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# Recall: an environment for notation/ annotation / denotation

Clarisse Bardiot

## Notation / annotation / denotation

*Notation* commonly refers to forms of transcription and symbolic representation. In the performing arts, notation is commonly associated with the creation of musical scores, but systems also exist for movement and dance, for example, Labanotation and Benesh Movement Notation. The desire to find an appropriate notation can lead to the development of different graphic strategies specific to an artist or even a particular production. Digital technology opens up new perspectives for notation, in particular as regards the recording and analysis of movement. Technologies such as motion capture can record movement in three dimensions and the resulting data can be visualised via diverse graphical forms. Software such as LabanWriter and LabanAssist (Lehoux 2013) exists to edit, manage and simplify the use of Labanotation.

Notation is also used for the conservation of media artworks with technological components. The Media Art Notation System (MANS) offers an ontology that makes it possible to describe a work in an abstract way (behaviour, interactions, and so forth) and in a concrete way (materials) (Rinehart 2007). This approach makes it possible to re-create the artworks using other technological components and adapted to new technological contexts. Such a re-creation is considered an interpretation in the same way that a concert performance is an interpretation of a written score. A complementary system devoted to the performing arts, the Performance Art Documentation Structure, has also been developed (Gray 2008).

*Annotation* is commentary applied to something that already exists, for example, a text. In the performing arts, one can annotate something that acts as a medium for annotation, for example, the notation of the production or a video or film recording of rehearsal<sup>1</sup>. Annotation with digital tools gives rise to various approaches, for example, graphically annotating film recordings of dance movements and choreography by William Forsythe (Forsythe 1999, 2009), enriching a filmed interview with various archive documents to create a 'webdoc' (Charrier 2014) and superimposing audio interviews with the artistic team onto a film recording (Wooster Group 2004).

Several software tools for text annotation of video are available, for example Advene, Anvil, ELAN and Vcode/VData, and ELAN has been used to annotate dance performances (Fernandes and Jürgens 2013). However, generally these tools are seldom used to annotate recordings of performing arts. The possible reasons for this include the text-centrism of the

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<sup>1</sup> An extreme example of dance annotation may be performed lectures such as the one given by Anne Teresa de Keersmaecker at the 2013 Dance Congress in Düsseldorf, Germany, where she commented on the figures of Fase as she actually executed them.

software in question, the difficulty of linking to other documents and the complexity of using the software during rehearsals. The Open Video Annotation Project makes it possible to link a film to different document types (images, texts), and two other digital tools – PM2GO and MyStoryPlayer – have been developed to serve the specific annotation needs of performing arts<sup>2</sup>.

*Denotation* establishes a conventional relationship between a sign and its referent, for example, between a word and the explicit meaning of that word. Denotation is often contrasted with connotation or the feeling that is evoked in a person. In contrast to notation and annotation, both related to the idea of ‘close reading’ of an artwork or document, denotation makes ‘distant reading’ (Moretti 2008: 33) possible. Distant reading steps away from the document itself, and this makes it possible to identify models and motifs and relationships between them when considering a very large corpus of documents. Where a large corpus of related documents are digitalised, achieving the status of Large Data<sup>3</sup>, denotation makes it possible to shift perspective away from the document itself, away from the performance or the artist to highlight relationships and aspects that can only emerge due to the change in scale this ‘distant reading’ affords. Finding and highlighting these new emergent connections is often done using data visualisation techniques.

One example of this in the performing arts is an analysis of the history of Broadway (Miller 2014) using all the available data including how long a show runs for, the number of revivals, genres, the casting and themes – taking into account all of the productions not only the commercially or aesthetically successful ones. This has made it possible to show, for example, that the central figures in a theatrical production are not the renowned directors, actors and producers, but the set designers, costume designers, and lighting technicians. Taking a further example from dance, the close reading and annotation of a recorded choreography of William Forsythe, *One Flat Thing, reproduced*, created a large data set from which the research team could select and visualise aspects of this data set so as to show relationships between the dancers that could not have been seen otherwise (Pallazi 2009).

## Rekall

Digital technology enables a range of different methods of analysis for the performing arts. Finding ways to combine notation, annotation and denotation could help one to get as close as possible to the complex nature of these works and the creative process behind them. Some of the examples given above occasionally juxtapose these different methods, but often when it involves the specific analysis of a single work or movement method. What is required is an environment that would make it possible to analyse, compare and contrast an infinite number of art works, not only their production but also their creation.

One of the problems with digital technology is built-in obsolescence. This means that we have to rethink the way shows and creative processes are documented. Because control desks for sound, lighting and stage machinery are digital, all productions are intrinsically affected by this phenomenon. Built-in obsolescence also has a major impact on the study of the making of

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<sup>2</sup> Advene: <http://liris.cnrs.fr/advene/>; Anvil: <http://www.anvil-software.org/>; ELAN: <https://tla.mpi.nl/tools/tla-tools/elan/>; Vcode/VData: <http://social.cs.uiuc.edu/projects/vcode.html>; Open Video Annotation Project: <http://www.openvideoannotation.org/>; PM2GO: <http://motionbank.org/en/event/pm2go-easy-use-video-annotation-tool/>; MyStoryPlayer: <http://www.eclap.eu/portal/?q=node/3748>. Accessed 23 September 2015.

<sup>3</sup> We prefer the term ‘Large Data’ to ‘Big Data’ when referring to large corpora that are physically almost impossible to process individually, but that do not, however, pose the same problems as the billions of documents involved in ‘Big Data’ and its 4Vs (Volume, Variety, Velocity, Veracity).

performance. Artists and their teams produce a large number of natively digital documents that are fragile and evanescent, for example email, texts, photos and video. The fact that there is so much of this digital material being produced not only raises issues regarding formats and preservation, but such a large corpus is best analysed through Large Data methods.

Recognised this situation prompted the development of ReKall, an open-source environment designed for the performing arts<sup>4</sup>. Two main aims have determined the way ReKall is designed: helping artists to document their works so that they can restage them, at the same time compensating for the obsolescence of digital technology; and helping researchers study the genesis and creation of stage productions in the context of natively digital documents and Large Data.

These two aims might at first sight seem to be quite distant from one another. This is true in terms of their ultimate objectives, even though these may turn out to be complementary, but it's not true from the point of view of the 'raw material'. Whatever the objective, the materials are the same – documents arising from the creative process and the recording of stage works – that are collected, analysed and viewed, according to different modalities and within different timeframes.

The three approaches we have identified (notation, annotation, denotation) are thus essential: the notation of a piece makes it possible to provide a 'score' that can, if required, be interpreted using other technologies without affecting the initial artistic intentions; annotation makes it possible to comment on and refine the information gathered from different documents; and denotation allows us to identify crucial information in a sea of documents, and to move away from close reading.

Following Lev Manovich with the aim of combining close reading and distant reading, ReKall preserves access to the source document. Manovich stresses how important it is to have access to this source itself—the artefact—and not only its translation into data or metadata. He writes 'That is, examining information visualizations of data representing aspects of cultural artefacts can lead to new understanding but it does not substitute getting insights via viewing the artefacts themselves. The last consideration is particularly important for the future of visualization in humanities, since perhaps the most important question, which is still unresolved, is how to combine distant and close readings.' (Manovich 2013)

The ReKall interface includes the following elements: on the left, a menu with different viewing and filtering options; and, on the right, the metadata of the selected document. The central workspace adapts itself to the chosen work environment, which offers a range of notation, annotation and denotation modalities. ReKall presents two environments: *data visualisation*, and a *timeline*. In the following paragraphs and in the figures we show, we have drawn from the on-going analysis of *Re:Walden* by Jean-François Peyret, a work presented from 2009 to 2013 in different versions (stage shows, a concert, and installations). The corpus includes more than 10,000 documents.

The data visualisation mode (fig. 1) makes it possible to aggregate an infinite number of documents of different types relating to a given work within the same interface. This is the mode where denotation takes place. ReKall brings together texts, images, sound, videos and softwares in the same workspace. Each dot visible in the interface represents a document.

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<sup>4</sup> ReKall got its start in 2007, under the direction of Clarisse Bardiot, as part of the DOCAM programme on the 'Documentation and Conservation of the Media Arts Heritage' run by the Daniel Langlois Foundation. Since 2012, the team has comprised Buzzing Light and Thierry Coduys on the current design and development (Bardiot et al. 2014).

Rekall provides a synthetic view of the quantity and the quality of the documents as well as their organization. In the centre, the upper part offers an overview of the documents in the form of thumbnails. When a document is selected, it is previewed in this window, which allows you to preserve a link between close reading and distant reading. The lower section is used for viewing data, displaying documents along an 'x' axis and a 'y' axis, with colour providing a third dimension. Using these axes, the Rekall tools make it possible to analyse the work graphically via its documents, and to identify, for instance, the various phases of the creative process, the areas of professional expertise involved in a particular residency. Filters allow the user to isolate a document and to spot anomalies or points of convergence: the max/msp patch forming the basis for the entire musical structure of the piece, the text that forms the basis of the dramaturgy, the video that provided a major source of inspiration. Denotation is implemented via two modalities in Rekall: first, a sign (a dot, a dash, a colour) denotes a document with precise properties (for example a colour can represent the format or the author of the document according to how the interface has been configured); second, a set of signs and their visual arrangement denotes a fact (for example, the articulation of dots along the x and y axes denotes a creative process: in the case of Jean-François Peyret, three main participants – the videomaker, the composer and the designer of electronic components – are present at almost all stages of the creative process, which is not the case for the actors).

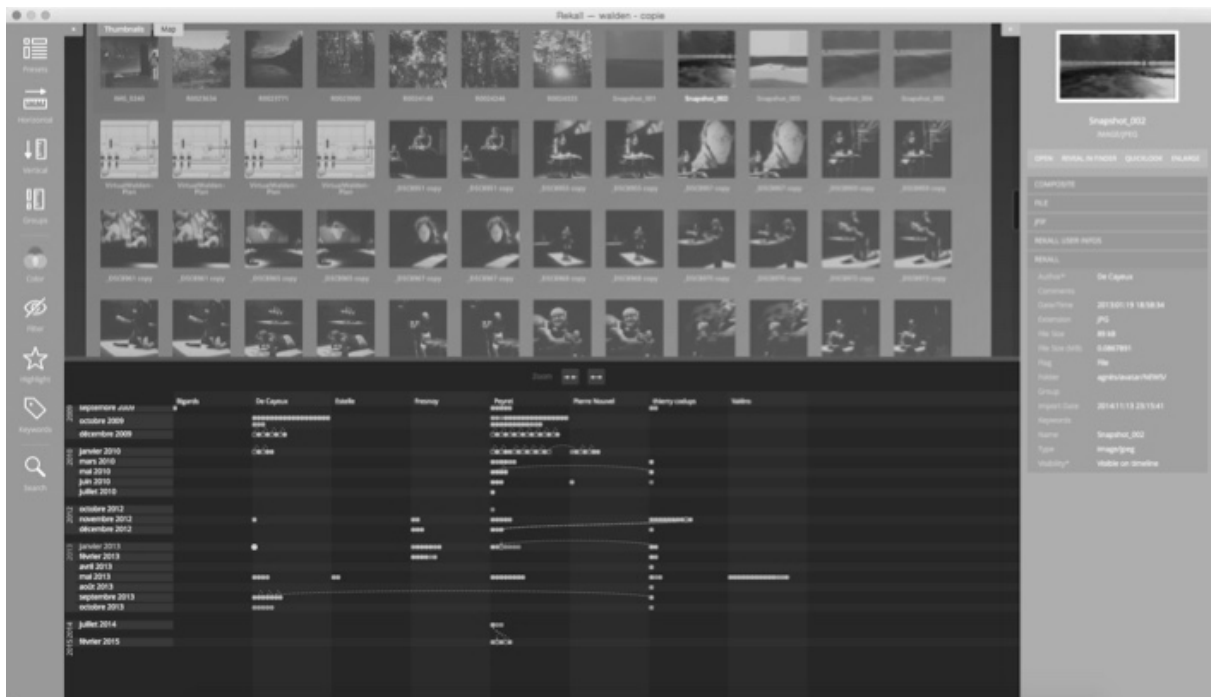


Figure 1. Rekall. Data visualisation workspace.

The timeline mode (fig. 2) looks at a selection of documents chosen by the user in visualisation mode. It is designed to allow the notation and annotation of the documents, as a complement to the information that is not perceptible or intelligible via data visualisation. Videos of the performance are displayed in the upper central window, making it possible to compare different versions of a single show at a glance. The selected documents are displayed in the lower central window, and a timeframe can be assigned to them. The user positions them at the desired point of the recording of the performance: a text to shed light on a scene, a secondary video to present a detail of the same scene and so forth. The documents arranged in this way in the workspace act as annotations of the other documents present, or of the video recording that forms the 'backbone' of the system. The ability to add markers is a further

notation and annotation feature: it allows the notation of the different cue lists set up by the technical teams (the lighting technician, the sound technician, and so on), providing an overview of all the technical ‘scores’ involved in the show; and it allows researchers or directors to annotate the video using text.

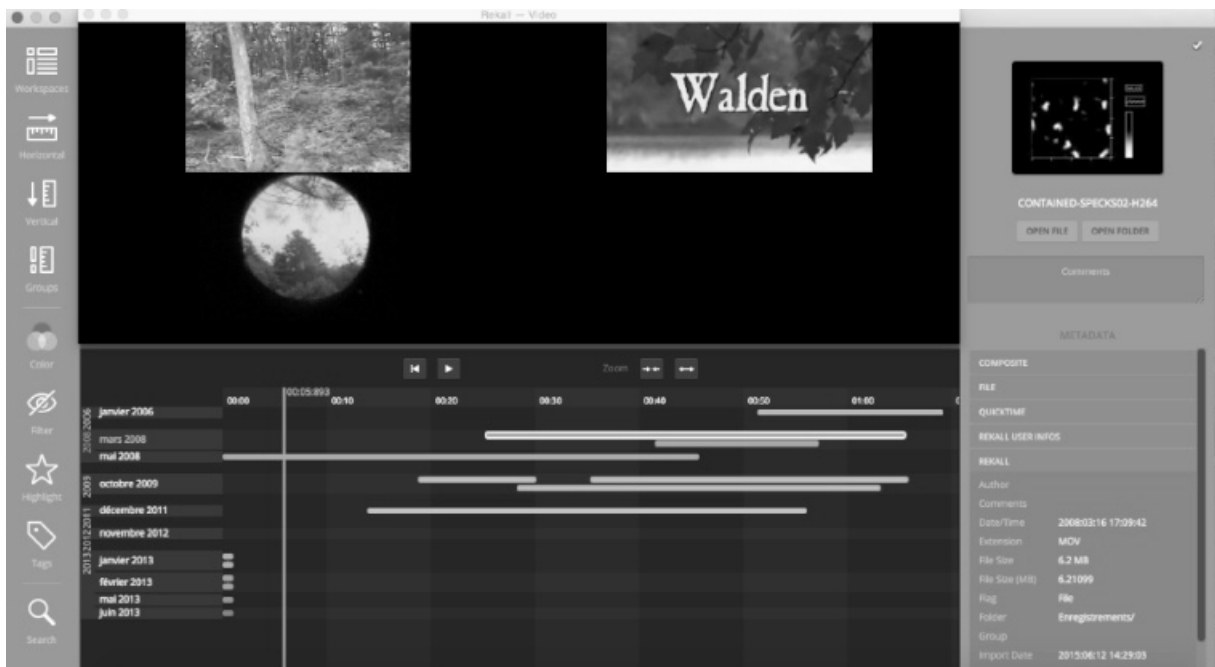


Figure 2. Rekall. Timeline workspace

In both workspaces, the user has access to the document’s metadata, which he or she can edit and add to. A ‘keyword’ field makes it possible to create a folksonomy for a specific show, for example. The ‘highlight’ button allows you to track the development of a concept during the creative process and via the documents that relate to it. Adding metadata, while specifying the nature of a document, is a form of annotation. Another way of annotating a document is to use the field ‘Comments’. This allows you to add text freely to indicate an action point (‘update’, ‘add’, ‘modify document’, and so on), provides immediate access to a particular detail and so on. The main problem with annotation is that it can only apply to a restricted number of documents, especially where large corpora are concerned. Rekall’s approach is to use denotation to identify the key document that needs to be annotated.

Rekall is an environment that makes it possible to combine notation, annotation and denotation. The combination of these different modes within a single interface allows us to combine close reading with distant reading, manual annotation with data visualization, and the notation of artistic scores with automatic metadata extraction techniques. Development of Rekall is set to continue over the coming months with the analysis of various performance corpora. Early tests have shown that Rekall is able to adapt to different aesthetic environments and different working methods, and to highlight the processes they involve. The complementarity of notation, annotation and denotation makes it possible to use the system in new ways: several artists have told us that they intend to use Rekall as a design and writing tool. This could open the way to connotation, in other words subjective expressions of the data.

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