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Additional Information

Web-based Platform for Subtitles Customization and Synchronization in Multi-Screen Scenarios

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ABSTRACT

This paper presents a web-based platform that enables the customization and synchronization of subtitles on both single- and multi-screen scenarios. The platform enables the dynamic customization of the subtitles' format (font family, size, color...) and position according to the users' preferences and/or needs. Likewise, it allows configuring the number of subtitles lines to be presented, being able to restore the video playout position by clicking on a specific one. It also allows the simultaneous selection of various subtitle languages, and applying a delay offset to the presentation of subtitles. All these functionalities can also be available on (personal) companion devices, allowing the presentation of subtitles in a synchronized manner with the ones on the main screen and their individual customization. With all these functionalities, the platform enables personalized and immersive media consumption experiences, contributing to a better language learning, social integration and an improved Quality of Experience (QoE) in both domestic and multi-culture environments.

Author Keywords

Accessibility; IDES; Multi-Screen Scenarios; Social Integration; Subtitles; Synchronization; Web; QoE.

ACM Classification Keywords

H.5. Information interfaces and presentation (e.g., HCI).

INTRODUCTION

Subtitles play a key role in TV and online video services. For many users, such as those with audiovisual impairments or non-natives, subtitles are essential to access and interpret audiovisual contents. Likewise, multimedia services and applications need to be adaptive regarding the users' needs, preferences and resources. With these premises in mind, this paper presents a web-based platform that enables the customization and synchronization (sync, hereafter) of subtitles on both single- and multi-screen scenarios. The platform allows dynamically adapting and customizing the

subtitles' presentation according to the users' needs (e.g., language), sensorial capabilities (e.g., format and size), preferences (e.g., format, size, location, number of lines...), the type (e.g., smartphone, tablet, TV...) and number of available devices, the application dynamics and the context of the targeted environment (e.g., domestic or public places...), while guaranteeing a synchronized layout.

During the demo session, the audience will be able to experiment with the platform, by interacting with it on main screens and using their own companion devices to create new, or join ongoing, multi-screen sessions. We also expect valuable feedback about its performance, design aspects, applicability, usability and future functionalities.

PLATFORM FOR SUBTITLES CUSTOMIZATION & SYNC

The technological components that have been used to develop the presented platform and its main functionalities are briefly described in this section.

Technological Components

The platform has been developed by exclusively using web-based components, such as HTML5, CSS3 and JavaScript (e.g., *Node.js*, *Socket.IO*, *jQuery*...), which allows guaranteeing universal (i.e., cross-network, cross-device, cross-platform and cross-browser) support. More details about these components and the advantages of web platforms compared to native platforms can be found in [4].

Functionalities

The platform is mainly comprised of an initial screen for selecting the (Youtube or HTML5) video or playlist, and the initial language (see Figure 1) and a main (player) screen with the subtitles controls (see Figures 2 to 4). In particular, the main screen includes controls for: 1) enabling and disabling the subtitles; 2) selecting their language; 3) simultaneously selecting various languages; 4) selecting the number of lines to be displayed (e.g., the previous and next ones); and 5) customizing the subtitles format (font family, size, color, background color and contrast). It is also possible to set a (positive or negative) delay offset to the presentation of subtitles and restoring the video playout position to the beginning of a specific subtitle line by clicking on it. In full screen mode (Figure 3), it is possible to modify the position of subtitles (subtitles vs surtitles) and to apply a transparency percentage to them. Interestingly, the platform allows showing a QR for the association of companion devices by scanning it. This way, the subtitles can be presented in a synchronized and

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customized manner on each companion device (Figure 4) in multi-screen scenarios. Remote playback control can also be enabled. The advantages of our platform compared to other existing ones are summarized in Table 1 (+ means better performance or extra functionalities).

The platform has been objectively and subjectively evaluated, having obtained very satisfactory results in terms of performance, usability, usefulness of its functionalities, its applicability and the awakened interest. Demo videos showing many of its capabilities are available at: <http://iim.webs.upv.es/prototypes.html#streaming>

FUTURE WORK

As future work, we plan to make our platform compatible with the Hybrid Broadcast Broadband TV (HbbTV) standard and to adopt artificial intelligence techniques, such as voice synthesis/recognition and image recognition.

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Figure 1. Initial Screen.



Figure 2. Main Screen: Player.



Figure 3. Main Screen: Player (Full Screen Mode).



Figure 4. Companion Screen (Tablet): Player.

Features	[1, 2]	[5]	[3]	Our Platform
Multiple (Simultaneous) Languages	N	N	N	Y
Dynamic Position	Y	Y	Y	Y
Dynamic format (size, font family, color, background color, contrast, transparency)	N	Y	N	Y+
Support for (remote) playback control commands	N	Y	N	Y+
Multiple subtitles lines and navigation	N	N	N	Y
Customizable delay offset to subtitles	N	N	N	Y
Integration in multi-screen scenarios	N	Y	N	Y+

Table 1. Our platform compared to other existing ones.

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