

XML Coding Of Dramatic Structure For Visualization

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Abstract

Every work of storytelling, play, film, novel, opera, musical, is characterized by the development of a plot in which characters embody certain roles, establish certain relationships, evolve their feelings, generate and get affected by events. It is a world populated by several possible levels of interpretation often difficult to follow. The delivery of narration-intensive media becomes everyday more common on the Internet where the Web provides a more interruptible and fragmented way of interacting with them, making their comprehension even more difficult than usual. We present an XML Schema defining a language (XNDL XML Narrative Description Language) dedicated to describe the time-based evolution of roles, relationships, events and consequences within a narration.

An XNDL file can be fed into a 'plot visualization and discovery tool' able to render a graphical representation of it through vector graphics, where stylized shapes, colors, size, arrows etc. all concur to simplify and explain what's going on. Why did that character act like this? Wasn't she supposed to be friend with this other, why are they fighting now? And how's she feeling, uh I see, she's marked as 'betrayed'... Did I miss something? And what's the relationship between those others: are they friends, lovers, is one of them taking advantage of the other?

Such a tool can be used stand-alone or even be synchronized with the timed delivery of the media it refers to. There are several scenarios we foresee for both the Schema and the tool, from the obvious educational ones, to the cross-exploration possibilities a codified version of the plots would provide (how Verdi's *La Traviata*, Dumas' *La dame aux camellias* and the Greek myth of Orpheus relate to the movie *Moulin Rouge*?), to being provided as a stream of information on iTV channels.

Introduction

As the use of narration intensive media through new communications channels become more widespread, content representation tools are being envisaged to help enrich user experience and interaction with it. We present our work in defining a language for the description of narration content in terms of narrative structure, plot elements, character stereotypes, character interactions, events and character behavior, all referred to as stereotypes. Editing and visualization tools based on such a language could potentially help in the study of narrative analysis and comparative analysis, in rich media delivery experience for entertainment, and of course in education and learning dramatic structure stereotypes

Thus from the first edition of this little book, I might offer (speaking not ironically but seriously) to dramatic authors and theatrical managers, 10,000 scenarios, totally different from those used repeatedly upon our stage in the last 50 years. The scenarios will be, needless to say, of a realistic and effective character. I will contract to deliver a thousand in eight days. For the production of a single gross, but 24 hours are required. Prices quoted on single dozens... George Polti, 36 Dramatic Situations

The British philosopher Alfred North Whitehead defined art as 'a model imposed on experience'. This very lucid definition helps explain why art in all forms refers to a limited number of themes and thought schemes, precisely because they are at the basis of our human experience. It's surprising how these schemes remained the same throughout human history and how they remain consistent in any form of narrative, be it songs, fables, novels, drama, legends, movies or jokes.

Karl Gustav Jung called these recurring themes *Archetypes*, universal models that we inherit from our collective unconscious. At the beginning of the Twentieth Century, the structuralist approach to analyzing narrative structure spawned the separate discipline of *narratology*.

Since then, many researchers and authors, over time, have attempted to capture the inner mechanisms of plots, the progression of dramatic situations and the variety of characters in terms of stereotypes, among these:

- Ronald Tobias' 20 master plots
- Georges Polti's 5 basic conflicts, then originating the 36 Dramatic Situations
- The nine-act structure
- The 69 situations attributed by Ronald Tobias to Rudyard Kipling
- Three basic patterns by William Foster-Harris
- Vladimir Propp's 31 standard functions of the folktale (narratemes)
- Joseph Campbell's 19 steps of the hero's journey
- Syd Field's three acts paradigm
- Dramatica.com's 8 Archetypal Characters and 16 motivation elements

Whether any of these can really encompass all works of fiction or not, is a matter of much debate. In most cases, though, the proposers only intended to provide a sample of the most common situations, not exhaustive thesauri. When adapting them to describe real world narrations, these situations can be modified, extended, mixed, added together or integrated to create completely new ones. What can be concluded by looking at these studies is that stories can indeed be decomposed and analyzed, either by pooling them into a set of predefined schemes (similar to what happens when a necromancer can read any possible stories from a fixed set of tarot cards) or by recognizing and using new themes when the existing ones fall short of our aims. It is possible to perform a perfectly similar operation with the subject of human feelings and behaviours, instead of situations. With a certain grade of approximation, a character's temperament and emotional state can be depicted in terms of a number of stereotypes.

Story and plot

The distinction between *story* and *plot* can probably be found back in [Aristotle](#), who differentiated between facts in the real world and elements taken from them and organized in narration called *mythos*. These very terms, as intended in literary studies today, were introduced and defined by the novelist and critic E.M. Forster in his famous work *Aspects of the Novel* in 1927.

From then on, *story* is the sequence of events that form the basis to the narration, and *plot* is the way these events get revealed to the reader/spectator and how they relate to each other through relationships of cause-effect.

In many cases plot does not match story in terms of time sequence, especially in the more modern narrative genres, such as novels or movies, which often break the Aristotelian principles of unity of time, location and action (e.g. with flashbacks).

In the description language we propose, we chose to keep as a basis the time of the media and therefore describe events and their consequences in the order they are narrated, thus preserving the possibility of associating the metadata directly to the media through MPEG-7. This even preserves the possibility of describing stories instead of plots, as they can be treated as special sub-cases of plots, in which events get narrated in the strict order in which they happen.

A Language To Describe Plot

Based on the above assumptions we set out to create a formal language that could be used to tag media (thus including text) and describe the contents in structural narrative terms, the XML Narrative Description Language (XNDL), which is currently implemented as an XML Schema.

Using XML Schema gave us a chance to focus our efforts on trying different arrangements without the added constraints of them complying with an existent format, a precious advantage at this early stage. XNDL closely reflects concepts to be found in the MPEG-7 Structure and Semantics Description Schemes and will soon be transposed into MPEG-7's Description Definition Language (DDL). As DDL is based on a compatible superset of the XML Schema language, such transposition should be rather straightforward. The XNDL language can be used to describe the plot underlying a certain narration: indicating how it affects characters and which stereotypes are used inside it.

Patterns

Associating plots to stereotyped dramatic structures is very similar to the well known and useful *Patterns* approach to sharing software design, originated by the work of architect Christopher Alexander in the late 1970s. Software Patterns are defined in terms of a description, prerequisites, list of participants, consequences and examples. We thought that this would be a good basis for the description of stereotyped dramatic elements, temperament or behaviour, and adopted this word to refer to them.

Let us summarize the main concepts we have incorporated in our Schema and their meanings:

Dramatic structure

The root element contains all the necessary elements to describe and break into a hierarchical structure a narrative work.

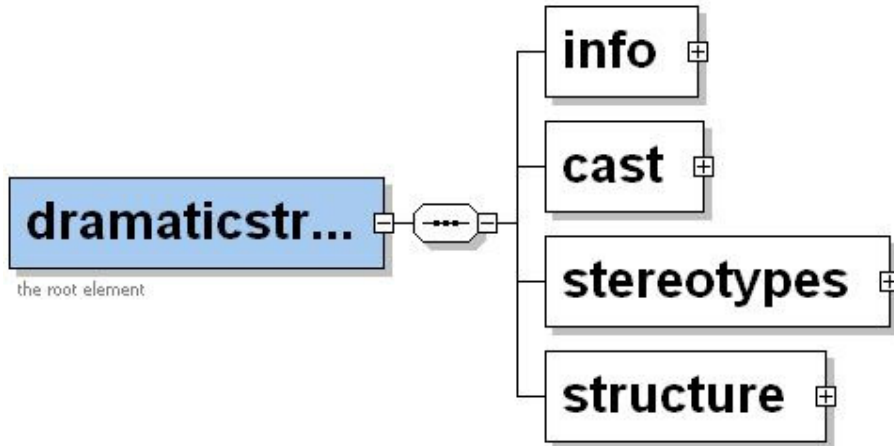


Fig 1. The DramaticStructure element

Stereotypes

A collection of Patterns that can be referenced in the Patterns section of a segment. The stereotypes collection may be provided by an authority or modified/extended by each single user. This section is intended to be used as a library. It could be provided by some authoritative source or be shared among a collection of XNDL files maintained by an individual organization.

Pattern

A single, well identified, stereotype situation, character type or narrative schema that describes its workings and a number of roles within it. A pattern can be attached to any segment at any level, and multiple patterns can be attached to a single segment.

Structure

A time based hierarchical subdivision of the media

Segment

Each of the time spans in which a structure is recursively divided, basically following the same element defined by MPEG-7

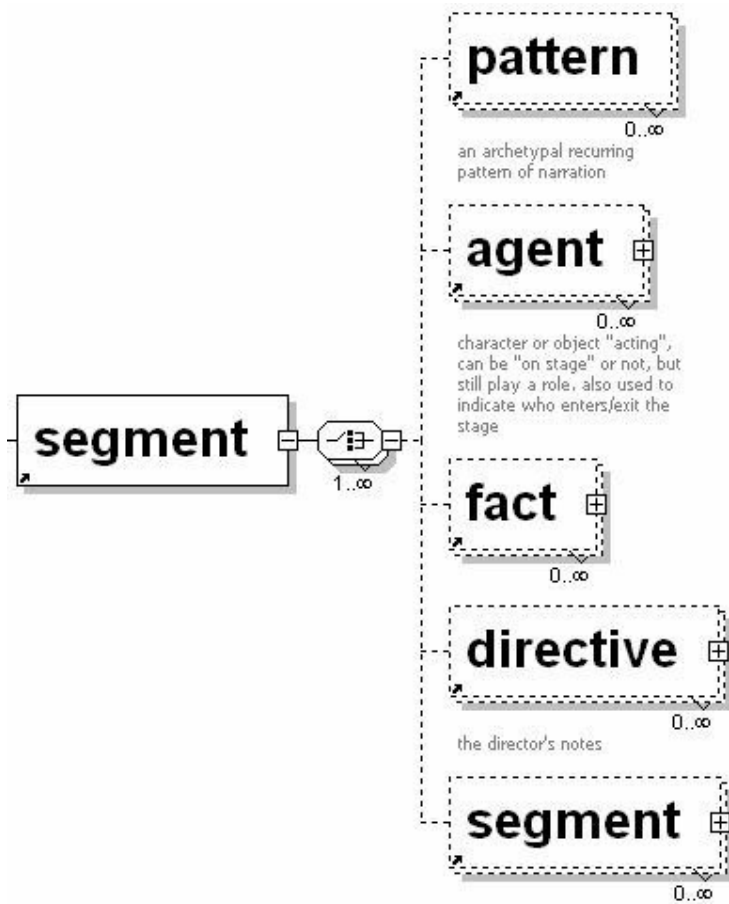


Fig 2. The Segment element

Agent

A character or object playing a role in a segment of the narration. Agent can also be used to record when a characters enters/exit the stage.

Fact

The change of internal properties of a character (e.g. mood) or the performance of an action or the occurrence of an event not generated by a willing cause

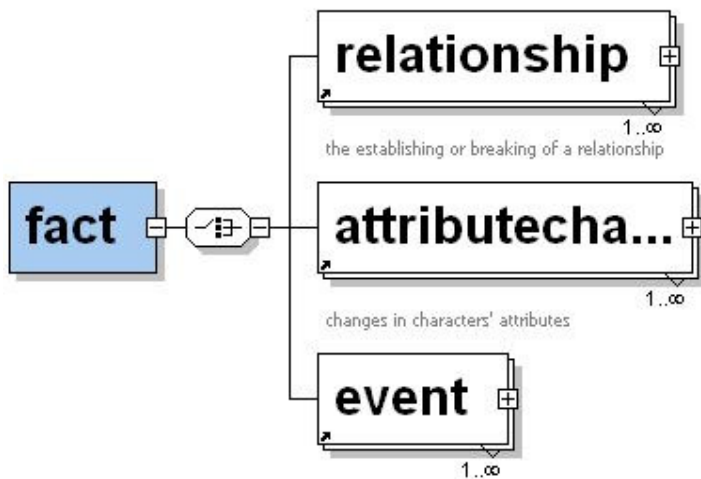


Fig 3. The Fact element

Directive

Includes a number of optional secondary indications about location, lights, costumes etc. which, if used, can be useful to represent and visualize the narration more accurately

The Schema has been conceived so to maintain as much generality and extensibility as possible. The *segment* concept for example, which reflects the same concept in MPEG7, being hierarchical, can easily be used to represent chapters, scenes, libretto lines, sequences, any structural decomposition should be regarded as functional to a specific representation. Therefore the concepts associated to it, such as *pattern*, can be referred to any level of narration, from the whole narrative to the single sequence, and can coexist at different levels.

Inside any of these levels, the *role* attribute can be specified by a segment within that level or by a character or event. In this way, for example, the *nine act structure* pattern can refer to the whole narration while its acts or scenes would reference *roles* within it.

Similarly and without contradicting the above, a single scene can be attributed the *pursuit* pattern and the *fugitive* and *punishment* roles attributed to different characters, or groups of them.

The pattern concept itself has been defined but no attempt to restrict the nature or number of possible patterns has been attempted. It has been left to the users to define which and how many patterns to use. They can choose to rely on free imagination to describe the situations or, possibly, choose to adopt a library of predefined patterns provided by some authority and/or based on some particular theory.

Visualizers

XNDL does not define in itself a means of visualizing information, which is therefore left to special visualization programs to understand the language and deliver it to the viewers. Visualizers can be thought of as very simple or sophisticated and based on many different graphical devices. There are virtually no restrictions to what metaphor a visualizer can use to represent the underlying information contained in an XNDL file.

A visualizer can choose to ignore certain information and many will want to provide discovery and cross searching tools, in order to identify similarities between different XNDL files, or order and classify them based on the dramatic patterns they use.

We implemented two simple visualizers, a text based one, which basically transforms the information contained in an XNDL file into textual descriptions, as they occur during the narration; and a vector graphics (SVG) based prototype, which uses color, shape and arrows to give metaphorical descriptions of characters, roles, mood, actions and events.

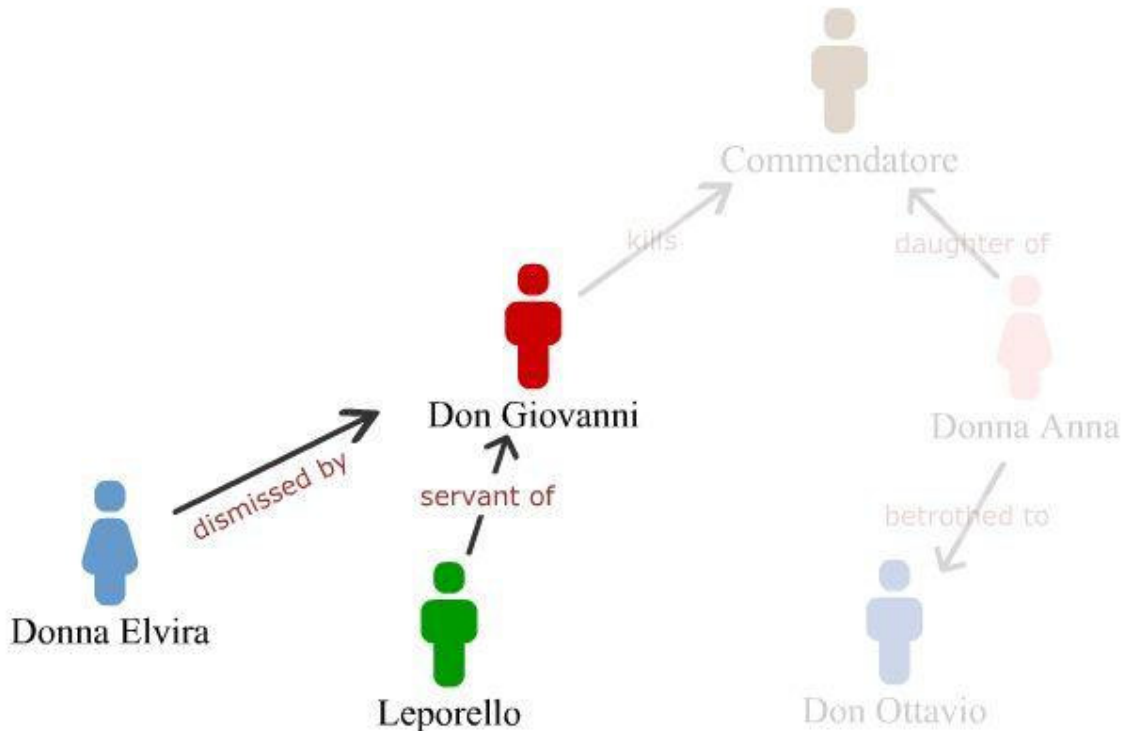


Fig 4. An SVG visualizer for XNDL

One possibility we would like to explore is to produce a visualizer capable of rendering XNDL through UML collaboration diagrams, modeling characters as objects with the addition of a few dedicated stereotypes. Collaboration diagrams are, in fact, well suited for showing the relationships (thanks to the links) between objects and for dynamic animation aimed at continuously representing the evolving status of a system.

Possible Uses

An authoring tool

With the XML schema in place, how the information is built up becomes critical. Authoring unaided would be an unwelcome task for most people whose work centers on the narrative. To ameliorate this situation an authoring tool will need to be created to enable people to build the structured information in a natural way. Such an authoring tool would have both a text input aspect and a graphical vector display of the plot visualization as it is built up.

Expert interpretations

How a narrative develops is part of the interaction between the author, the text/drama/opera/film and the listener/reader/viewer. However, experts in particular fields have ways they characterize such things, so they are the natural users of our extensible schema. By capturing their views in the schema, they can be made available to others, who can access the resultant XML. Given an appropriate authoring tool, such experts will be able to draw out the parallels and differences between different narratives, providing the grounds for comparative study. With an agreed standard, dramatic structures can be shared around the world, giving the possibility of comparing the way Mongolian shamans tell stories and the way Homer told his.

Learners' interpretations

As a student of drama we may come across many different approaches by experts to any particular plot; comparing them can often be difficult. Being able to see the plots as visualizations can immensely ease this process, enabling the development of a critical understanding. But further to this is the possibility that the learners themselves can create their own interpretation, visualize them and help themselves develop new and clearer understandings of dramatic structures.

Building a community of learners

As experts and learners develop their own interpretations of narrative structure, some interesting new possibilities arise. Given a standard XML Schema, this material can be shared. This means that, for example, students working in a school in England can develop a shared environment for the study of drama with students at a school in New Zealand. This network capacity opens up possibilities for diasporas everywhere. The traditional narratives of Nigeria can be studied by the Nigerian diaspora in the U.S. and their dramatic structures understood. This helps to build communities of understanding centered upon narrative architectures. The nuances of understanding, so often

lost on distant observers/readers, can be elaborated by culturally embedded learners. By subtle semantic tagging, new emotional understanding can be revealed, providing a stronger basis for the creation of mutual understanding and significance.

With a shared schema in place, as time moves on, it will become possible to literally see the way in which understanding of certain dramas has changed over the years. We would find it very enlightening now to be able to really comprehend how the members of the audience of the first night of Shakespeare's *Romeo and Juliet* understood the drama and compare it with the way the first night audience of *West Side Story* would have characterized its narrative development.

Analysis Of Other Narrative Forms

Speeches

The use of the schema is not limited to what we think of as dramatic narratives, although this includes a vast range of cultural objects from epic poetry, plays, and operas to novels, musicals and films. We can also see how this schema can be applied to other narrative or dramatic objects. We can understand a speech as a dramatic object; the ancient art of rhetoric is based upon this premise. For instance, if we look at the way Plato unpacks the moral qualities of a speech in the *Phaedrus* we can see how significant this is. If we apply this approach to the speeches of modern politicians, we can picture the journey they are taking us on as listeners.

Conversations

Conversations can be mapped in similar ways, whether they are face to face, on the telephone or on-line. To be able to visualize conversations as dramatic structures is revealing. It enables us to understand the ebb and flow of ideas. This could be especially important where the conversation in question has special significance, in a court of law, for instance.

Journeys

Journeys can also be seen as a special sort of narrative. We only have to think of the narratives based upon the journey as a motif, from the *Odyssey* through to Chaucer and Dante, to contemporary road movies. Journeys have their own narrative structure, felt by the protagonist and observable through the filters of time and distance. Journeys can be mapped as dramatic structures, and the visualization of these can be linked to the geographic map of the journey.

A quick overview of a narrative

As well as the more intense uses outlined above, there are other situations where we want a quick, easy-to-understand overview. We might be rushing to get to the opera, not knowing what the basic plot is, wanting to just quickly scan the key elements on a mobile phone, or we might be needing a clear overview of a book we had hoped to have read. Or we might have missed the first part of a drama on television and want to catch up with what has happened and learn how the character relationships have developed. In these circumstances a visualization of the plot and the characters trajectories would enable us to grasp the essentials quickly and easily. This is especially true for those of us who think configurationally rather than in sequences.

Authoring of dramatic structures

Whilst the XML schema was initially developed to help the understanding of existing narratives, it could also be used in the creation of new ones. We know that authors work in many ways, from those who plan out their work in minute detail before starting to write to those who start with characters and a situation and follow them to a conclusion. Especially for those who craft the plot beforehand, a visual representation can be useful. Being able to compare and contrast it with other narrative developments by other authors could engender new departures. Certainly if the narrative needs to be shared with others at an early stage, then a visualizer with the ability to adjust the elements would form a strong shared working environment. Effectively, a plot outliner could be built based upon this schema.

Storyboarding / Screenplay writing

The activity of storyboarding could be greatly facilitated by the use of a tool based upon the Schema. This could allow both the basic outline of plot and character development and the adjustment of these to suit the desired purpose. Such a tool could enable the creator to change both the values within the schema and the trajectory of the narrative in the visualization. Imagine if Juliet had wakened earlier and left the vault with Romeo, only to be confronted by the two rival families continuing their turf war. Such a plot change could be made in the visualization and the consequences explored.

Authoring interactive narratives

Whilst any narrative could benefit from such visualizations, the interactive narrative with its enormous potential complexities could benefit most of all. Being able to see the nodal points with their multiple pathways and how they relate to character and context could give greater chance of more resonant structures being developed.

Building new toolsets

We have just suggested a few of the simple toolsets which might be developed on the basis of this schema. There are many more. Others could develop new tools which could enhance our communication and understanding in the context of the narrative, in ways that we have not yet thought about.

Conclusion

With the present work we have described our efforts to create a specific language to represent plots and dramatic patterns within works of narration. The possibilities springing from our first findings are very encouraging, and we intend to extend our research and develop further prototypes in the near future. The many application areas which we envisaged before now promise new challenges and possibilities to try our work with real world projects. We look forward to them to improve and refine XNDL. As soon as it is stable enough we will transpose it to be compliant with the MPEG-7 standard.

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