Hypervideo Production Using Crowdsourced Youtube Videos

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ABSTRACT

Hypervideos, consisting of media enriched and linked video scenes, have proven useful in many scenarios. Software solutions exist that help authors make hypervideos from media files. However, recording and editing video scenes for hypervideos is a tedious and time consuming job. Huge video databases like YouTube exist that can provide rich sources of video material. Yet it is often illegal to download and re-purpose videos from these sites, requiring a solution that links whole videos or parts of videos and plays them in an embedded player. This work presents the SIVA Web Producer, a Chrome extension for the creation of hypervideos consisting of scenes from YouTube videos. After creating a project, the SIVA Web Producer embeds YouTube videos or parts thereof as video clips. These can then be linked in a scene graph and extended with annotations. The plug-in provides a preview space for testing the hypervideo. Finalized videos can be published on the SIVA Web Portal or embedded in a Web page.

CCS Concepts

•Human-centered computing → Hypertext / hypermedia; Graphical user interfaces;

Keywords

Hypervideo; Crowdsourcing; Authoring; Chrome Extension

1. INTRODUCTION

Hypervideos consist of linked video scenes. A scene graph provides an underlying structure which connects video scenes in a meaningful way. The viewer can choose a path through the scenes by selecting one of the next available scenes. Another way to navigate is with a table of contents, which allows the user to jump to a specific scenes in the scene graph and play the hypervideo from there without having to navigate through the scene graph again.

While hypervideos have proven to be useful in many different scenarios, it is a tedious job to film all needed scenes, cut and edit them, and maintain a high quality for further usage. However, "as of July 2015, more than 400 hours of video were uploaded to YouTube every minute" [10]. Reusing these videos can reduce hypervideo production time significantly. Our previous hypervideo authoring tool, the SIVA Producer [3, 4, 5, 6], provided all functions to create hypervideos. But it also required storing the video on a local hard disk. A more practical solution is to web-link the video clips and play them directly from their source.

2. RELATED WORK

While hypervideo systems have been implemented since 1996 [9], very few authoring tools are currently available. The SIVA Producer [3, 4, 5, 6] allowed the creation of annotated interactive non-linear videos, a special form of hypervideos. However, all videos had to be available on ones hard-disk making it difficult to legally use large video pools like YouTube with current copyright restrictions. Klynt [2], a tool for interactive storytelling, also provides many features for hypervideo creation and allows the integration of YouTube videos. However, only the whole video can be embedded, not shorter sequences from within the clip. YouTube video annotations, which appear in different shapes in the video (like speech bubbles or notes), can allow videos to be linked with each other [15]. However, no view is provided that shows links between videos (like a scene graph). This makes it hard to create and maintain larger projects. When a user clicks one of the hotspots, a new web-page with the linked video is loaded. This destroys the impression of a coherently presented the hypervideo. Our research has not discovered other platforms that allow easy linking of user generated video from platforms like YouTube.

3. SIVA WEB PRODUCER

The SIVA Web Producer is implemented as a Chrome Plug-in [8] which can be activated on YouTube video pages and opens in the lower part of the browser. The application is organized in a tab concept with six tabs.

The **Select Project** tab provides an overview of one's projects. New projects can be created or already existing ones can be selected and loaded for editing. This area also provides functions to export the hypervideo structure and publish the hypervideo on our online platform [11]. Apart from a direct link to the exported video, an embed code is also provided allowing users to embed their hypervideo into
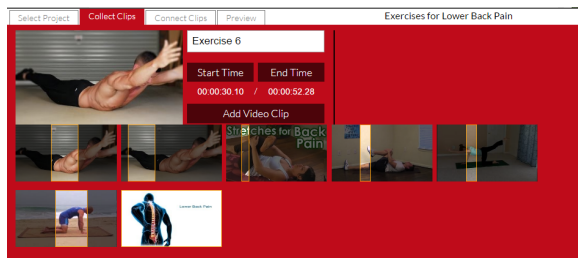
Figure 1: Collect clips tab (media repository)

Figure 3: Preview tab (player)

other web-pages. During playback, the SIVA Web Player loads the videos directly from the YouTube web-page using the YouTube API [14].

The **Collect Clips** tab has two areas (see Figure 1). In the upper left area, the currently displayed YouTube video can be named and added to the scene repository below. If only a part of the video is needed, start and end time of the desired clip can either be defined manually or selected with corresponding buttons while watching the video. The lower part of the screen contains a repository where the already created clips are shown. An orange box on the preview thumbnail indicates which part of the video is selected from the respective clip. The unselected parts are grayed-out.

The **Connect Clips** tab also consists of two sub-areas (see Figure 2). The right side shows a list of all previously created clips. Each clip is represented by a preview thumbnail, the name, an assigned number, and a colored rectangular frame. Each frame has a unique color which helps to better identify the clip in the scene graph on the left side of the tab. The clip is dragged from the list on the right onto the graph area on the left. Doing this changes its appearance, eliminating the thumbnail image making the box smaller. Two connectors are added. A scene graph is created by clicking the outgoing connector area of one scene and then clicking the incoming connector area of another scene. A valid scene graph has at least one connection from the start node to one scene, and each scene is reachable from the start node. The elements in the graph area can be re-sized, providing a better overview of larger graphs. A right-click on a scene in the scene graph opens an annotation editor that allows adding text or image annotations to the scene. Annotations can be arranged in a desired order and are shown over the whole duration of a scene.

The **Preview** tab uses the same player as our hypervideo platform and allows the author to test the video without having to export it first (which was a major shortcoming
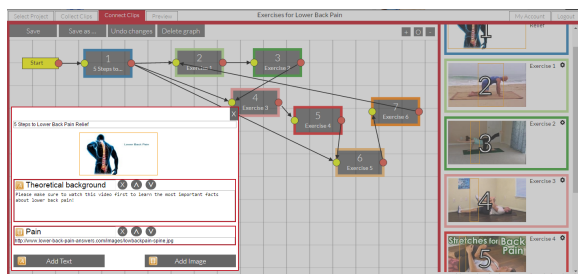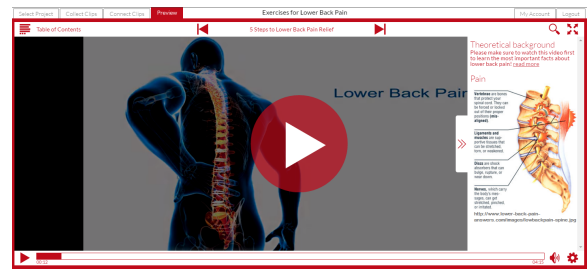
of our desktop version of the SIVA Producer [3, 4, 5, 6]). The video is shown centered. It may be overlaid by a selection panel on the left side at the end of a scene where the viewer has to decide on how to proceed in the hypervideo. Additionally, an annotation area on the right side of the screen can be opened and closed by using its handle. The player furthermore provides all elements of the SIVA HTML5 Player [3]. Along with the title of the current scene, buttons for the table of contents, search, and full screen mode are shown in the top pane of the player. The play/pause or repeat button (depending on the state of the video), the video time line, the volume control and the settings button are shown in the bottom pane of the player.

The My Account tab allows users to administer their personal data. Users log out of the system by clicking on the log-out tab.

4. DEMONSTRATION

The demonstration of our SIVA Web Producer Chrome extension describes its use in a physical exercise scenario. Personal trainers or physiotherapists can create fitness videos with existing materials from YouTube. A search on May 4, 2016 showed about 2,220,000 results for the term "fitness exercises" and about 75,300 results for the term "physio exercises". Linking selected videos or parts of videos results in a training program that can be fitted to the needs and daily condition of the user (for an example see [7]). Existing training programs can be extended or new ones may be created. We can imagine using the system in other scenarios like e-learning courses or tutorials. A demo video is available [1], as well as a tutorial [12].

5. CONCLUSION

The SIVA Web producer, a Chrome extension, is an authoring tool for the creation of hypervideos that links externally stored videos and annotations (from sources like YouTube) to scene graphs that are read and played by a web player. This eliminates the need for hypervideo authors to download, reconstruct, and store media locally. These completed hypervideos are then be published on our hypervideo platform or embedded in web pages. While our current version only accesses YouTube, future work will include integrating videos from other platforms like Vimeo [13].

6. ACKNOWLEDGMENTS

Figure 2: Connect clips tab (scene graph)

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