

# Creating and Sharing Hypervideos with Advene

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## Categories and Subject Descriptors

H.5.1 [Multimedia Information Systems]: Video; H.5.4 [Hypertext/Hypermedia]: Architectures, Navigation

## General Terms

Design, Experimentation

*Note:* The prototype and accompanying examples are available from the Advene website: <http://liris.cnrs.fr/advene/>. A specific page for the ACM MM07 Open Source competition has been setup, with direct links: <http://liris.cnrs.fr/advene/acmmm07.html>

## 1. PRINCIPLE

The Advene project aims at developing an open-source framework for hypervideo engineering, that allows to 1/ annotate audiovisual documents, i.e. to associate information to specific fragments of a video; 2/ provide augmented visualisations of the video that use the annotation structure; 3/ exchange the annotations and their associated visualisation modes independently from the original video, as documentary units called *packages*.

The goal of the project is to foster innovative uses of audiovisual material, allowing users to quickly experiment with new ideas, based on existing or specifically created metadata. For this, we acknowledge the tremendous importance of metadata and focus our reflection on it and its uses: creation, visualisation and exchange.

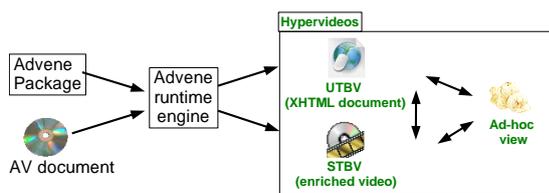


Figure 1: The Advene principle

The principle, illustrated in figure 1, is to bundle both metadata and their visualisation specification in a single document, called a package. The package can be shared by various means (e-mail, download from a web server, ...) and reused by other persons. Basic use of a package simply consists in visualising its metadata, through the views

proposed by the author. Advanced use means modifying or augmenting either the metadata or its visualisation specifications.

To provide these features, the Advene project defines a data model, based on the hypervideo model described in [1]. The model features three main elements: the annotation structure (structured annotations and relations), the views (specifying how to render the annotation structure together with the audiovisual document) and queries (allowing to dynamically select elements from the model). Annotations are pieces of information of any type (simple text for basic needs and active reading, audio comments, pdf documents, etc.) that are linked to a specific spatio-temporal fragment of the audiovisual document. The current implementation provides two types of view specifications: static views, using templates to render XHTML documents, and dynamic views that allow to enrich the play of a movie with supplemental information, interaction possibilities, etc.

## 2. THE GLOBAL ARCHITECTURE

The Advene prototype is a cross-platform, open-source software, reusing off-the-shelf components (video player, templating system, ...). The video player, VideoLan Client [2], is a versatile and cross-platform video player that supports many types of audiovisual documents on almost any medium (video file, DVD, video stream).

The Advene prototype embeds and controls the video player, as well as a small webserver that allows it to be accessed through a standard web browser to visualize XHTML documents rendered from templates. An event engine handles events that occur during the use of the application, and may programatically trigger actions, thus providing a basis for the definition of dynamic visualisations.

## 3. ACTIVE READING AND ANNOTATION CREATION

Annotations can be created either by importing data from external applications, by using assistants that extract information from the video document or by using the note-taking feature of the application.

The note-taking feature provides a simple means to enter time-aligned text, taking quick notes while watching the audiovisual document. Once the notes are complete, they can be converted to annotations of a given type. The annotations can then be refined by changing either their content, their type (transmuting a generic annotation to a more specific one) or their timecodes (aligning on other annotations).

## 4. STATIC VIEWS

One of the ways of visualising information is through dynamically generated hypertext in XHTML format, using the annotations contents as well as screenshots extracted from the audiovisual document. The Advene prototype thus embeds a templating engine taken from the Zope platform<sup>1</sup>. The Zope Page Templates defines two entities: an addressing scheme named TALES (*Template Attribute Language Expression Syntax*) and a templating language called TAL. Both offer interesting properties. TALES presents a simple addressing scheme, using a path-like syntax, presenting the data as a simple structure. TAL relies on TALES, together with seven simple processing directives stored as XML attributes in a specific namespace. TAL templates are thus XML-valid and may be edited with any XML editor in a straightforward way. We are integrating and extending a WYSIWYG browser-based XHTML editor in order to ease the definition of new templates.

## 5. DYNAMIC VIEWS

Dynamic views, that allow to execute various actions depending on events occurring during the AV document play, also rely on TALES to specify elements from the model. Their rule-based syntax (Event-Condition-Action), inspired by classical interfaces (mail filters, etc.) aims at being accessible to end-users. Events match user interaction occurrences and metadata-related events (begin or end of annotations, etc). Conditions include notably Allen relations on fragments (contains, before, overlaps, etc), as well as many tests on metadata contents. Actions allow to control either the video player (play, pause, go to another position, take screenshots, display text or SVG captions on the video, etc.) or elements from the GUI (display informational and navigation popups, open an URL in a web browser, etc.).

## 6. DATA EXCHANGE

Data exchange is a fundamental aspect of Advene. An Advene package is a file that contains both the annotation data and the definition of its visualisations. It is thus possible to exchange data and visualisations in order to conjointly work on the same audiovisual document and produce analyses as well as raw data (annotations) reusable by others. The independence, storage-wise, of the package from the audiovisual document means that the frequent distribution restrictions of the audiovisual document do not apply to the package.

There are two ways of exchanging data: by copying data in order to modify it, or by importing existing data. The import mechanism only defines a reference to data (annotation, views, schemas) stored in another package, in order to benefit from its evolution.

Being single files, packages can be stored on a standalone, disconnected computer for private work, sent by e-mail or stored on web servers (as opposed to some AV metadata systems that rely on databases).

## 7. CONTRIBUTIONS

The Advene project aims at studying and creating innovative interaction modalities with audiovisual documents, by facilitating user-innovation through metadata exchange. Its metadata-centric approach focuses on metadata exchange

<sup>1</sup><http://www.zope.org/>

and visualisation, and stresses the importance of its availability to the end-user. Moreover, compared to other approaches that focus either on metadata storage (as MPEG7 [3], Annodex<sup>2</sup>) or on visualisation (as SMIL<sup>3</sup>), we consider that both are interdependent and should be considered together. That is why the definition of Advene packages includes both metadata and visualisation specifications.

Eventually, thanks to the versatility in terms of supported formats (DVD, digital video files, streaming, ...) of the video player, the Advene prototype can be used to work on diverse data sources. It is especially interesting to consider DVDs, that provide a large, common and various corpus, available to end-users.

## 8. REFERENCES

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<sup>2</sup><http://www.annodex.net/>

<sup>3</sup><http://www.w3.org/TR/smil20/>