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Mylène Leitzelman, Nicolas Delaforge

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# Semantic-Enabled Contacts as part of an Art Project Management tracking tool

Case of Re-Source project

Mylène Leitzelman

Mnemotix

Knowledge engineering Cooperative

Mandelieu, France

mylene.leitzelman@mnemotix.com

Nicolas Delaforge

Mnemotix

Knowledge engineering Cooperative

Mandelieu, France

nicolas.delaforge@mnemotix.com

***Abstract***—At the beginning of the Re-Source project, is the observation that Art World is now fully 2.0, facing challenges such as transparency, reflexivity and participation. Mnemotix, a digital cooperative society, has been working for 2 years in partnership with the Contemporary Art Foundation Lafayette Anticipations and Alexandre Monnin, on an innovative application aiming at documenting in real time the collective process that leads to the production of works of art. Based on semantic technologies, tailor-made ontology and thesaurus, this application chain proposes to highlight the community of actors and skills involved in artworks production.

We will present in this article our innovative custom-made tool for collaborative storytelling of Artworks, the dedicated Re-Source ontology as well as its use in a semantic annotation interface to promote Artworks monitoring and visualizations of the interactions between members, contacts, resources and projects within the Contemporary Art ecosystem.

***Keywords***—*Semantic Web technologies; data enrichment; Artworks project; data storytelling; contacts social network*

## I. INTRODUCTION : ART WORLD 2.0

The project that we present in this article is based on an observation and a general issue that actors of art and cultural institutions are facing today. First of all, we start from the observation that the Art World today is fully 2.0, ie viral (hyperconnected) and social (collaborative). Just like Andrew MacAfee was talking about Enterprise 2.0 [1], to explain the fundamental changes in the introduction of social and collaborative tools of Web 2.0 into the office environment, the same goes for the art of the 21st century. Digital technologies bring equal resonance to the issues that today faces contemporary art: transparency, reflexivity, participation, etc.

Why "Art World 2.0" ? On the one hand, because many works of art are the product of collective research, meetings, accumulation of knowledge and know-how involving a multitude of contacts and not just isolated artists. For Howard Becker, who studied art as "collective action", in [2] the "Art Worlds" describe the cooperation of professional networks, including the most discreet or anonymous, which contribute to the creation and dissemination of works [3]. In a few words, the coordination of many actors is necessary to create art. On the other hand, the Art World is more and more synchronous, where all its actors - artists, gallerists, institutions, curators, critics, public,

collectors etc. - interact with the same tools. For the first time in history, those who produce, emit and receive forms or produce ideas use the same digital environment.

Beside this observation of an "Art World 2.0", is growing the following issue: artistic and cultural institutions like the Contemporary Art Foundation Lafayette Anticipations<sup>1</sup>, are all facing the problem of the loss of information during the production of artistic projects. There is yet a large amount of data generated during the genesis and realization of art projects: images, documents, videos and contacts... But most of the time, these highly informative data on artists and their creations are stored in a corner of hard disk or at best on an isolated server. They are kept aside "just in case", but are very rarely re-used. In the end, only the images of the project results are produced on museums for instance. At the beginning of 2014, around a collective brainstorming of artists, curators, librarians and researchers led by Alexandre Monnin and Lafayette Anticipations, the framework of the Re-Source project has been designed to give a technological answer to enhance the notion of participation of actors from Worlds of Art (refer to the seminar "Digital artifacts and materialities" led by Alexandre Monnin and Jérôme Denis, in the Philoweb Blog<sup>2</sup>). The objective of this platform is to set up an application chain of real time collection, documentation and indexing, involving from the start all the actors of the project, the artists, but also (and especially) the staff who support the artists and their artistic projects.

## II. THE RE-SOURCE PROJECT

The development of the Re-Source platform has been carried out by a young digital cooperative called Mnemotix<sup>3</sup>. Spinoff of a research project led by INRIA Sophia Antipolis [4], the Mnemotix team is leading collaborative and sustainable projects, mainly based on open source, in the field of knowledge engineering, semantic Web, information exploration and visualization.

### A. *The global platform*

Thus, Mnemotix has been working for two years in partnership with the Foundation Lafayette Anticipations, on an innovative custom-made application aiming at documenting in real time the collective process that leads to the production of works of art. Simultaneously as a project management, documentation, live archive and communication software, this application chain proposes to highlight the community of actors and skills involved in artworks production. Indeed, from the earliest stages of production to various publications, the Re-Source platform must be a central instrument for sustaining contact relationships that the Foundation wants to maintain with the supported artists and all the contacts generated during the realization of the artistic projects.

The expected outcomes of this solution are: 1) to enable both cultural institutions to better manage data so far treated as "dead" data, 2) to enable artists to build a detailed and navigable history of their work 3) to allow artists to consult works of others assisting them by the way in their own prospective work, 4) to allow the general public to see "behind the scenes" through innovative consultation devices, offering a very large number of opportunities for research and cross-linking of published data, such in [5].

Technically, this application chain is based on an original, distributed and asynchronous architecture. It consists of different autonomous modules that communicate with each other, among which we have: a specific module for the documentation of artistic projects (called Weever) and a custom-made SKOS terminology management module (called Konzept), modules dedicated to the analysis and extraction of metadata from digital resources (such as texts, videos, photos, docs), but also modules for publishing data for the various users of the archive (such as a frontend website under Drupal, mediation devices and mobile applications).

### B. *The documentation module Weever*

More specifically, Mnemotix has developed an innovative tool for collaborative documentation based on "project mode", called Weever. This name refers to the book written by Tim Berners-Lee ("Weaving the Web" [6]) so highlighting the act of weaving digital resources together, which is the object of this tool. In addition, the tool also makes it possible to weave parallel but intersecting timelines representing the art projects supported by Lafayette Anticipations.

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<sup>1</sup> <https://www.lafayetteanticipations.com/fr>

<sup>2</sup> <https://goo.gl/54gCqq>

<sup>3</sup> <http://www.mnemotix.com/>

This application has been designed to allow non-librarian users to contribute as simply as possible to the archiving and documentation process of Artworks. To facilitate the indexing process, the features of a drive (such as Dropbox, Google Drive or Own Cloud) have been combined with note-taking functionalities (like Evernote) enhanced with automatic semantic annotation. The digital resources downloaded by the users are then analyzed and then semantically annotated. They are finally aggregated into timelines featuring the different projects in order to establish the most precise and the most complete chronology of the project (as presented in the following Figure).

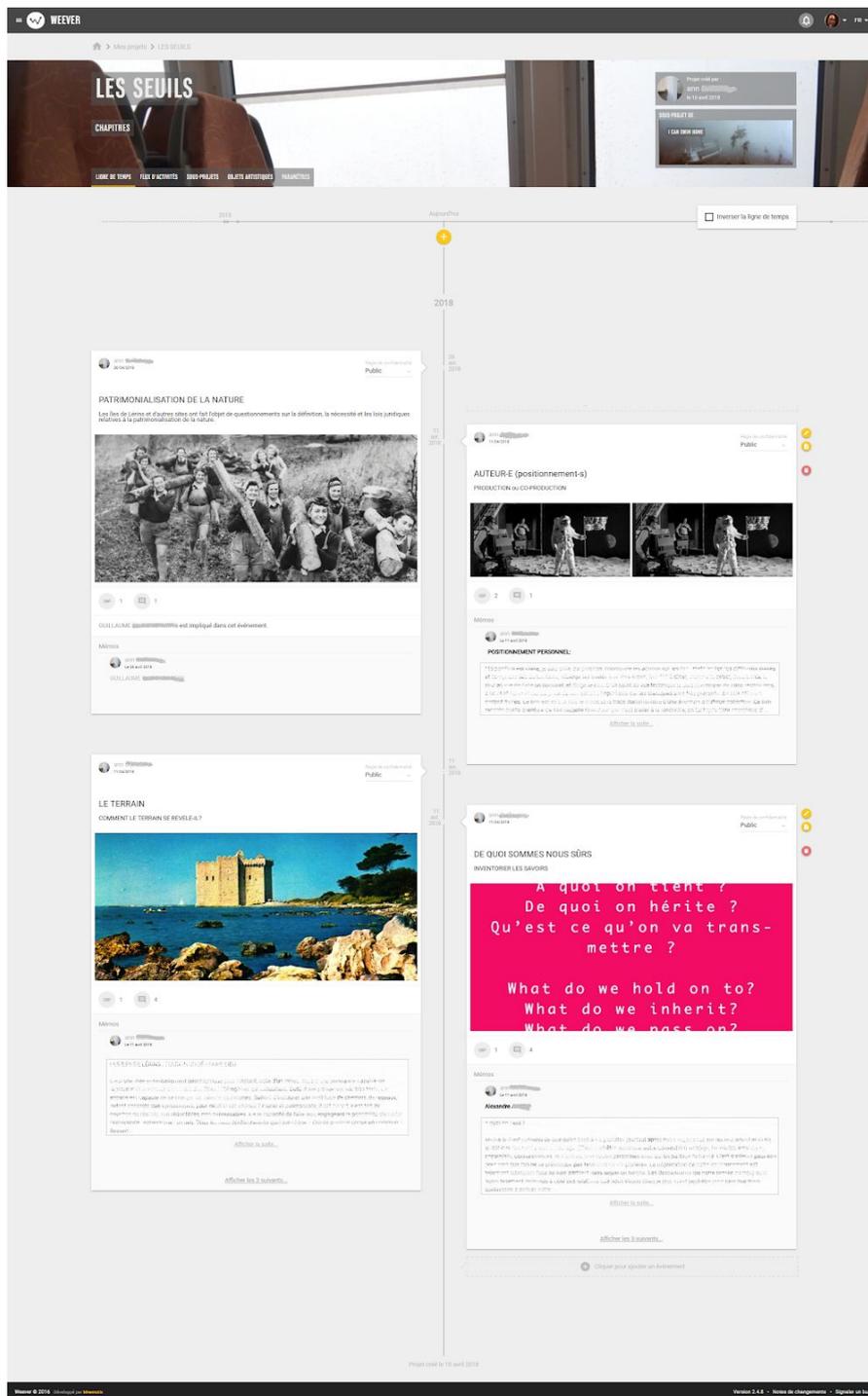


Fig. 1. The timeline visualization of an Artwork project

The timeline visualization has been chosen as one of the best features to "tell" the story of a project (see in [7] Ogawa's similar storylines for archiving software development projects). We will detail in the following paragraphs this form of data visualization facilitating the sharing and collaboration among users and linking contacts into thematic networks.

### III. THE RE-SOURCE ONTOLOGY

Although several ontologies for Artwork exist (FRBRoo [8] or Cidoc CRM [9], for example), the choice was made not to use them. Indeed, these ontologies were created in a context of particular use, that of cataloging and searching for information in library or in museums. Specifically, the Re-Source solution is built on the basis of an ontology, created ex nihilo and articulating three distinct but interconnected sub-models: an event model for the "project" activity, a "classic" documentary model for the description of the Foundation's resources, and finally a "social network" model. In addition to this ontology, a SKOS<sup>4</sup> thesaurus also created ex-nihilo as a result of many collective brainstormings, is intended to cover all descriptors used by members of the Foundation, representing its four areas of expertise: curation, production, administration and editing. The hierarchical concepts of the thesaurus are used for automatic indexing and annotation in Weever.

The event model, as its name suggests, is related to the concept of "event". An event is a generic object that can characterize anything, provided it is dated. An event can be punctual (a visit of an artist, a meeting) or lasting over a defined time period (as a conference). In Weever, a "project" is materialized in a timeline (with a start date but not necessarily an end date). It aggregates as many events as possible and it is associated with a certain number of metadata (title, description, creator, date of creation). Projects can also possibly be associated with one or more data of the web related to it (into the standards of the web of Linked Open Data, with reference to [10] detailing how Linked Open Data with the help of semantic web technologies can be used for Cultural Heritage contents).

Events are complex objects that allow the users to aggregate a large amount of information to document a project. They can represent trivial things like sending an email or more complex things like visiting an artist studio, attending a seminar... It is possible to associate with an event additional information such as, for example, media resources (text, documents, photos, videos,...), contacts of any kind (people met, artists, companies,...), "Concepts" from the Skos thesaurus, geographical information, memos (see next paragraph explaining the semantic annotation), etc... The "event" representation is an essential object of the Re-Source model because the more information on contacts, actors, resources and concepts are associated for describing the events, the richer is the Re-Source archive, that can finally return new interesting relationships among artworks.



Fig. 2. The "event" object of the Re-Source Ontology linked to contacts

Concerning the "Social network" model, it describes the contacts of the Foundation's staff in the ecosystem of contemporary art. These contacts can be people (artists, critics, patrons), companies (artisans), collectives (artistic

<sup>4</sup> <https://www.w3.org/2004/02/skos>

groups), institutions (museums, foundations), etc... More than just an address book, this part of the ontology also describes the relationships that the members of the Foundation maintain among their contacts in the manner of a dedicated social network. This network of contacts should allow users of the application to share a clearer vision of the world of contemporary art and also better organize their contacts in artistic projects. Each object of this sub-model can be associated with one or more geographic locations, so it can generate location-based content. Similarly, each of the contacts can be "tagged" by one or more concepts from the Skos thesaurus. Hence, the interest of a semantic enrichment of contacts is the possibility of generating cartographies of these networks of contacts. These cartographies can be observed in a thematic way, by competence, by sector of activity or geographical places.

In accordance with the Semantic Web best practices, we have largely used the existing FOAF model for the description of the "social network" of contacts, ie the elements people, organizations and groups [11]:

1) *People description*: People in the FOAF ontology are described by simple fields such as last name, first name, date of birth, email address, telephone, etc. but also by a large number of fields dedicated to their online activity (for example website, blog, various accounts online etc...). One of the difficulties with FOAF is whether what is described is the physical person or one of the many virtual identities of that person. This distinction is important because it can be used to do what we call "federation of identity", ie a unique profile to bring together the different "accounts" of the person. In the same way, the relations defined in FOAF are made between the people and not between the online accounts. A "known" relationship in FOAF should therefore reflect a relationship of knowledge between two real people and not a virtual relationship. In order to clarify our posture with respect to this inherent ambiguity of the FOAF model, we have taken as a design principle that any entity defined as foaf:Person and its associated URI correspond to the physical person. Similarly, the relationships described using this URI represent the "real" relationships that the person has with other people, groups or organizations within the ecosystem of the Foundation.

2) *Organization description*: Organizations in FOAF are used to describe any legal entity by associating some basic information (name, website, acronym, etc.). It can be companies, institutions, NGOs... In the Re-Source Ontology, relationships between people and their belonging to any entity are made in a loosely way (for instance artists can be interconnected to different organizations).

3) *Group description*: Group-type objects essentially represent informal groups and not legal entities. It is a very generic object, and therefore very flexible, to constitute sets of people who are not necessarily connected to each other. Groups identify people who share common characteristics, such as curators, administrators, art critics, artisans, journalists, and so on. Group membership is declared by a "GroupMembership" relationship that qualifies and dates the relationship with the fields "role", "startDate", and "endDate". In the Weever application, the Group object is also used to assign levels of rights (from simple reader to contributor and administrator) that can be combined within a project or cross-projects.

The Re-Source Ontology is structuring in a semantic model (RDF / OWL), which means all the information objects that can be exchanged within the Re-Source platform as well as the relations that these objects have between them. Several features have been developed based upon this data model to enhance the indexing process and to unveil relevant contacts interlinked into Artworks.

#### IV. STORIFYING FUNCTIONALITY BASED ON SEMANTIC ANNOTATION

We have seen in the previous paragraphs the genesis of the project to create a living Artworks archive for a cultural institute, based on a timeline of projects related to events, structured by an ontology of documentary resources and a social network as well as a dedicated thesaurus of hierarchical concepts (Skos model) for semantic enrichment. We will present here a functionality developed to "put into stories" the archived projects exploiting semantic enrichment. The idea has come to go beyond the activity of being merely a librarian but rather of being the "journalist of one's own activity". Storytelling with data, directly originating from computational journalism, is indeed designed to establish a personal connection between the creator of the presented data and the reader [12].

This feature, we called Memo, allows users to attach rich text to an event, in order to maximize member collaboration, and to help tracking contacts within a project and between projects. The goal is to literally "put into story" the timeline of the project, in the form of a temporal logbook. It is possible to add little stories that would had an influence on the artistic project, as for example, artists influenced by the conditions of production of their work because of external constraints, which change the direction of the project etc...

A memo appears in the form of a text window attached to an event. The editing of a memo is only allowed to its creator, in the same way that on a discussion thread only the author can modify his comments. On the other hand, it is possible to offer free editing space by creating several memos, opening an asynchronous discussion between several users about an event. One purpose is thus to articulate the individual points of view of the members of a project with a global narrative thread representing the project.

To optimize the analysis of these narrative threads, we have introduced in the writing of a memo the fact of being able to semantically bind any cited contact (ie members of project groups, artists or external actors) with the platform's database of contacts (ie the curators, the administrative staff, the artists, the researchers, the artisans, the sponsors, ...). In the same way as on Twitter application, we kept the “at” symbol (@) to mention a person, and the “hashtag” (#) to mention a concept of the Skos thesaurus. When typing the name of a contact in the memo window, starting by an “at” symbol, the list of contacts appears automatically to find the right person, or to create a new one. The same action when starting some text with a hashtag gives the user a sub-menu for exploring the Skos Thesaurus to choose the right concepts.

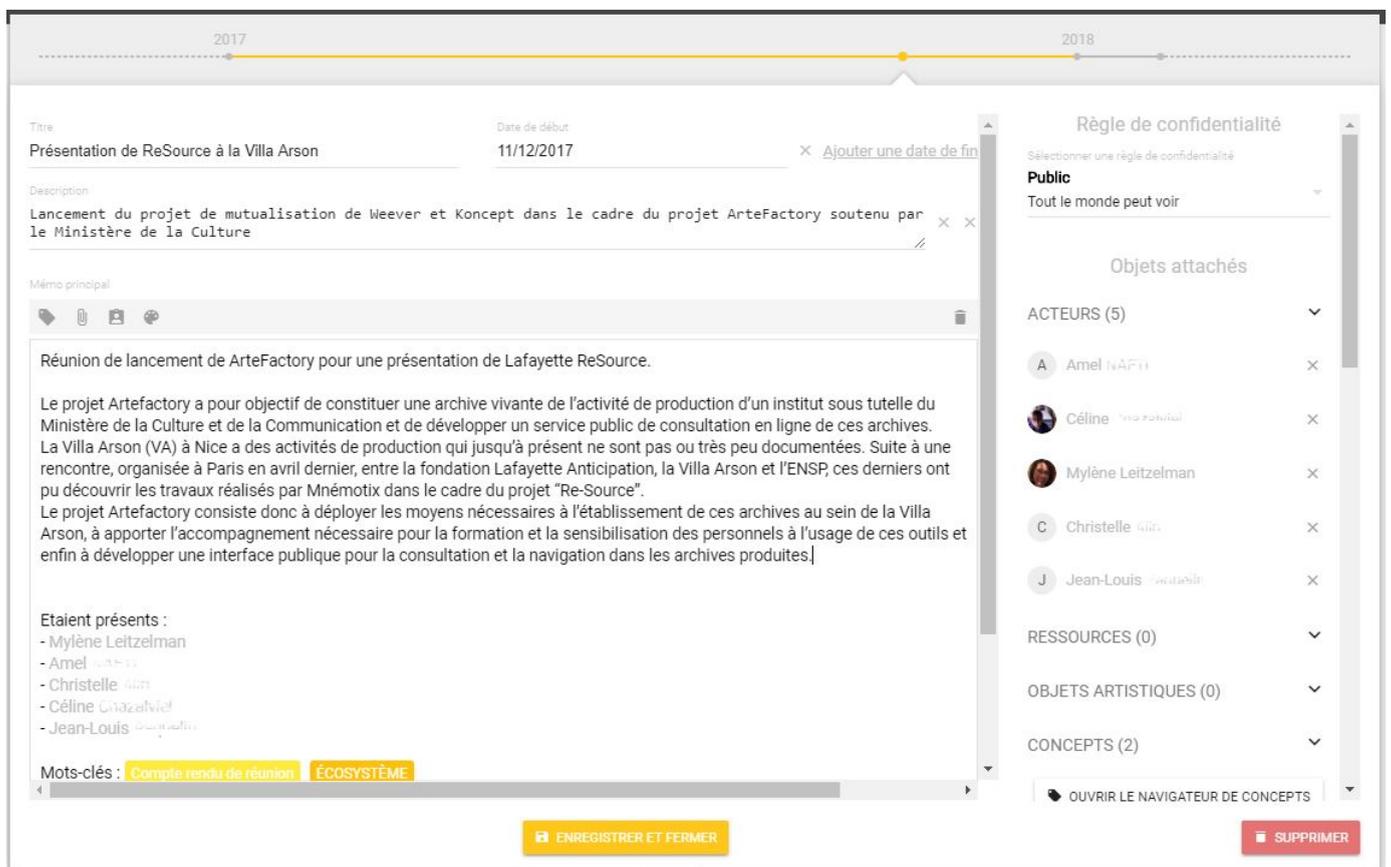


Fig. 3. The Memo window attached to an event inside the project’s timeline

Finally, when opening an event on the project timeline, we can see at a glance the contacts (ie members of the platform or external people mentioned) who are involved in an event, according to the quotes made in the memos (on the right of the screen in Fig 3). One of the first applications of contact analysis was to enrich the faceted search interface of Weever. Indeed, its first page offers search-result faceted refinement, to target specific items in projects. It is possible to select a particular contact, whose name has been mentioned in a project inside memos. We can also see in the faceted search which are the most mentioned contacts in the art projects.

## V. CONCLUSION AND FUTURE WORKS

We presented in this paper a dedicated functionality of semantic text enrichment for an Art Project Management tracking tool with at its core a structured data model (OWL/RDF ontology and SKOS thesaurus). The Memo

functionality, attached to any event of an artistic project, proposes an augmented text editor to cite contacts from the platform address book and also concepts from the thesaurus.

This semi-automatic way to semantically enrich texts into memos has been chosen on one hand to involve the user in the act of indexing stories with controlled vocabularies, hence limiting noise, and on the other hand to facilitate the relationship analysis of text (ie links between cited contacts, concepts, uploaded digital resources, text, creators and projects).

In a near future, we plan to propose a new front-end to explore and visualize inferences on semantic and interlinked resources in order to reveal new relationships among artistic projects (ie networks of contacts, visions of contemporary art ecosystem, thematic exploration of Artworks, ...). Currently, we propose automatic detection of concepts from the thesaurus on uploaded digital resources with the help of Semantic Web technologies combined with natural language processing methods. We will very soon extend this feature to propose automatic contact detection and indexing on any uploaded digital resource and any documented projects, that surely will foster the creation of intertwined contacts social networks for better mapping the Contemporary Art ecosystem.

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