

A Web-Based User Interface for Interaction With Hierarchically Structured Events

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ABSTRACT

Intelligent technologies have been used in various ways to support more effective representation and processing of media and documents in terms of the events that they refer to. This demo presents some innovations that have been introduced in a web-based interface to a repository of media and documents that are organized in terms of hierarchically structured events.

Author Keywords

Events, visualization, interaction

ACM Classification Keywords

H.5.1 Information Systems and Presentation: Multimedia Information Systems

SCIENTIFIC AND PRACTICAL CONTEXT

In recent years, researchers in several communities, including (intelligent) multimedia retrieval and the semantic web (see, e.g., [3]), have begun to realize the potential benefits of assigning an important role to *events* in the representation and organization of knowledge and media.

Intelligent technology is being applied to several aspects of this enterprise, such as the automatic detection and classification of events. A question that has been less intensively studied is that of how to provide user interfaces that enable users to interact with and benefit from event-oriented representations. This demo presents a web-based user interface¹ which was developed to address this question within the 7th Framework EU Integrating Project GLOCAL.² The user interface is implemented with the GOOGLE WEB TOOLKIT. It makes use of REST services to access media and event structures.

The following scenario is a typical one for the deployment of this user interface: There exists a web-based repository of media, documents, and commentary concerning complex sets of interrelated events, ranging from highly prestructured events like soccer tournaments to spontaneously emerging events like political uprisings. Content for this repository is provided

¹<http://www.dfki.de/glocal/latest>

²GLOCAL: Event-based Retrieval of Networked Media, grant agreement 248984, <http://www.glocal-project.eu/>


and accessed by professional users such as employees of news agencies and nonprofessional users ranging from “citizen reporters” to casual visitors.

The following section sketches three innovative aspects of this user interface.

INNOVATIVE ASPECTS

1. Going beyond timelines to capture the hierarchical structure of complex events

The most familiar way of visualizing sets of events is with timelines, and there are a number of sophisticated web-based implementations of timelines, such as TIMELINE³ and the recently introduced FACEBOOK timeline mode. But there are limitations to timelines’ ability to capture the hierarchical structure of events. André et al. (in [1]) showed how some hierarchical structure could be introduced into a timeline visualization, but this method is not generalizable to hierarchies of essentially arbitrary depth.

Hierarchical structure is often an essential part of event-based organization. For example, the significance of a goal in a soccer tournament or a debate in a presidential campaign can often be understood only in terms of the larger event of which it is a part. Therefore, as shown in Figure 1–1, the GLOCAL user interface explicitly visualizes a complex event as a hierarchy based on a *subevent* relation (symbolized by the light-grey  icon); subevents on the same level are shown on a simple timeline where appropriate.



2. Providing collapsing and filtering functionality for flexible access to the various types of content that are associated with events

Any interface that represents events is likely to associate with each event various types of content such as media depicting the event, information about participants in the event, comments about the event, information about purchase options, and various types of metadata. The most straightforward approach for linking these items to an event is to have them appear in a separate display area when the user selects the event and requests display of the additional content. This method has limitations when the user wants to get an overview of a number of events and their related content at once. On the other hand, making all of the available content visible makes it difficult for users to focus on types of content that interest them. The GLOCAL interface addresses these limitations by

³<http://www.simile-widgets.org/timeline/>



Figure 1. Partial screenshot of the GLOCAL user interface, cropped and rearranged for compactness, illustrating the three innovative aspects discussed in the text.


(a) representing the related items via links of different types within the visualization of the event hierarchy (e.g.,  for media and  for users' comments, as shown in Figure 1–1); and (b) providing powerful and flexible mechanisms for expanding and collapsing particular subtrees of the hierarchy and for filtering the visible content (see Figure 1–2). Some of these mechanisms were suggested by functionality offered by mind-mapping tools (e.g., Mindjet's MINDMANAGER), whose functionality is seldom found in web-based systems.

3. Support for view sharing in the context of event-related stories

There are various situations in which a user may want to create or read some sort of *story* concerning a set of events. For example, a Dutch soccer fan may want to discuss why his team committed so many fouls in the final game of the 2010 World Cup; or a professional journalist may want to explain the fall from power of Colonel Gaddafi. These needs are similar to those addressed in a different context by the *sense.us* system of Heer et al. (see [2]), which enables users to (among other things) share and discuss saved *views* of visualizations of data.

The GLOCAL user interface satisfies these needs by (a) making it possible to save a view of an event hierarchy just by storing the current page URL; and (b) providing an intuitive interface with which the user can read or compose a text that includes links to such views. Each view shows a subset of the content which the author of the story has interactively created using the various collapsing and filtering methods mentioned

earlier (see, e.g., the view in Figure 1–1, which is linked to the first sentence of the story in Figure 1–3). The reader of the story can interact with each of these views using the same interface functionality.

Two of the ways in which this interface solution differs from that in *sense.us* are that (a) a given piece of text can contain any number of links to views and (b) the visualization shows where stories are available by including backward pointers from events to stories which refer to them (e.g., the  icon in the upper right of Figure 1).

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