

# Authoring Environment for ShapeShifting Screen Media Productions

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## Abstract

We define ShapeShifting programmes as interactive and reconfigurable moving image productions that adapt their content, on the fly, to suit the preferences of the viewers or engagers. They are automatically edited at the time of delivery. We have developed a paradigm, a computational model and an accompanying software system for the creation and delivery of ShapeShifting Screen Media programmes. These are all generic – genre and production independent. They employ AI techniques including: logic programming, ontologies, symbolic representations, normative statements, and constraint satisfaction heuristics. This paper outlines the Authoring Environment component of the aforementioned software system.

## Introduction

ShapeShifting Screen Media is a new form of entertainment. It includes truly-interactive TV programmes (Ursu et al. 2007a), but it is not restricted to them. ShapeShifting programmes adapt their content, on the fly, to suit the preferences of the viewers – programmes are *automatically edited at the time of delivery* to reflect the choices of their viewers. ShapeShifting programmes can be delivered on broadband networks but they can also be broadcast.

We have developed a paradigm (Williams et al. 2006; Ursu et al. 2007a), a computational model (Ursu et al. 2007b) and an accompanying software system for the creation and delivery of ShapeShifting Screen Media programmes. The software was exhibited at the International Broadcast Convention (IBC) in 2006. This paper outlines the Authoring Environment of the software. The papers (Ursu et al. 2007a, 2007b) provide the necessary background for this paper, at least as far as the terminology is concerned.

A number of ShapeShifting productions have been realised with our software, including the romantic black comedy *Accidental Lovers* (Tuomola et al. 2006). The programme was broadcast on Channel 1 of the Finnish Broadcasting Company 12 times in four 10pm scheduled slots. It achieved peak viewing figures over 80,000, which,

in a country with a population of 5.4 million, was more or less similar to those achieved for popular programmes scheduled in this slot.

## Authoring Environment

The production of the media essence is outside the scope of our software, as it is already supported by a number of commercially available professional tools (such as Avid and Final Cut Pro). The Authoring Environment subsumes the following components (refer to Figure 1):

- ingestion tool
- description tool
- ontology definition tool
- narrative canvas
- preview tool
- syntax checker
- semantic tests

They are all designed to be used directly by media producers.

Through ingestion, essence is brought into the system. The logical units, called media items, that describe the blocks of essence with which the narrative threads are made, are created at this stage. One media item is created for each block /element of essence.

Media items are annotated with metadata. Certain types of features (mainly “low level”) could be extracted automatically, but they can be viewed and amended, if necessary, via the description tool. Other features (mainly “high level”) have to be manually associated to media items. They are defined in associated domain ontologies, which, in turn, can be defined in the Authoring Environment.

The narrative canvas is a graphical user interface through which the narrative structure of each ShapeShifting programme is created. It closely reflects the Narrative Structure Language (NSL) (Ursu et al. 2007b).

Testing and validation is a process whereby the author ensures, at any stage in the development of a ShapeShifting programme, that the possible narrative threads are meaningful, coherent, cogent, attractive, and enjoyable. This is a hard problem. We approach it from three perspectives: *preview*, *syntax checking*, and *semantic testing*. Preview is almost the same process as the delivery of narrative threads, but:

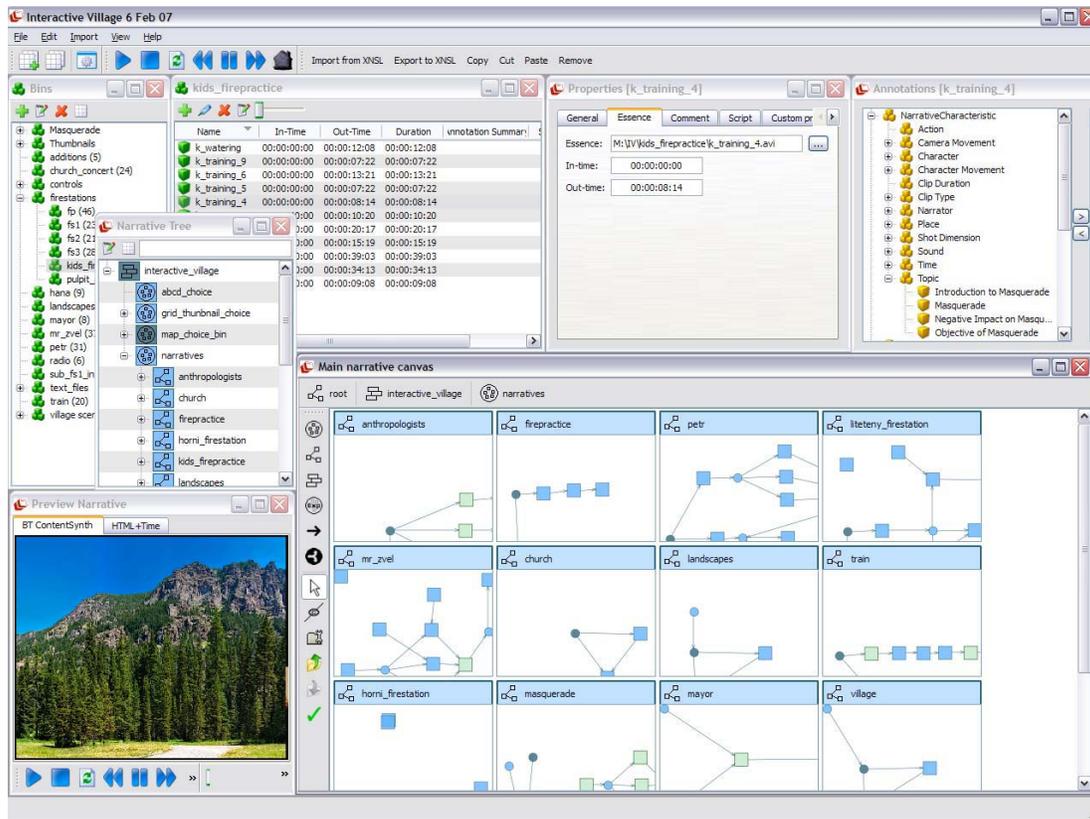


Figure 1. Authoring Environment for ShapeShifting Screen Media

- it may be done with essence of lower quality, stills, or even with text; and
- it may be done for parts of and not necessarily the whole narrative structure; since a part selected for preview may depend on other not selected parts, such as via a choice made there by the engager, all such dependencies must be resolved before or during the selected part's preview.

Syntax checking is used simply to ensure that any narrative object is constructed correctly from the point of view of NSL.

Semantic tests are dedicated procedures that can extract characteristics of the narrative space that are meaningful to authoring. Some are *generic* and closely linked to the inner workings of NSL. Examples include: find the conditions under which a certain point in the narrative space may or may not be reached; given certain conditions, find the objects of a selection group that would never be used in any narrative thread. Others are more *specific* and formulated on the basis of heuristics and formalised expertise regarding authoring. Examples include: does a selected object comply with the three act structure? Is there a dominant temporal order in the narratives corresponding to a narrative object, and if so which is it? Semantic testing represents our first step towards implementing intelligence within the *authoring environment* itself. Finally, it will be built as a knowledge-based system,

embedding authoring knowledge and being able to apply it during authoring time to advise or constrain the author.

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