Storyboard Generator

an Architectural Pattern for Multimedia Applications.

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Abstract:

Multimedia systems are innovative systems that initially meant to be used primarily for educational and presentation applications. The wide use of Internet and generally the "media war" that characterizes our age, forces the use of Multimedia in a lot of other types of applications. Innovative systems require innovative techniques and methodologies. In this paper we present an architectural Pattern for the creation of a StoryBoard. The StoryBoard is a technique that is borrowed from the film making, and enhanced with additional characteristics from Multimedia systems such as interactivity. This pattern assists the designer in generating a StoryBoard for the application that he is going to develop.

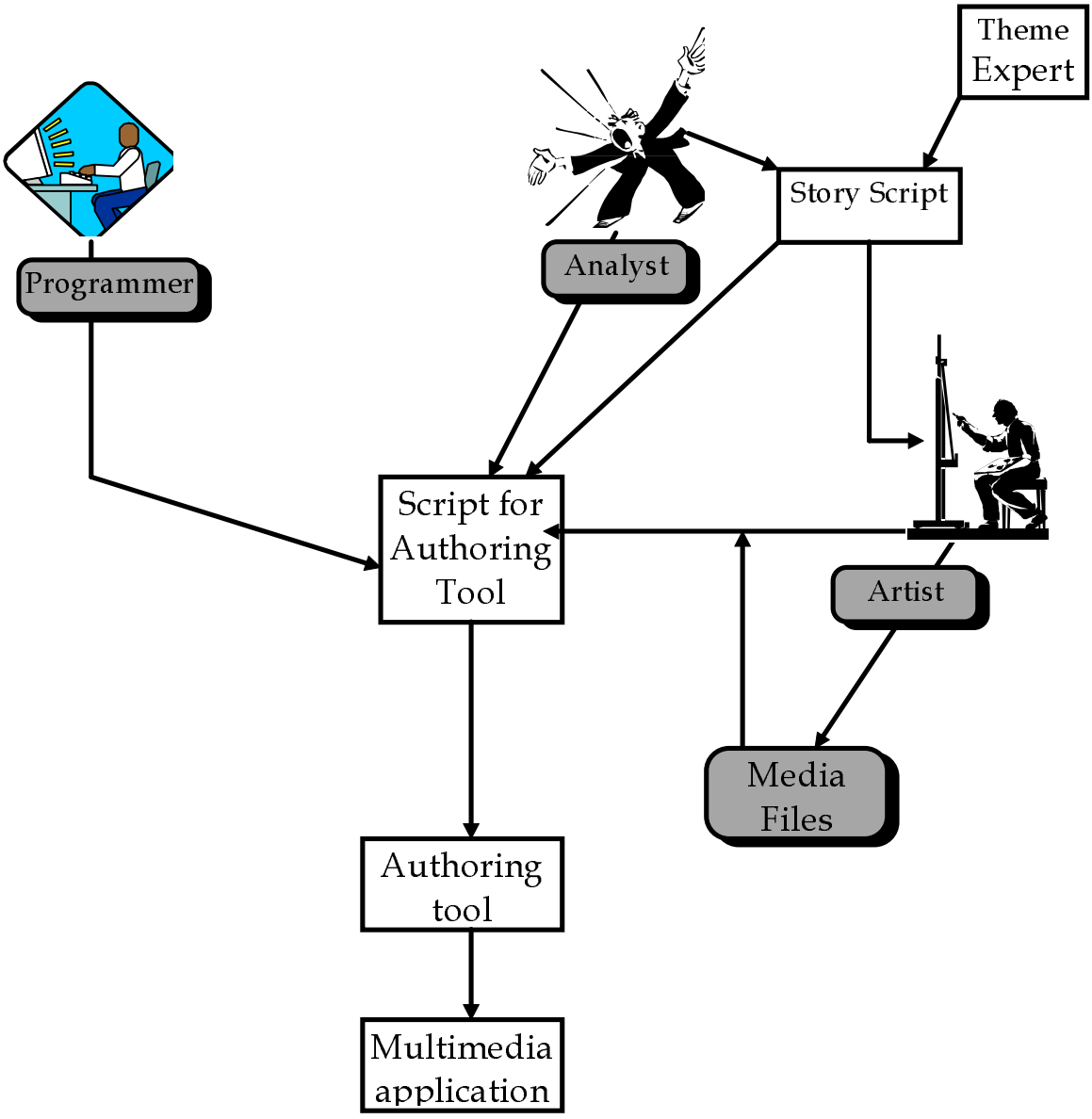
Name:

Storyboard Generator.

Example:

Consider a multimedia application for the presentation of an ancient Greek tomb (Schema 1.1). The analyst together with an archeologist (Theme expert), prepare a list with the themes to be presented. The artist and the analyst, based on this list prepares a story script (in most of the cases a simple text) that describes how these themes are going to be presented. Then a group of software developers are working to create an authoring tool specific script.

Another group of artists is developing the necessary media for the aesthetic part of the project (Video, images, animation, sound).



Schema 1.1

Context:

Development of a technique for the creation of a StoryBoard that is going to be used in the implementation of Multimedia applications using an authoring tool.

Problem:

Multimedia systems are innovative systems, and the usage of standard tools and methodologies has as a result the minimization of the individual Multimedia characteristics. Multimedia applications require tools that emphasize the user interface, ways to express interactivity, and methods of designing the creation and the usage of time media.

Most of the time, developers use authoring tools for the creation of Multimedia applications. This assists substantially the development of Multimedia applications in the minimization of the development period and simplicity in dealing with complex aspects like time media, synchronization etc. The problem is that there are no standard methodologies that can help the developer to design the application before authoring. However in most of the cases a story board is created but still there is no standard methodology of how this can be build.

The nature of multimedia applications requires the close coordination of people with different education, expertise, and background. Artists, have to work closely with computer and subject experts. As, it is obvious there are many problems mainly in the exchange of ideas (people do not speak the same "language "), and in the coordination of the development team. Due to those problems the success of a multimedia application is based on "multi-talented" people that can take up more than one role in the development (e.g. an artist-programmer).

The complexity in the nature of multimedia applications and the absence of standard methodologies, are enhanced with the problems in the coordination of the different people in a multimedia team. We propose as a solution the use of standard way for the creation of the story board for a multimedia

application, that is going to be used as a common "language" between the developers. Our solution must take the following forces into consideration:

- The story board produced must be easily understood by all kinds of people involved in multimedia development.
- It must be independent from any authoring tool.
- It must be easily extensible to conform the system evolution.

Solution:

The term story board is borrowed from the film making, in order to provide tools for advanced User Interface design and assist in dealing with time media, such as video and audio. This design tool is enhanced with interactivity characteristics that are necessary for Multimedia applications.
The story board is composed of different composite parts known as *scenes*. Every scene is composed of different fundamental multimedia elements e.g. video clips, sound clips, text etc.

The scenes and all the multimedia elements are identified, and all of them are given a unique id. This enhance the communication between the development team. All the multimedia elements are described and documented so that the resulted StoryBoard will be also a detail documentation of the application.

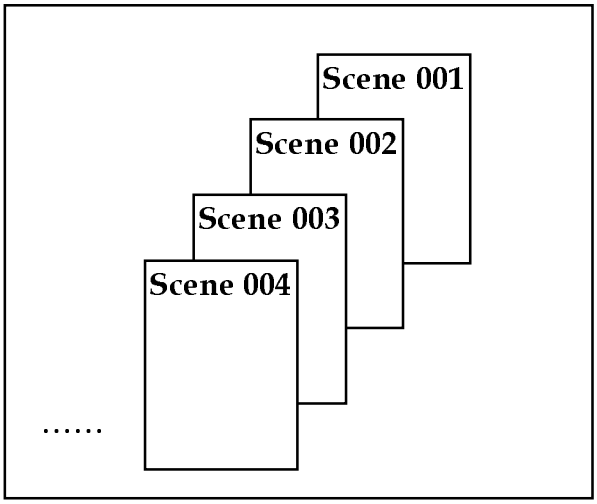
The scene's description includes also the *spatial* and the *temporal composition* of the multimedia elements and the ways that the user can *interact* with the application.

Applicability:

This pattern can be used for the creation of a StoryBoard of any Multimedia application.

Structure:

The StoryBoard is an arbitrary set of different Scenes (schema 1.2). Every Scene is initialized when the previous Scene terminates and it terminates when a user interaction or the story script it self causes a change in the spatial composition of the current Scene.



Schema 1.2: *Every application is composed of different Scenes*

Participants:

Every scene is composed of different Multimedia elements and its description has three different parts:

- Spatial composition.
- Temporal composition.
- Interactivity description.

Spatial composition

In Spatial composition the architect gives a rough description of the position of each of the Multimedia element on a Scene. A fuzzy positioning of the elements is used since the artistic development of the user interface is going

to be created during the development phase by the specialists, in most of the cases with tools provided by the authoring system.

It is important that all Multimedia elements are presented and addressed by a unique id-number. This description will be used as a reference for the other two parts. The naming convention of each element can be decided by the architect, but we propose the following:

SSS-C-OOO

SSS : 3 digits to form a unique id for the Scene identification

C : Category -----> I for Image
S for Sound
T for Text
B for Background
M for Music
V for Video
A for Buttons
F for Information Line
H for Help
Y for Hyperlinks
U for Audio
C for Clips
G for Stages

OOO: 3 digit id for element's unique id.

We can say that the Spatial composition is the technical view of the user interface.
This fuzzy scene (that is actually a screen) is followed by the catalog of all the Scene's elements e.g.

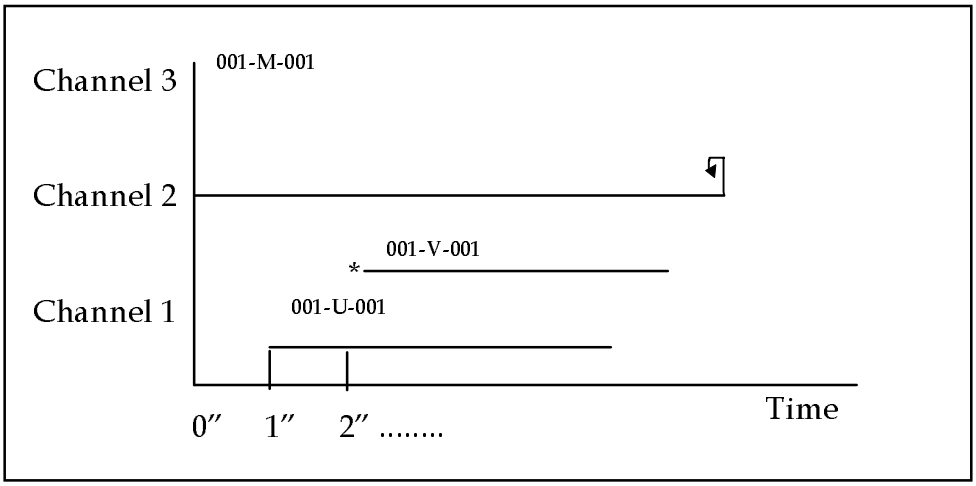
001-I-001 :

Description : Image displaying Venus

Source file : "Venus.gif" (This can be a filename or a database link)

Temporal Composition

In the temporal composition we have a timeline presentation of all the time media (Schema 1.3)



Schema 1.3: *TimeLine description of the temporal media*

Every time media is represented by a line showing its starting and ending time (duration). There are also special symbols that are attached to each element like * which means that this element starts after a user interaction (e.g. the video starts play when the user pushes the play button) ↰ and that shows repetition. Also the designer can use different kind of lines in order to show for example a non interactive media.

Interactivity description

Here, there is a description of all the interaction elements. The most common categories of interaction elements are the Buttons and the Hypertext links.

For the Buttons, descriptions of different states, actions performed and special conditions are provided, e.g.

001-A-001

State:

Active, Inactive

Actions:

1. Start video 001-V-001
2. Set state to Inactive.

Conditions:

Perform action only when it is active.

For Hypertext links :

001-Y-001

State:

Visited, Non Visited.

Actions:

1. Go to Scene 002 (Scene number)
2. Set State as Visited

Consequences

1. With the use of the StoryBoard, a common vocabulary that is used between the developers is created. The Multimedia development group is composed of developers with different backgrounds and specialization

and this creates additional complexity in the implementation and coordination of a Multimedia project. The use of a common "language" by the developers in order to communicate and document, will also reduce the complexity in coordinating the activities of the different subgroups.

2. One of the main aspects of Multimedia applications is that the design should support the system evolution. In a Multimedia system, the media elements change, the links are updated, etc. The proposed system is modular since it identifies every element and this allows the designed system to handle the evolution with lower cost.

3. The StoryBoard acts as a documentation of the application. The major part of the StoryBoard is done during the designing phase. Any changes that are decided during the development phase have to be done first in the StoryBoard and then in the application.

4. The StoryBoard is understandable by the non programming experts and this has as a result that the whole team can understand and follow the system development and this helps the developers to understand and correct problems from the early stage of the development.

5. The StoryBoard simplifies the description of complex elements like audio and video in a way that is very close to the authoring system requirements.

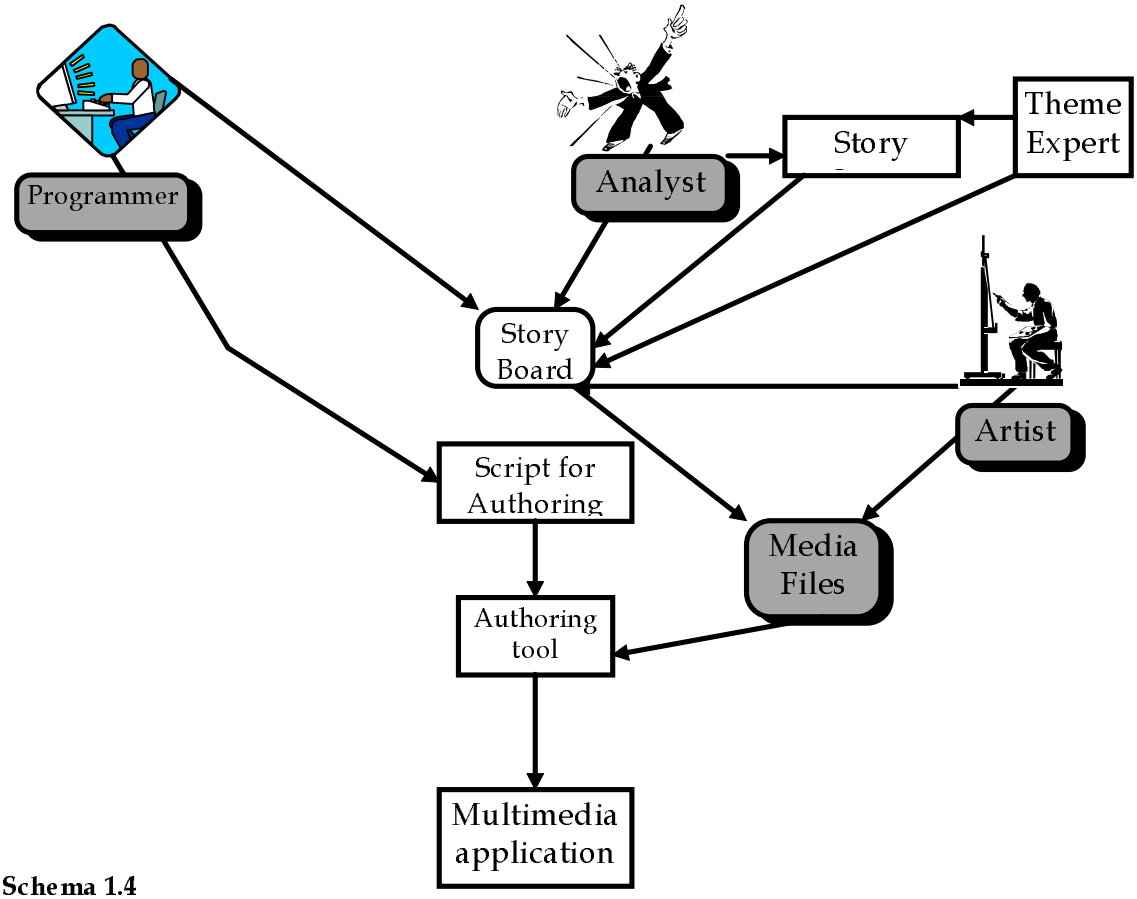
6. The definition of a Scene may cause a duplication of descriptions if the change that is performed in the spatial composition of a scene is not so substantial. This could be solved by the definition of Master Scenes that are used as a reference for the scenes with minor changes to a Master Scene.

7. The StoryBoard is independent from any authoring tool.

8. Only the Buttons and the Hypertext links are described in the interactivity description. As the technology provides new ways of user interaction the pattern can be enhanced with descriptions of new types of interactions like voice control etc.

Example resolved:

As it is shown in schema 1.4 the developers the theme expert and the artists are working together in order to produce a story board. Then, the developers using an authoring tool implement from the story board the real application.



Schema 1.4

Future Work:

This pattern is planned to be expanded as a pattern language by the creation of additional patterns that will express in detail the three different parts of the StoryBoard and generally will help the Multimedia application architect in

developing of successful Multimedia applications. Also the current pattern needs to be regularly updated in order to support new technological achievements.