Enable Wikis for seamless Hypervideo Integration

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ABSTRACT

Motivation – Wikis are Web-based collaborative systems that allow users to create, share and interlink content. Existing Wikis restrict users to edit and arrange text with other embedded media formats. Unfortunately moving pictures are handled as a whole without considering their temporal dimension. Their time-related composition and association with other parts of the wiki are withheld from the users influence. Thus, current wikis cannot be used to host or author rich dynamic and interactive hypervideos along with hypertext elements.

Research approach – A comparison of hypermedia systems and video production tools as well as wiki software was made to identify requirements of time-based user interfaces for hypervideo authoring environments.

Findings/Design – In this paper I present an approach for seamless and collaborative integration of interactive hypervideos into existing wiki environments. The wiki metaphor is combined with a direct manipulation user interface for hypervideo authoring and particular markup conventions.

Originality/Value – The research makes a contribution to collaborative work and learning with wikis. It enables users to annotate spatio temporal hyperlinks as well as composite sequential video clips through both, graphical user interface and generic markup language.

Take away message – Moving images within wikis can communicate ideas in ways that text can not. These images can be interconnected with other wiki contents.

Keywords
Wiki, CSCL, hypervideo

INTRODUCTION

Wikis such as Wikipedia are a good example of text-based, collaborative knowledge databases. Its their aim to share stored information with a dedicated but almost broad audience. Information is organized in pages or articles which are interconnected among each other and beyond the wiki by hyperlinks. Page content itself consists of text and encapsulated static or continuous media elements. Users can collectively make changes and create new pages as easy as using a common word processing software. Due this similarity it is reasonable to explain limitation in compositing and manipulating continuous media elements within wiki engines of today. Continuous media elements can only be assigned to a certain spatial position and dimension within the predefined layout. Current wikis do not address its characteristically temporal peculiarities.

As Tim Berners Lee (1999) stated editing web content is as important as browsing, video should not be excluded. In this paper I am presenting techniques to host and edit dynamic and interactive video as a representative of continuous media.

RELATED WORKS

Augmenting wiki pages with a composition of several video clips can be considered as asynchronous incremental collaborative creation. Kaltura as an example of web-based video editing software supports collaborative management, creation and publishing of videos as plug-in for MediaWiki to encourage video integration at Wikipedia. Multiple takes can be composed on parallel time tracks. The result is saved on the server and can be referenced as video inside a wiki page. Neither the wiki markup editor nor the graphical authoring interface offering spatio-temporal annotations or interactions like hyperlinks.

As an integral part of hypervideos hyperlinks promote the audiovisual realization of the hypertext idea. Because of its non linear information structure and its sequential information access hypervideo authoring requires different user interface approaches then typical video editing software with its single or multi track timelines. Instead authoring environments make use of (at least one) of these principles (Seidel 2008):

- direct authoring, e.g. YouTube, ADIVI (InnoTeams 2007);
- graph based interfaces, e.g. MediaLoom, pipaciti (Seidel 2008);
- markup/text editors, e.g. Video-Wiki (Blankinship & Mikhak 2007).

Non of these authoring applications or concepts include word processing functions and, except Video-Wiki (Blankinship & Mikhak 2007), were considered as collaborative web applications. Video-Wiki is "an integrated suite of web applications for collaborative markup and remixing video content". Analogue to HTML source view of Web browsers, closed captions are used to represent the structure of a video. These
closed captions can be rearranged in a graphical editor in order to restructure video playback. Spatio-temporal are not provided.

To achieve a seamless integration of hypervideo into common wiki engines four core requirements need to be considered: (1) provide spatio-temporal hyperlinks, (2) concatenate video clips one by one, (3) represent the interplay of video and hyperlink as wiki markup, (4) include hypervideo as part of the word processing environment.

USER INTERFACE
Following Hardman et al. (1999) the design of outgoing hyperlinks can be distinguished in intra page links, inter page links, inter page temporal links as well as external link targets. To facilitate a consistent user interface link type and destination is represented by an icon and short text. Beside that incoming links can be temporal referenced in the wiki markup.

Collaborative hypervideo authoring consists of two main tasks: adding a video and annotating hyperlinks. Correspondingly the rich text editor of the wiki engine has been extended by two buttons to access both authoring tasks.

![Figure 1: Dialogue for inserting video](image1)

![Figure 2: Dialogue to annotate hyperlinks](image2)

In the first dialogue (Fig. 1) video resources can be selected from a library, uploaded from the users file system or taken from the web. In order to reference each video needs a unique identifier within a wiki page. Optionally the user can constrain video playback by defining its start and end position on the timeline slider.

The second dialogue (Fig. 2) aims to define the spatial and temporal link position inside the video. The base video acts as guidance to indicate the (static) link position by clicking inside the video. Temporal position and dimension of the link anchor can be selected on the timeline slider. Furthermore the link target needs to be specified by providing a (wiki) URL and/or unique identifier. Closing the actual dialogue results in the appropriate wiki markup inside the editor text field.

WIKI MARKUP EXTENSION
By offering a consistent markup for hypervideo authoring video content becomes more transparent. Core of the extension is the addition of time-related parameters considering that current wiki engines only allow spatial arrangements. Furthermore the markup extension allows concatenation of video clips (Fig. 3).

![Figure 3: Markup editor with two sequential clips and hyperlinks](image3)

APPLICATION
The implementation of the presented concepts for a hypervideo wiki resulted in multiple prototype plug-ins. Through letting almost of the plug-in code run on client-side its integration into MediaWiki, DrupalWiki and Twiki could be simplified by reusing Javascript code and regular expressions to parse particular wiki markup. Video playback and time-related functions such as hyperlinks have been build with a framework for interactive videos called vi2. As first application scenario a group of four historians and teachers were ask to spread and interconnect sections of book about a concentration camp in Lower Silesia (Seidel 2008b) into a hypertext DrupalWiki. Participants were encouraged to enrich the static content by 20 to 120 minute long oral history videos of holocaust survivors and contemporary witnesses. The resulting hypervideos should reference on the particular wiki page about mentioned persons, places or incidents. Furthermore participants were asked to annotate text-links targeting specific parts of the videos.

An evaluation of the resulting link structure and placement emphasizes hypervideo usage mainly as introduction referring to text contents and as summary with backward references. Participants wanted to have more video material to balance text and hypervideo more evenly. The overall feedback of the participants has been very positive although users suggested a direct authoring functionality during video playback.

REFERENCES


