H.5.3, J.5, K.4.1, K.4.2

1 Introduction

This paper presents a socio-technical approach and a prototype public tool integrating two aspects in a synergetic way: the discovery of social networks and knowledge flows by the visualization of blogs and online conversations and the usage of spatial applications to uncover relationships between people and real space.

The project places emphasis on (1) using social software to facilitate community forming in specific regional, spatial application scenarios and (2) eliciting new knowledge from community-based interaction processes in spatial settings. Thus, we are demonstrating the work on a public tool that enables new forms of cross-municipal communication and interaction.

2 Approach

To improve the value of online-platforms in regional contexts, we merged a specific *cartographic mapping* and a specific *conversation visualization* approach. Synthesizing online networking, geographical localization and visualization methods

[see e.g. Donath, 99 and Lima, 05] should create intuitive access to the interaction patterns and the user-generated collective knowledge of a regional community.

2.1 Collaborative Mapping and Online Conversation

The method of resolution for the prototype is to connect the elaborated functions of a conventional internet forum with an additional module to embed a geographical (regional) dimension as reference and orientation framework for the community. *The connection of a cartographic map (static and closed) with online conversation (dynamic and ongoing) is conceptualized and designed to generate additional information of the relationship between geographic frames of reference and the occurring communication and interactions processes of individual user and user groups.* Enabling the interrelation between spatial information and user generated content (collaborative mapping) reflects the localization and structure of the community and its representation as *network of people* with specific backgrounds. Geographical frames are related to specific discourses that are relevant especially for the people in this area.

2.2 Visual Studies and Online Conversation

The combination of the usage of the cartographic material and the visualization patterns, here realized as a visualization of the communication activities on the map, allow “*to make the complex accessible*” and “*to make the hidden visible*” – the geographical distribution of members and their degree of involvement into specific subject-matters concerning the social issues of a region. Mapping, thus, is a designer’s task to invent strategies for information visualization enabling new interpretations [see Abram et al., 06]. Using a map as tool for supporting online conversation necessitates implementing a dynamic quality that is realized by dynamic visualization of the user’s activity. Thus, the difference to actual forms of visualizing online communication or blog activity is that it is based on a synthesis of cartographic mapping and visual analysis.

The self reflexive practices activated by a visualization on a map are essential for the collective identity of the community and, moreover, the dynamic expression of social activity as well as its interpretation. Referring to the categories of [Judelman, 04], both complexity (list / all articles of a thread) and interrelationships (location, article, user) are visualized.

3 Visualization Patterns in the Prototype

The data base for the visualization is automatically generated from both the user profile (registration data) and the user’s activities in the forum (number of posts per thread). The user profile contains the localization of single participants as well as special group belonging(s) relevant for the forum. Two types of visualization, the visualization of the discussion and of the community, are realized: The user can switch between a text forum with common functionalities and a visualization mode that is displaying the discussion in a thread on the scalable map (figure 1). Items with different coordinates and sizes are representing the local position as well as the

intensity of participation of a participant. This display format is reflecting the geographical dissemination of the subject-matters and allows judging the spreading and relevance of a discussion with regard to the intensity of participation.

The visualization of the community allows intuitively identifying the geographical distribution of the members as well as the density of participation. A more differentiated image of the digital community is available by several filter functions selected by individual parameters. By changing the maps (e.g. political/physical and statistics maps), additional knowledge about a specific community frame can be gained due to e.g. a comparison of the community's activity on a specific topic and the appropriate statistic data for the section. The generated image of the spatiotemporal progression of the online-discussion allows to cross-read the contents in the context of municipal specific statistical maps.

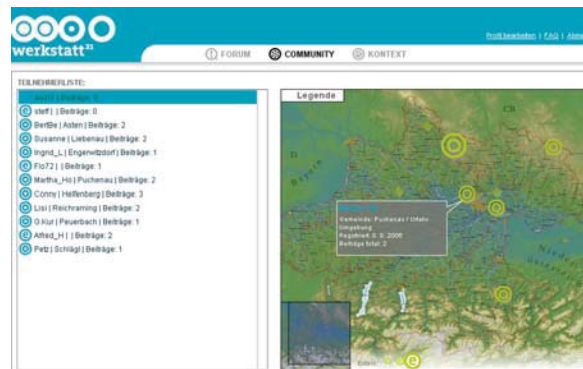


Figure 1: Snapshot of the Discussion Visualization in the PROvisionS Prototype

4 Synthesis and Conclusions

The result is a spatial application [see Hockenberry, 06] that enables, as public tool, new forms of cross-municipal communication and interaction and elicits new knowledge from this community setting both for the users themselves and for external research. Starting from scientific research and project evaluations, we've chosen the approach to combine a specific *collaborative mapping approach based on cartographic material* and a specific *visualization approach representing asynchronous online discussions both in structure and content*. Due to the cartographic mapping approach, it was possible to create a close link between the real life experience and the digital space of the community.

Due to the visualization approach it was possible to redesign linear-chronological text based communication supported by the most conventional online platforms and suffering from insufficient transparency, incoherent accumulation of huge masses of data etc. Users can access the hidden knowledge reservoirs of the community (structure, history and localization of the online discussion) at the first glance. The combination of both approaches opens up a democratic *place* facilitating self-reflection and identification within specific regional context. Knowing about the

origin of posts and annotations leads to a coherent image of the real social environment and the focal point of topic discussion. Due to democratic principles and easier identification of collective interests and fields of action, online communication within regional contexts facilitates to quickly shift from knowledge to activity and vice versa. The visualization functions also serve as 'diagnostic tool' for different branches, scenes and milieus.

5 Future Prospects

The visualization of interaction patterns shall be enhanced to facilitate network analysis and graphic/visual representations of the contents of a discussion. In this context, the Ars Electronica Futurelab started collaborations to develop tools synthesizing the current results with semantic and self-learning functions.

Acknowledgements

The R&D of two prototypic applications of 'Social Software as tool for cross-municipal communication processes: a community network for Upper Austrian citizens' was funded within proVISION, a programme of BMWF Ministry of Science and Technology, Austria.

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