

## CASE STUDY OF A GENERATIVE EDITING AUDIOVISUAL PROJECT

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Computation Communication Aesthetics & X Bergamo, Italy 'iAm' is an online short-film editing engine that generates pseudo-infinite instances of the same story. This artistic artefact can be considered a working prototype that serves as a proof of concept. Its artistic aim is to point out the relationship between humans and machines by letting the software make decisions during the editing process. The technical implementation becomes an experiment to test the importance of narrative patterns and structures of specific ways to formalise a story, while at the same time it questions the idea of final cut, authorship and finished work. It is a multidisciplinary project that involves UX design, software development and film shooting. The artefact becomes a formalization of several ideas.

## 1 A CRITICAL APPROACH TO VIDEO EDITING INTERFACES

Standards are important to set up bridges of communication. Standardised protocols such as language or other means of codes, common ways of interaction and a global infrastructure, are needed for the creation of a global society. In the 1930s, Otto Neurath pioneered with the isotype the progressive development and use of icons in our culture. The aim was to create a standard visual language that would be international and easy to understand for anyone. In the field of technology, the popularization of icons was done by Xerox and Apple in the early 1980s. Since then, Graphical User Interface (GUI) and the field of User Experience (UX), have been growing constantly. It is well known that metaphors used in the first personal computers helped to reduce the gap between analog and computational environments. This historical moment was important for the adoption of technologies by a large audience that was mostly familiar with analog processes instead of using computation.

GUI allows visual exploration of possibilities and characteristics of the applications. Most of those interfaces are visually appealing and use metaphors that relate to the cultural, economic and political systems from where they belong (Lakoff 2003) and are conceived to address a specific audience.

Since the turn of the 21<sup>st</sup> century, online video has been popularized due to an increasingly higher bandwidth, better compression codecs and the popularization of technologies like Macromedia Flash and, more recently, HTML5. Platforms like Vimeo (2004) and YouTube (2005) have fostered the presence of audiovisual documents in the net. Today's media content is mostly produced, distributed and viewed in a digital environment and uses standardized metaphors and icons that we all recognize. Analogous standards had an influence on the terminology used in software and were translated into the new environment (Echeverria 1999). The logics used in analog cinema and video editing worked perfectly in this new environment, but they are not exhaustive. Mainstream software such as AVID, Adobe Premiere or Apple FinalCut allow to easily understand the principles of editing in real life analog mechanics. However, expert computer users lack the possibilities of using coding in those interfaces, and native computer users find that most of the icons they use have no references to real life elements. A new logic to the computational context is needed to fully take advantage of this environment.

#### **1.1 REINVENTING THE MEDIA.**

Nowadays, in this context, audiovisuals are realized, produced and distributed mainly using this new digital environment (Vialas 2013). According to Murray, instead of just translating the analog content to a digital container, "digital design is about shaping interaction within new combinations of the format and genre conventions that make up a new medium" (Murray 2011). Along the same lines, Manovich stated: "We do expect computer narratives to showcase new aesthetic possibilities that did not exist before digital computers" (Manovich 2002).

We can think of all the material accumulated during shooting as forming a database, especially since the shooting schedule usually does not follow the narrative of the film but is determined by productions logistics. During editing, the editor constructs a film narrative out of this database, creating a unique trajectory through the conceptual space of all possible films that could have been constructed. From this perspective, every filmmaker engages with the database-narrative problem in every film, although only have done so self-consciously. (...) Given the dominance of the database in computer software and the key role it plays in the computer-based design process, perhaps we can arrive at new kinds of narrative by focusing our attention on how narrative and database can work together. How can a narrative take into account the fact that its elements are organized in a database? How can our new abilities to store vast amounts of data, to automatically classify, index, link, search and instantly retrieve it, lead to new kinds of narrative? (Manovich, 2002).

Manovich points to some essential characteristics of digital cinema, especially considering how the data base of media can be manipulated and accessed. Briefly reviewing how editing software addresses this idea, we find several approaches. If we observe mainstream editing software such as AVID, Final Cut or Premiere, we can see a multitrack timeline that follows the analogy of a celluloid. For the media selection dialog window we commonly use an easy to navigate folder structure and a preview window. That software is meant to output a linear closed audiovisual cut. Observing software with a more contemporary approach to the editing capabilities we find those producing web-docs such as Korsakow [http://korsakow.org/], Klynt [http:// www.klynt.net/] or Interlude [https://interlude.fm/]. In those cases, the navigation through the database of a media is designed using a diagram instead of a linear timeline. Underlying metaphors in that software are 'nodes', 'neurons', or 'narrative units' that can be connected together with the interaction of the viewer. On the other hand, tools for VJing or live cinema such as Resolume, Modul8 or GrandVJ, substitute the idea of a timeline for a preview and a real-time output and allow many different ways to access the media database. The interface is meant for real time performance and it includes random access to files, live sources and multiple layers. There is a relevant amount of artists and creators that use graphical programming environments such as Max/MSP/Jitter, vvvv, Isadora, Pure Data and Touch Designer, or that use scripting frameworks such as OpenFrameworks or Processing. In those cases, the use of algorithms to edit audiovisuals is possible and allows interesting ways to navigate the media data base.

For those different tools, examples and tools made by artists, filmmakers and developers such as Aaron Koblin, Chris Milk (Koblin and Milk 2010) with their online contextualized generative proposal *The Wilderness Downtown*, the artist Carlo Zanni (Zanni 2006) (Zanni 2007), the projects and thoughts of Michael Lew (Lew 2002) (Lew 2015) or the famous Bear 71 documentry (Mendes and Allison 2012), among others have been reviewed.

Taking into consideration these ideas, and focusing mainly on ways to access a database, an artifact that is based on generative editing principles has been developed.

## 2 'iAm' THE PROJECT

For the project, a multidisciplinary 28-member team was created, including filmmakers, producers, artists, actors, UX experts, and coders. The main difference between a common filming team was the presence of two software developers and an interface designer, as well as a director with experience in filmmaking and software development.

The project consists of a website that allows users to view a new cut of the short-film any time they want. The director's cut becomes the software's cut created, by the viewer's demand, as a unique random instance of the potential combinations of the short.

The artefact involves different disciplines, and has 3 main parts: the shooting of an audiovisual repository according to a specific script, a web-based software interface based on a visualization of the amount of footage and its possible instances/combinations, and a server-side software that edits the selected shots in real time and encodes the result into a web-friendly format for online viewing.

The content of the shots reflects on how technology is changing our daily lives and often shifting us from natural contexts to stressful landscapes of information overload. It questions who is really in control: humans or machines. The very design of the project reinforces this dilemma by generating an automated cut, never edited before and only conditioned by the pattern set up by the director, but out of his control.

## 2.1 INSPIRATION AND IMPLEMENTATION PROCESS.

A poem, reflecting on the relationship between humans and machines, on the co-dependence, the addiction and the increasing presence of technology in our daily life, was the start of the project. This poem, written mostly using aphorisms, is able to be read randomly and still make sense. Some of the inspirational sources of the ideation and practical implementation of the project, together with the original poem, can be found here: <u>http://iam. caotic.net/influences.html</u>

When trying to convert those sources of inspiration into an audiovisual project, a hybrid between website and film was considered to be the most interesting solution. A draft of the structure was developed by mixing the possibilities of code driven decisions together with the ideas of cinema as a navigable database, considering the possibility of producing a generative short film. One of the core aims was to merge the possibilities of both traditions while exploring the possibilities in film editing that open up when merging both.

# 2.2 IMPLEMENTATION: FOLLOWING A DESIGN AND CREATION METHODOLOGY.

In a very early stage of the project Terenci Corominas, Albert Blanc, both filmmakers, together with the programmer Julià Minguillón, were invited to join the project. One of the first issues that had to be addressed was to overcome established metaphors in editing and film production. The team had to discuss methodologies that allow new ways of thinking and writing the script. Dialogs, sketches and group research about common references were established during the first two weeks of the project. Concepts of live performance, randomness or platonic ideals were discussed. Some guidelines for the project were agreed: the project had to be narrative; a clear synopsis had to be explained; it had to create new formal results each time viewed and the illusion of choice or interaction had to be avoided if the viewer would not really be able to choose or interact. After several sketches (Fig. 1.) and discussions, the resulting proposal was a folder-based database with all the media available, sorted in a way that a pattern could be executed to randomly select clips from each folder and create a coherent story. Design and creation methodology allowed to test some of the ideas and to adjust and address problems found in the early ideation.



**Fig. 1.** Sketches of possible concepts and data visualizations used in the design and creation process.

Once the mechanics of the software were decided, the team plotted six stories that all shared the same structure and synopsis:

Someone is doing a common thing and gets distracted by a phone call; when trying to talk on the phone he/she get exposed to a big amount of images/information; when they hang up the phone what they were doing has changed dramatically.

The filmmaker team followed the common filmmaking notation to develop a synopsis, storyline, storyboard and film planning, but considering as many shoots from different angles as possible, so for each scene at least two different possible shoots were available. Each take was edited individually and kept as a clip in order to combine them freely later. With this way of working the synopsis engendered a very strong guideline, and it allowed a richer diversity of shootings while respecting the structure to be added. With that common structure, the original poem has been adapted and divided into 37 sentences, nine soundtracks have been prepared by two different musicians, and about two hours of archive audiovisuals, including scenes of films, documentaries and found footage, have been compiled. Each of those clips are saved in a tree folder structure allowing storage of many clips in each set-scene folder (Fig. 2.). All available information for each clip (cast, folder location of the file, duration in frames, and to which narrative group it belonged) is kept in a XML file (Fig. 3.).

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Fig. 3. Snapshot of the XML file.

As a result, each short film follows one of the six plots, choosing between all the shots available in each scene, choosing one sentence from the original poem, a soundtrack from the nine available and selecting several frames from two hours of archive film. All elements are randomly selected following the main structure and the resulting short film has a duration of 25 seconds.

This solution allows the control of the flow and rhythm of the film, ensuring it makes sense and stays coherent, and at the same time maintaining a possibility of the greatest number of combinations.



## 2.3 DESCRIPTION OF THE TECHNICAL EDITING PROCESS.

**Fig. 4.** Snapshot of the data visualization of the available media.

A PHP website plots a data visualization (Fig. 4.) using Processing. js that represents all clips and media in the database as a graphical pie. When the user presses the central "play" button, the Processing sketch generates a random combination and starts an animation to show the resulting structure of the created short-film. Meanwhile, this combination is sent as a chain to a script written in Python that checks the availability of the footage and generates a command to FFMPEG software to concatenate the chosen combination. The resulting file is stored to a folder that keeps all the generated short-films named by date of creation (Fig. 5.). The visual representation intends to visually convey the amount of combinations. The timeline as graphical pie represents the fact that, although there is only one starting point, the centre, the possible endpoints (on the perimeter) and the paths to reach them are virtually infinite.



**Fig. 5.** Scheme of the tools, actions and structure of the project.

## **3 CONCLUSIONS**

So far, about 740 films have been generated and stored in the server of the project and can be viewed by any visitor. All of them follow similar structures and have the same pattern, but none of them can be considered a final cut. Each of them is a valid variation of an idea that cannot be defined more than in its structure.

The artefact serves to illustrate some of the possibilities of using computation to edit audiovisuals and explore means to visually represent that process. While understanding the broad software possibilities that exist today to conceive the editing process (non-linear editing software, web-docs or interactive cinema platforms, VJing and live cinema and even tailor-made experiments), this project explores the intersection between computational generative art (Galanter 2003) and the field of film editing. As a result, new ways of editing, storytelling and real-time contextualization of film are detected as possible.

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Showing the process and visualizing the database of footage is an important part of the project. As Janet Murray states, new manners to design and represent have to come with new digital tools and systems [5]. In this case, the big challenge is to question a preconceived notion of fixed narration and to show and explain how a specific generative editing short film works.

As Olav W. Bertelsen and Søren Pold state in their paper "Criticism as an Approach to Interface Aesthetics" (Bertelsen and Pold 2004) it is not about rejecting the actual interfaces, but to understand in a critical way, that many more possibilities exists beyond the proposed metaphors and setups.

We conclude that metaphors such as Premiere or Final Cut, along with many of the ideas underlying the logics of the mainstream production system, such as authorship or masterpiece, can today evolve into more complex and rich concepts and for this, a critical approach to the interface is needed.

## **4 FURTHER RESEARCH**

The project is designed to be able to make modifications to the structure or increment the footage archive by just updating the XML file and folders. It follows several standards and it is developed with open source tools. These characteristics make it an interesting tool for further explorations and it has become a playground to test various experiments and essays. Evolving the project, by using more sophisticated ways to select the footage instead of randomness, seems to be appropriate to explore a more interesting dialogue between the viewer and the potential combinations of the narration.

Further research interviews and focus group methodology are planned in order to review the data visualization and the UX. On the other hand, new development is being done to speed up the process of rendering, testing different codecs and HTML5 live streaming, to ensure a smooth experience for the viewer and eliminate waiting time.

Besides the interest of the mechanism, the interface and data visualization of this experimental audio-visual, other theses arise; it is known that viewing the same video many times gives us different information and our perception of it evolves. Would viewing many instances of a pattern be more efficient in communicating an abstract concept than the repetition of a specific instance several times? Who is the protagonist of this artefact - the viewer, the author or the code? Is the message as relevant as the interface we look through? Are there better ways to visualize the repository? Is it possible to create a self-explanatory interface? How do people perceive this type of generative film? Do they prefer to see a unique cut? Does it trigger a sense of distinction or value, or the opposite? If a tool for filmmakers were to be developed following the iAm principles, would they use it? How would they adopt it and in which cases? Should this interface be a graphical user interface or a command line interface? These are questions that remain to be explored.

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