

Character-based guided tours: the DramaTour Project

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1 Methodology and system architecture

DramaTour is a methodology for creating interactive presentations in which information is narrated in a dramatized form by a virtual character. In this demo, we present its application to the development of web-based virtual tour in an historical site.

Through the DramaTour web site, the user can explore a virtual representation of the 17th century Palazzo Chiabrese in Turin, a former residence of the Savoy family. The interface simulates a tour in the Palace: for each room selected by the user, the system delivers a sequence of audiovisual clips (with 3D graphics) in which a virtual character provides information about the room. The virtual guide is a teenage spider, “Carletto”, whose family has inhabited the palace from ages (Figure 1).

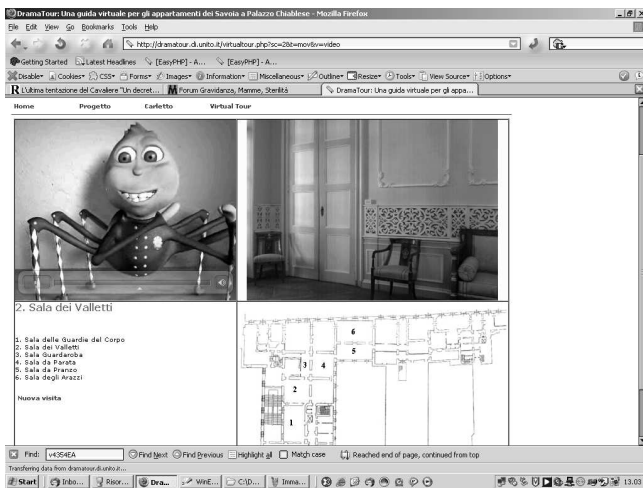


Figure 1. The web site of the virtual tour with Carletto (<http://dramatour.di.unito.it>)

The DramaTour methodology defines a conceptual framework for organizing the behavior units of the system, and a system architecture that assembles these units in real time in response to user's inputs.

The system has a modular structure: the handling of the interaction with the user is mapped onto the *interaction manager*; the content organization is mapped onto the *presentation manager*; the ultimate delivery to the user in a well-edited, audiovisual continuum is handled by the *delivery manager* (Figure 2).

The knowledge base of the system is constituted by a set of *behavior units*, that contain an audiovisual clip with 3D animation and sound. Behavior units are tagged with meta-information that the system uses to generate the behavior of the character:

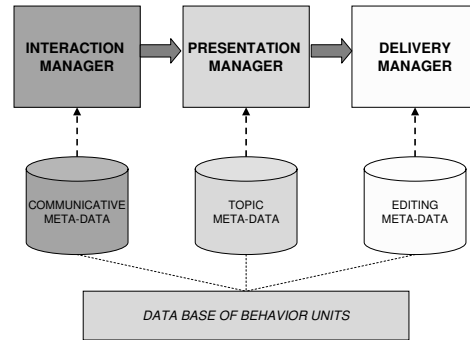


Figure 2. The system architecture according to the DramaTour methodology

- *Communicative meta-data* describe the communicative function accomplished by the unit. Although the main goal of the system is presentational, the artificial character who delivers the presentation must account for some basic interactional functions in order to qualify itself as a believable agent and thus promote the user engagement.
 - The *informative* function is the primary task of the system, i.e., providing the user with useful and contextually relevant information during the visit. The execution of this function is assigned to the presentation manager, which handles the selection and the organization of the conveyed content through a sequence of behavior units.
 - *Interactional* functions, handled by the interaction manager, are divided into *social*, *directive* and *phatic*. The *social* function implement basic social protocols, like greeting the user at the beginning of the visit, or introducing itself. The *phatic* function consists of signalling to the user that the character is active and willing to receive input. The *directive* function includes all the actions that the character performs in the attempt to force the user behavior in some way.
- *Topic meta-data* contain the description of the informative content of the units with respect to set of ontological representations of the presentation domain. Following meaning relations in an ontology corresponds to structuring the presentation along a certain narrative line; the dialectics between different narrative lines substantiates a dramatic tension in the presentation.
- *Editing meta-data* contain the information needed for assembling the audiovisual clip to obtain visual fluency.

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In order to assist the authoring task, a web-based authoring interface has been created to enter the application data and to define the meta-data according to which they are classified by the system (see Figure 3).

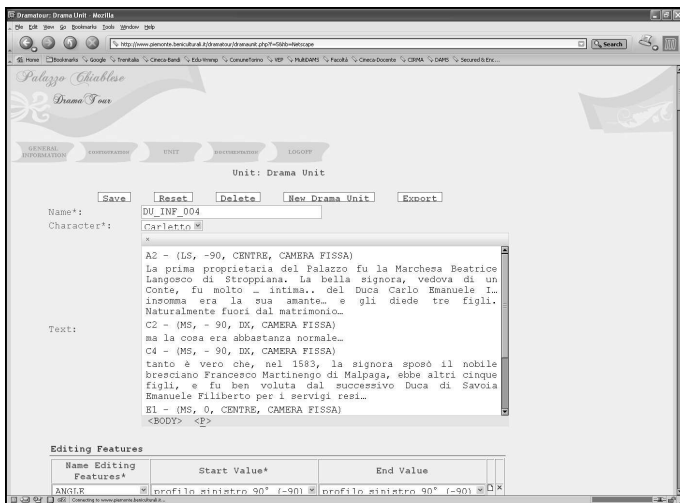


Figure 3. Web-based authoring interface

2 The web-based virtual tour

The visit is structured along a topological dimension, according to which the palace is modeled as a set of rooms. The system starts by enforcing the greetings by Carletto, i.e., it plays audiovisual clips where Carletto welcomes the visitors and introduces himself. Then, Carletto starts talking about the room in which the visitor is currently situated. Carletto not only knows the history of the palace in detail, but knows a lot of funny anecdotes about the people who have lived there through the centuries, and is striving to tell them to the visitors.

Each time the user enters a room, Carletto starts (or resumes) the presentation of the objects (furniture, artworks) in the room following a topological narrative line. The system proceeds by delivering about the 80% of the material related to each room. For each subtopic of a room, the system delivers 80% of the material about the subtopic, then delivers one unit that has a direct connection with the last unit according to the ontology of historical relations, thus performing a short historical digression. For each return to a room, the system delivers 50% of the remaining material, so that something relevant possibly remains to be said about the room.

When all the subtopics of a room have been explored and the visitor remains in the same room for some time, the system delivers some directional clips, that advise the visitor to proceed to some other room. If the user does not seem to react to the system, Carletto finally activates the phatic function, by playing funny games and gazing to the user from time to time.

3 Site design and client-server architecture

The web interface simulates the tour in the virtual space, by proposing to the user a virtual representation of each room accompanied by

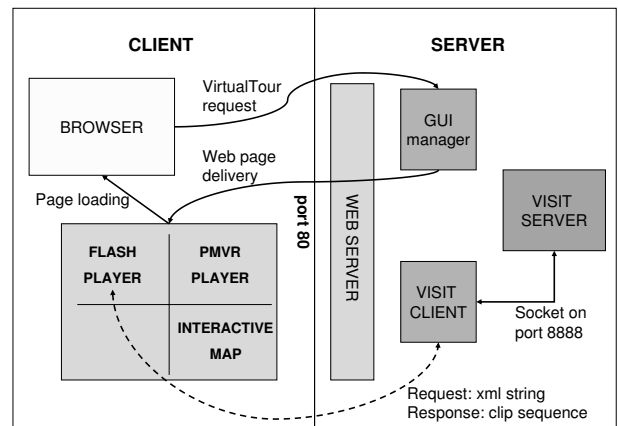


Figure 4. Architecture of the DramaTour website

the sequence of clips in which Carletto provides information about the room.

The layout of the interface is divided into four square areas, as shown in Figure 1. In the top row, the area on the left contains the multimedia player, while the area on the right contains a PMVR representation of the currently selected room (implemented in Quick-time VR format). The bottom row contains a numbered list of the room names (on the left) and a map of the site (on the right), in which rooms are numbered consistently with the list on the left.

The visitor is free to decide the order in which he/she wants to visit the rooms, since the DramaTour methodology does not make any commitment to a sequential access to the set of rooms – if not required by a specific location. It is important to stress that the presentation delivered to the user may vary even if the user follows the same order of visit, thanks to the non-deterministic aspects incorporated in the architecture of the system.

The navigation flow is very simple: at the beginning of the visit, the current room is, by default, the first room. The user can click on the map to move to a different room. In order to provide the user with feedback about the current room, the room name becomes highlighted in the room list.

The application consist of a visit server and a visit client that communicate through http. The visit server is implemented in Java, while the data base system is MySQL (<http://www.mysql.com/>). The web-based authoring interface used to insert and manage clips information has been developed in PHP (see Figure 4).

The visit client is a PHP program that runs on the http server. PHP receives the user's current location from the client and communicates with the visit server (implemented in Java, according to the architecture presented in Section 1) via a socket.

A version of the application has been developed for mobile devices for guided tours in the real site. The web-based and the PDA-based applications share the same visit server: while in the web-based application the user localization is given by the interaction with the location map, in the real environment a wireless network localization system provides the position of the user to the visit server. On client side, both applications share the same multimedia player, so the same set of multimedia clips can be reused.