UNIVERSIDAD POLITÉCNICA DE VALENCIA

ESCUELA POLITÉCNICA SUPERIOR DE GANDÍA

Master in Digital Post-production

Máster en Postproducción Digital

Postproduction process for abstract video creation within an interactive product

Master's Dissertation

Author:
BOUASSA, Zakaria

Tutor:
PAYRI LAMBERT, Blas Gastón

GANDÍA, 2020

Acknowledgements:

For my beloved mother and my adored father,

For my teachers, and mentors,

For my sister, my brothers, and my friends,

For all mankind…

May Allah guide us all.

Zakaria

Abstract

This work is a part of the creation process of an interactive product, carried out together with other participants (Jianqiao Li and Melissa Palestino), in which the user will be able to navigate through different environments while music and video are changing.

This document contains two main parts: Bibliographic research and experimentation.

The first one explains the role of interactive products in the digital era and its applications in the digital business, alongside with the explanation of other concepts related to video art creation and post-production processing.

The second part explains the steps followed to make this interactive video art. In order to create different atmospheres inside the videos that compose the final product, a two-dimensional representation of the psychological environments is approached, in which Energy (High / Low) and Affect (Positive / Negative) are the axes. This work studies the concept of the audiovisual elements that represent different levels of affects and energies, proposing a series of videos that will be integrated in the final product.

The process of creation includes a video shooting of certain elements, alongside with post-production processing of the footage in order to develop both the figuration and the pure/symbolic abstraction in the composition of the image.

The essential part of the experimental work consists of the exploration of the different visual effects, such as vertical superposition, color gamut and contrast, ... and it studies the influence of filming and editing rhythms in order in generating different combinations of energy and affect.

Keywords: Abstraction, abstract environments, interactivity, digital, visual composition, digital effects, audiovisual post-production, visual representation, filming, editing.

Resumen

Este trabajo se enmarca dentro de la creación de un producto interactivo, realizado junto con otros participantes, en el que el usuario podrá navegar a través de diferentes ambientes mientras la música y el video están cambiando.

Este documento contendrá dos partes principales: teoría y experimentación.

La primera parte explicará el papel del producto interactivo en la era digital y sus aplicaciones en el campo empresarial digital, junto con la explicación de otros conceptos relacionados con la creación de videoarte y el procesamiento de postproducción.

La segunda parte explicará los pasos seguidos para hacer el producto de videoarte interactivo. Para crear diferentes ambientes dentro de los videos que compondrán el producto interactivo, se abordará una representación bidimensional de los entornos psicológicos, en los que la energía (alta / baja) y el afecto (positivo / negativo) son los ejes. Este trabajo estudiará el concepto de los elementos audiovisuales que representan diferentes niveles de afectos y energías, proponiendo una serie de videos "cerrados" que se insertarán en el producto final.

El proceso de creación incluirá una filmación de video de ciertos personajes, junto con el procesamiento de post producción del metraje para desarrollar tanto la figuración como la abstracción pura / simbólica en la composición de la imagen.

La parte esencial del trabajo experimental consistirá en la exploración de los diferentes efectos visuales (superposición vertical, gama de colores y contraste, ...) y el ritmo de la filmación y la edición para generar las diferentes combinaciones de energía y afecto.

Palabras claves: abstracción, ambientes abstractos, interactividad, digital, composición visual, efectos digitales, postproducción audiovisual, representación visual, rodaje, montaje.

Table of Contents

Part One:

Introduction

1. Presentation

The advertisement and entertainment industries are in constant search for new ways to reach more customers and expand their notoriety in the field. From real live exhibitions to virtual marketing platforms, companies and marketing agencies are trying to put efficient and innovative solutions in order to acquire as much as they can the attention and the engagement of the customer. One of the most trending audiovisual solutions nowadays are the interactive videos, in which the viewer has the ability to intervene in the process of film creation, customize the storyline of the video, and create multiple versions of it. Therefore, this type of product will ensure an increase in the engagement of the audiences and give them the possibility to be part of the creation process.

An uncommon audiovisual form that uses the interactive feature is the video art form. Many interactive film creators, and filmmakers in general, tend to resort to conventional forms and genres of film due to its potential in reaching a broad audience from a commercial point of view. However, the abstract aspect of video art gives the film creator the ability to fully express thoughts and emotions using the audiovisual medium in its purest form, in which the post-production phase is an essential part of the creation process that provides the true experimentation in creating emotions and meanings through the language of film, especially film editing.

For that reason, this work comes to study the use of interactive technologies in making interactive video art.

2. Objectives and purposes:

The evolving use of interactive technologies in audiovisual products makes the study of such a new form a real opportunity to lead the next generation in content creation especially in the motion picture products. Therefore, this work came to shed light on this type

of technology and use it to create an interactive video art, in which the production process experiments the relationship between internal and external rhythms of the video in order to create abstract atmospheres.

The goals of this work could be summarized as following:

- Investigate the impact of interactive videos on increasing the viewer's engagement towards the audiovisual piece.
- Experiment the effect of audio and video editing in creating different rhythms and thus creating different meanings and psychological atmospheres.

3. Methodology and workflow

This work is a part of the creation process of an interactive product, carried out together with other participants, in which the user will be able to navigate through different environments while music and video are changing.

In the first place, this work discusses the impact of the interactive video in increasing the audience's engagement and how it is affecting the way the viewer is consuming audiovisual materials. And since the project that is subject to study in this paper is an interactive video art, different concepts related to the video art form, interactive technology, and post-production processing are touched upon in this part.

In the second place, the work studies the different possibilities to represent various psychological ambients within the interactive product that aims to give the viewer the possibility to be part of the creation of the storyline of the video. In order to create different atmospheres inside the videos that composes the interactive product, a two-dimensional representation of the psychological environments is approached, in which Energy (High / Low) and Affect (Positive / Negative) are the axes (Russell et al., 2005) (see figure 13). This work studies the concept of the audiovisual elements that represent different levels of affects and energies, proposing a series of "closed" videos that are inserted in the final product.

The process of creation includes a video shooting of certain elements, alongside with post production processing of the footage in order to develop both the figuration and the pure/symbolic abstraction in the composition of the image.

This part begins with proposing a workflow to create an interactive audiovisual product, starting from the preproduction phase to the exportation phase of the final product. After that it dives deeper in the post-production process in order to study in detail the way the audiovisual rhythm is created in the editing phase of the process, and how a psychological atmosphere can be generated using the different visual effects provided by editing softwares.

The essential part of the experimental work consists of the exploration of the different visual effects (vertical superposition, color gamut and contrast, ...) and the rhythm of both shooting and editing in order to generate the different combinations of energy and affect.

The experimental part consists also in showing the steps and techniques of the creation of abstract atmospheres taking advantage of the various tools and features embedded in this phase of the production process.

The practical development of the work is accompanied also by an investigation of the visual effects in abstract and narrative works, and by a bibliography about the perception of affect and energy in the audiovisual products.

Part Two:

Review of literature on interactive video art and audiovisual Post-production

1. Interactive Video art: definition and history

1.1. Interactivity in art:

Interactive art is a new form of art where the viewer is no longer a passive consumer of the artistic piece rather than an involved participant in the process of creation of the artwork. According to Soler Adillon's definition, interactive art is:

> a series of related actions between two or more agents where at least one of them is an artificial system that processes its responses according to a behavior specified by design and takes into account some of the previous actions executed by them. (2015, p.236)

That definition suggests that technology and digital media participate in shaping this new form of art, and in inviting the observer to take part in achieving the purpose of the artwork. It also features digital interfaces and processors to read and capture the interaction of the human participants, considering them as generators of inputs for artistic creation. Many types of interactive artworks are invented taking advantage of the availability of a wide range of electronic equipment and digital softwares. Alongside allowing the audience to influence the course of the performance, this type of artwork is supposed to provide the participants with a partial or total immersive experience.

The world has known the first interactive art creation as early as in the 1920s, with Marcel Duchamp's piece named Rotary Glass Plates, in which the piece enabled the participant to turn on the machine and stand at a distance of one meter in order to see an optical illusion (Paul, 2003) (see figure 1). But the actual form of interactivity in art was developed in the 1960s due to political reasons, among many others, and that was with the artwork "Changing-Paintings" of the artist Roy Ascott (see figure 2). Aside from that, the interaction and the engagement of the audience with artworks was perceived as having a positive impact on the creative process (Edmonds et al., 2006).

Figure 1: Marcel Duchamp's Rotary Glass Plates.

Figure 2: "Changing- Paintings" 1961 by the artist Roy Ascott

After this period and with the beginning of the digital era in the 1970s, artists began to experiment new technologies in their creation process such as in live performances and direct broadcast of video and audio (Paul, p 18, 2003).

The popularity of interactive art increased in the 1990s due the advanced developpement made in computer-based tools, which created for the artist a real opportunity to diversify the art creation process and experiment new ways that had never been possible without this technology. Humans and machines participated alongside with the artist in creating a new type of art-experience. From that period to now, this new art-form has been continuing to expand, benefiting from the development of digital technologies, and many galleries and museums started to implement this form in their shows and exhibitions.

An example of a museum that is incorporating such technologies is the LMNL Interactive Digital Museum by Onedome in San Francisco. It offers a unique immersive experience for the visitors, and it's made up of innovative and interactive installations interconnected into a fun and artistic exploration, inviting the audience to engage and collaborate in creating the art within its various exhibitions. The museum is created in collaboration with many new media and visual artists from around the world, and featuring many rooms as well as secret compartments and chambers, providing a unique experience for all audiences and ages.

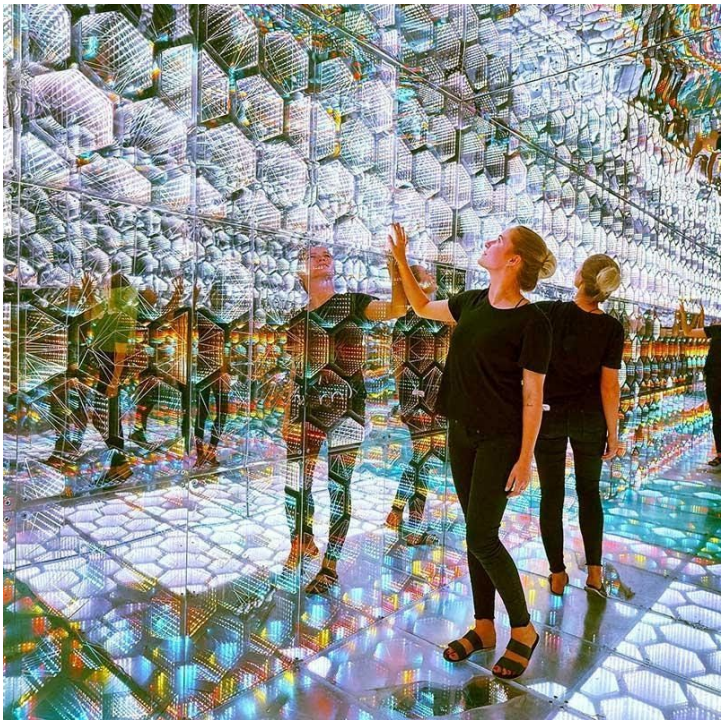


Figure 3: Interactive art in LMNL museum by OneDome.

1.2. Video art:

Video art is a form of motion picture art that is generated by one or multiple participants. It appeared in the 1960s and '70s with the widespread availability of affordable videotape recorders and the ease of its display through commercial monitors (Hartney, 2009). Video art became a major medium for artists who wished to explore digital technology as a new way of expression. Their videotapes, often non-narrative and of short duration, could take many forms such as recordings that are broadcast, installations viewed in galleries and

museums, online streamings, DVDs, and performances which may incorporate different elements such as video monitors, and projections, displaying live or recorded images and sounds (Hartney, 2011). There are also video art performances that take place live, combining videos, music and sounds in different ways. It is complex to define video art or narrow its scope, since it can manifest itself in multiple ways. This modality may or may not have dialogues, use actors, use recordings, bet on live music or rely on screens. Its main feature is the use of moving images and audio.

Early artists working in this medium, such as the Korean-born artist Nam June Paik, created installations of numerous television sets programmed with the artists' own experimental and abstract videos, creating sculptures that are internally kinetic. The video art was born when Paik used the Sony Portapak to shoot footage of Pope Paul VI's procession in New York City (Maura, 2012).

Figure 4: Portrait photograph of a leading artist, Nam June Paik(1932-07-20 - 2006-01-29) taken by Lim Young-kyun (1955 -) in 1983.

Other artists began to experiment with video projection, which enabled them to create more-monumental effects, often viewed on museum and gallery walls, and they have managed to become also a true benchmark in video art. We can highlight some of them such as the following:

- Nan Hoover (1931 - 2008). She was an American-Dutch creator who is considered a true pioneer of video art. Her most significant works include "Fields of blue" (1980), "Color pieces" (1980) or "Light and Object" (1982).

- Eija-Liisa Ahtila (1959). She is a Finnish video artist who has been recognized internationally thanks to artworks such as "Consolation Service" (1999), which was awarded at the Venice Biennale, or "The Wind" (2006), an artwork that won the Artes Mundi Prize.

- Jordi Colomer (1962), a Spanish artist who has managed to become an international benchmark. Among his significant works we could find "En la pampa" (2008), "Arabian Stars" (2005) or "No future" (2006).

In the same way, there are numerous groups and organizations that have specialized in this type of art and are dedicated to promoting it and giving it a leading role among other art forms. For instance, the Demolden Video Project (Santander - Spain), The Experimental Television Center (New York - United States), Julia Stoschek Collection (Düsseldorf - Germany), AEC Ars Electronica Center (Linz - Austria), Duncan of Jordanstone College of Art and Design (Scotland) or ZKM Center for Art and Media Karlsruhe (Germany), among others.

Unlike cinema, video art may not have narration. This means that video art does not set out to tell a story, but to transmit a concept or generate sensations. For this reason, despite the fact that its formal characteristics bring it closer to experimental cinema or television, experts often link video art to painting and photography because of their intention (Julián Pérez Porto and María Merino, 2015).

The flexibility of the medium and the ease and immediacy of video technology attracted a wide range of artists—experimental filmmakers, photographers, performance artists, conceptual artists, sound and process artists, among others. By the 1980s and ’90s higher production values and a closer intersection with installation strategies began to surface in the works of many artists. The advent of digital recording technologies in the 1990s and beyond has further extended the possibilities of TV monitor-based or projected video art as a major medium in modern art.

1.3. interactive video:

The concept of Interactive Video has been evolving in recent years, being widely used as an educational and entertainment tool. This part seeks an approach to the most widely used concept of interactive video.

Videos are powerful elements of the multimedia content on the Internet. Hundreds of them are viewed daily from mobile devices, computers and smart TVs. In general, the user interacts with the videos using the typical pause, rewind and play controls. However, the interactive video suggests that the viewer could interact within the video as if being part of the scene. Hence, interactive video represents a further advance in the evolution of this type of multimedia content. Thanks to the interactive video, from being spectators we become part of the video we are watching.

Interactive Video is a video, generally produced with traditional techniques, to which data has been added in a way to give the user the possibility to be part of the creation. Under the term interactive video, many systems are accepted, and not all with the same degree of complexity.

Despite this, talking about interactive video means referring to the conjunction of the possibilities offered by video technology and computer technology. Consequently, the interactive video would include the didactic characteristics of both.

Interactive video, as a result of the fusion of two powerful electronic media: video and computing, makes it possible to combine the power of evocation of the image with the capacity for dialogue of the computing media, which is referred here as “interactivity”. And, the possible applications of such technologies extend over a very broad spectrum. For this reason, interactive video accommodates a multitude of possible configurations, ranging from simple video equipment to complex systems made up of video equipment, computers, peripherals, etc.

History of interactive videos:

The first apparition of a show that claimed to implement the concept of interactivity in its work was in 1961 with William Castle's film Mr. Sardonicus (1961), which is a story about a man whose face becomes frozen in a horrifying grin while robbing his father's grave. The audience was given the chance to vote on Sardonicus' fate using glow-in-the-dark thumbs handed out before the film.

Another important work that is considered as one of the first interactive videos was created 50 years ago by the Radúz Činčera, the Czech screenwriter and director, under the name of "Kinoautomat" (1967), dubbed into English under the subtitle "One Man and His House". In 1967, the world knew the first interactive film, in which there were nine points during the film where the action stops, and a moderator appears on stage to ask the audience to choose between two scenes; following an audience vote, the chosen scene is played (About Kinoautomat, 2010) (see figure 5).

Figure 5: A presentator asking the audience to choose the direction of the events of Kinoautomat movie

Alena Cincerova, the daughter of Radúz Činčera, said in an interview made by Radio Prague International:

> It is interactive because it's the first film in the world where the audience can change the plot by voting, by pushing buttons. They are choosing several times, nine times throughout the movie. They can choose how the situation will go on. Mostly it stops in very dramatic moments, and then an actor comes on stage and asks the audience to decide what the main hero of the movie should do.(14th June 2007)

After that, many film creators had been intrigued by this form of film, and started to create many versions and derived concepts of interactivity in videos and games.

With the switch to digital video that started in the 1980s, many film creators have experimented different types of interactivity within their artworks. The first Danish interactive film was made in 2003 by the director Morten Schjødt under the subtitle “Switching” (2003). This new form of film was developed specifically for DVD viewing, and gives the user the ability to switch between scenes and experience changes in the film by clicking on the screen or using the remote control.

In 2018, the video-on-demand streaming platform, Netflix (www.netflix.com), released its first interactive film "Black Mirror: Bandersnatch" (2018), which redefined the general public's understanding of interactive movies. The film asks the audience questions with different options at certain points of the story, and they can change the subsequent plot of the film by clicking on different options. The film has 12 different endings with a total length that varies from person to another depending on the options that have been chosen. Generally It takes about 90 minutes to complete the traditional plot (in case the audience does not make judgments and subjective choices, the movie will automatically make all the decisions), but in other cases the total duration of the plot can reach 300 minutes. Due to its immersive feeling that makes the audience a participant in the story, the users will be willing to watch the plot with multiple versions repeatedly, resulting in increased content consumption. Although the production of the film took 18 months to prepare and produce, the final ratings from the audience were not satisfactory.

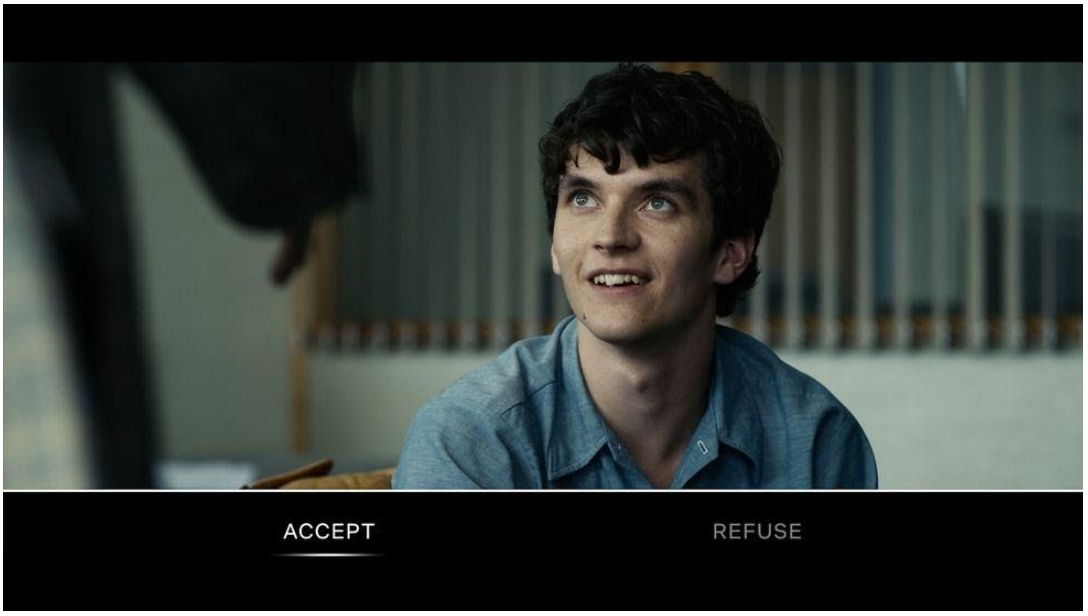


Figure 6: a scene from Black Mirror: Bandersnatch in which the viewer is asked to choose a direction for the movie.

Many other platforms offering a variety of interactive TV shows and music videos, have been proving the success of this new video form in captivating more engagement from the audiences. For instance, the Eko platform (www.eko.com) contains various interactive video genres such as tv dramas, comedies, DIY video, tv-reality and music video... in which the character or the presenter occasionally asks the audience a few questions, and the audience helps the character make the next action decision by clicking on different options (see figure 7).

In the fashion show "Clothes Call with Nina Garcia" (Eko, 2019), the audience can click on different types of clothes in the list to choose different outfits and let the model change the outfit in real time. Compared to video programs, the company's interactive music videos are less innovative. For example, in the video clip "Wiz Khalifa - Staying Out All Night" (2014) the music stays the same, and only the direction of development of the video clips on the story changes.

Figure 7: the viewer is asked to interact with the video and choose the ingredients of the meal.

Types of Interactive Videos

Among the most common types of interactive videos and that have been developed in recent years, we could find the followings:

- Conversational Videos:

This type of video allows the users to interact as if they were having a conversation with the characters in the video.

An example of this type is the Burger King advertising campaign, entitled The Subservient Chicken (2001–2012, 2014). In this campaign the user could write different actions and in the video the actions indicated by the user were shown.

Another example of a conversational video is: "A conversation with Ian" (Percy, 2014), a video in which the actor Sir Ian McKellen can be asked questions about his opinions on different plays he has starred in. Video organized by the National Theater of the United Kingdom.

Figure 8: viewers can write comments on the dialog box and the character interacts with them.

- Customizable Videos:

They allow the user to adjust some variables and then display the personalized video at the end with the preferences that the user has made. However, the user may not be able to interact with the video while it is playing. A typical example of this type of video is Volkswagen advertising video, in which you can customize the car in question.

- Exploration Videos:

They are intended to simulate an embodiment of limited movement, in such a way that it appears that the user is moving during the video to the point he wants. The effect is achieved by repeatedly playing parts of the video in a loop. Applied in museums and exhibitions.

- Interactive video components:

In an interactive video, a wide variety of components can be introduced whereby the user can interact with the video in one way or another. The most important are the following:

- Video Choice:

Components that break with narrative linearity. Various decision points are presented and depending on the viewer's choice, the story changes.

- Video Commerce:

Component that turns the video into a kind of online store where the viewer can see and purchase products without having to leave the video. The user can mark the products that appear in the video through annotations that, when clicked, display product sheets with a button to buy the product.

- Video Catcher:

Component that tries to turn a video into a game: the clearest expression of gamification applied to a video.

- Video Quiz:

Component that allows collecting data related to the opinion and preferences of viewers.

- Hypervideo:

It is a video reproduction that has embedded links to the video and that are accessible by the user, allowing navigation between the user and other hypermedia elements. It has a concept similar to hypertext, which allows access to other information in the same document from other text.

Interactive video applications:

Interactive videos are often used intensively in marketing campaigns to publish a product. In the political and journalistic sphere, they are often used so that people can intervene in interviews with public figures. Also it can be used in museums and exhibitions, as a way to complement the user experience with what they are already seeing.

1.4. Interactivity and customer engagement:

Marketers rely on content to attract prospects and engage customers. This type of marketing that began with the digital era, is known as “inbound marketing”. It’s a new business methodology that aims to attract customers through creating valuable content and digital experiences (HubSpot). It started with the development of electronic paper format, known as PDF format, and as it went mainstream, static forms of contents became less differentiated due to the vast use among competitors. Advances in content marketing effectiveness were seen when digital marketing leaders began deploying more visual forms of content, and it was video format. Therefore, many organizations started to implement video content marketing in their strategies, as the video production became more and more affordable.

In order to captivate more the attention of the customer, adding interactivity to content marketing was judged the most effective method to date. In 2015, a study conducted by Brightcove group with the collaboration of Demand Metric (Demand Metric 2015), a marketing research center, shows that the use of interactive videos is significantly increasing among marketing agencies, due to its outrunning performance compared to other forms of content. Half of the organizations subject to study are thinking of implementing new interactive videos in their marketing campaigns, and 20% of them are already using interactive products in their strategies. The average planned spending on interactive videos was estimated to fall within a range from 30,000 USD to 40,000 USD in the following year.

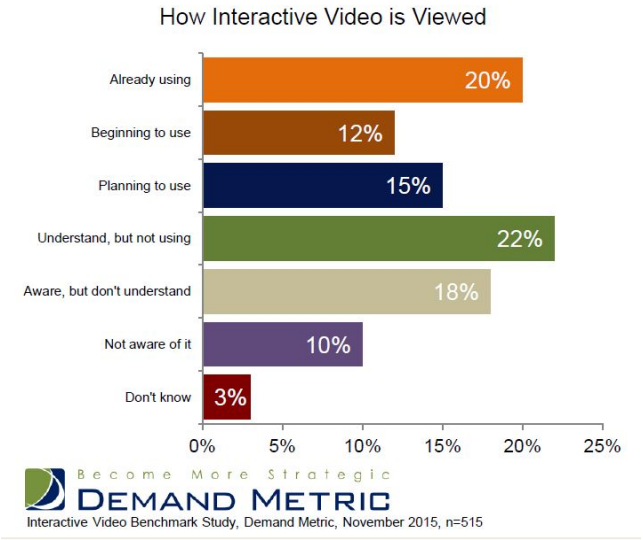


Figure 9: Statistics made by DemandMetrics on how interactive video is viewed by their customers. Source: Demand Metric.

According to another leader in the media strategy group, Magna of the IPG Media Lab, an interactive video advertising drives more than 47% of gain in time spent with a marketing message compared to a conventional video. In addition, the factor of interactivity in this media form enhances the memorability of the brand in the awareness of the viewer, which levels up the impact on purchase intent nine times higher. The study shows that advertising campaigns that use the interactivity feature in its strategy, are more cost efficient. Entertainment-focused interaction, such as gamification or playable advertising, extends the time consumers spend with a branded message by 15% and improves the brand's KPIs.

In addition to entertainment, the study recommends using human-focused interactions such as with a celebrity or key character in the video instead of just showing the product itself.

The benefits of using an interactive video over other types of video are shown to be persuasive for marketing agencies and media strategy groups. Indeed, this new form of media is proved to be able to better attract attention to users, and offer partial or total immersion with the story or events of the video: the person is one more actor who is involved in the video and interacts with it. On the other hand, implementing the interactive technology in

marketing campaigns will provide companies with analysis on how the user interacts with the video (Williams, 2017).

2. Post-production in the digital era:

This section of this dissertation dives in another important and essential aspect of the interactive video: the creation process. As in conventional films and videos, the production process of a motion picture artwork or product must go over three main phases: screen writing and pre-production phase, the production phase, and finally the post-production phase. This part analyzes with more depth the particularity of the first and the third phase of the process, for the reason that the production phase remains the same as in conventional filmmaking.

2.1. Pre Production:

This phase is considered to be the most crucial phase, since a mistake in pre-production can translate into bad work in the rest of the stages. This phase begins with the conception of the idea and ends on the first day of the production. The work done during pre-production could be divided into two large groups:

On the one hand we have the creative work of the director and the screenwriter. It consists of the conception of the idea, the treatment, the writing of the technical script, etc. Basically it consists of treating the idea or argument of the audiovisual piece until it is given the necessary consistency.

On the other hand there is the production work. This consists of obtaining all the necessary resources so that the idea elaborated by the director can be fulfilled. This involves searching for and hiring the entire technical team, obtaining the appropriate locations to shoot the piece as well as the relevant recording permits, renting the necessary audiovisual equipment, starting a casting process to find the most suitable interpreters, preparing a shooting plan that specifies the activity of each of the shooting days, budget the entire project, plan subsistence and means of transport, and a very long etcetera.

The main difference between an interactive video and a linear motion picture, is that the first one requires more preparation and attention. In fact, to create an interactive video

with multiple branches and versions, the script writing team needs to create in advance all possibilities within the artwork, and ensure the coherence and consistency between the different branches of the story. Alongside with the screenplay, the creator of the interactive product should have a clear map of the different events within the ramified story. In the example of the interactive film “Black Mirror: Banderbach” , we can see in the figure 10 all the possible paths that the story had presented in a ramified tree of events.

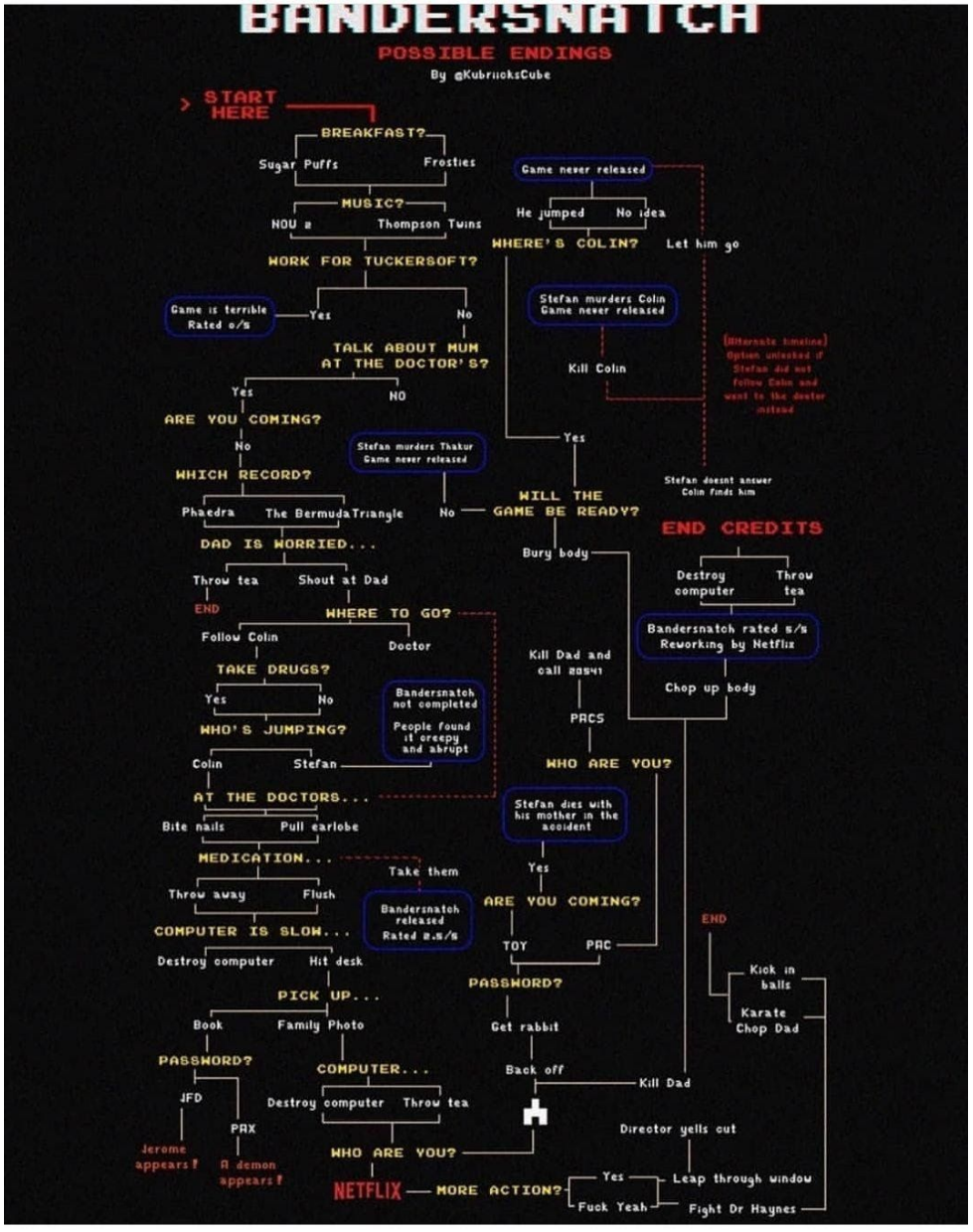


Figure 10: All possible endings of the movie Black Mirror Bandersnatch.

2.2. Post production: History of video editing

In both artistic and technical levels, the audiovisual post-production phase is where the artwork gets its final shape. In interactive videos, this phase is mainly divided into two stages, the first one consists of video and audio editing alongside audiovisual effects, and the second one is related to the IT system and the integration in digital platforms.

- Audio and Video Editing:

In the filmmaking world, the terminology regarding editing is clear and decided from the beginning. The term "edition" is always used, with its different linguistic variants in different countries.

From the early beginnings of the motion picture era, the professionals of the television and film medium used the expression “edition” to emphasize the technical aspect of this phase since their form of expression was different in their material means from the cinematographic resources. Other professionals prefer to use the term of montage in order to get closer to the most experienced language of celluloid.

Editing a video consists of manipulating it, that is, joining some images to others, deleting some, adding digital effects or titles, incorporating music and any other material that would allow a product ready to be duplicated or broadcast (Aguilera et al., 2011).

With the beginning of the digital video era, and in a more technical than creative sense, video editing is called "post-production", in order to make it independent from the concept of editing. It’s also defined as “the work of integration in a single medium that is carried out from a potentially heterogeneous raw material, consisting of images, sounds, texts and graphics, recorded or synthesized.” (Rubio Alcover, 2006).

Likewise, among video media professionals, there is a more restrictive use of the expression "post-production", which comes from the cinema and refers only to those processes by which the special effects of a program are obtained and to all kinds of manipulations that carry out the editing process itself, in order to achieve an improvement in the quality and appearance of the final product.

- Objectives and characteristics of video editing:

Many are the objectives of the editing phase en audiovisual creation, and that depends on the nature of the final shape the producers wanted to make. the following list contains the main goals that editing professionals take into consideration in this phase:

- The editing is what differentiate the art of cinema from the other forms of art. it's considered to be a second writing of the story using intrinsic features to tell the story and transmit an idea. In the next part of this chapter, we discuss in depth how film editing can create exclusive meaning and rhythm differently from other types of art.
- The video editing is the main tool that enables the creators to ensure continuity in the story, by establishing order and a narrative structure
- It is in this phase where it's possible to adapt and synchronize sound and image.
- Technically speaking, the editing helps fixing and adjusting the sound and image quality

With that been said, multiple features and characteristic of audiovisual editing could be cited as following:

- It includes in itself an independent language element which makes it exclusively belong to the motion picture field.
- It is considered to be the last creative phase in the making process, and therefore, it has a high degree of artistic and technical responsibility
- it establishes, through the choice and selection of the images, a subjective point of view.

- Audiovisual Effects:

Audiovisual effects are an integral part of the story. However, the main part of it is done in post-production, and usually needs to be carefully planned and choreographed in pre-production and production. The visuals are designed and edited like explosions, car racing, or even simple effects that change the composition of the image. To achieve the

desired effects, a visual effects supervisor is involved in the production from the beginning, working closely with the director and the production team.

The first time the visual effects were seen to be used was in 1900 by the French director Georges Méliès (Gress, 2015), at the time the trick was "to capture the reality that was unfolding before the camera lens". The next director to be recognized for his handling of visual effects is Willis O'Brien in the movie King Kong (1933) and is followed by William Wyler, who applied the technique of "matte painting"(annotation) in the films The Ten Commandments (1956) and Ben-Hur (1959); his work consisted of painting the scenarios that were placed as backgrounds in the movies where the actors were placed

2.3. Video art creation in post-production process:

Main branches of the video art form are screendance and visual music. The exact definition and scope of the screendance is in perpetual debate, but it could be defined as an audiovisual artwork that uses cinematographic language and dance or body movements to create meaning and emotions. Dance is currently present in numerous audiovisual productions, from more or less experimental video dance works with hundreds of active festivals (Payri, 2018). Within this genre, we could classify it into three types:

1- A filmed choreography from a fixed point, as the spectators would see a performance on the stage, this type is majorly done for documentary purposes.

2- The staged choreography or the restitution with staging of the choreography. It's a linear filmation of the dance from different angles and camera moves, as if in a movie production, respecting the duration and structure of the dance.

3- The third type is what is called “Choreocinema”, a term coined to describe the artwork of Maya Deren in years 1940 (Higgins, 2006, p.199; Austvoll, 2004, p.2), it can be also named video-dance (Berrier, 1991) among many other terms. This type is characterized by breaking the natural linearity of the filmed choreography and following the logic of the audiovisual language to create a new choreography using different and abstract spaces, audiovisual effects and time remapping.

On the other side, visual music is defined as a time-based visual representation that establishes a temporal architecture in a way similar to the sound, or what is known as absolute music. It’s a non-narrative form that could be accompanied, or not, by sound.

Creating new choreography by editing:

For dance and video-dance, rhythm and the feeling of tempo is essential for congruence between music and image, and there are several ways to create this congruence:

Editing: changing planes can set a “montage rhythm”, but in practice the feeling of rhythm and tempo is much more marked by the movements of the choreography than by the montage. In her book Cutting Rhythm, Karen Pearlman said:

> The actual materials that editors shape in time are movement and energy. The pulse, which is the smallest expressive unit of the movement of time and energy, is discussed before looking at the choreographic processes of shaping pulses into phrases. The ways that choreographers construct dance movement phrases are compared to the ways in which an editor assembles movement into phrases and sequences when creating rhythms. (2009, p.23)

It’s important to understand the concepts of absolute music and visual composition, since they form an essential part in all forms of video art, especially screendance and visual music.

Absolute music: With the statement of the Russian composer Igor Stravinsky that says: “Music means nothing outside itself” (1956), we can understand that absolute music, also known as abstract music in many literature, is a non-representational music that uses materials of sound patterns to create temporal structure. It first appeared at the end of the 18th century in the writings of authors of early German Romanticism, such as Wilhelm Heinrich Wackenroder, Ludwig Tieck and E. T. A. Hoffmann but the term was not coined until 1846 where it was first used by Richard Wagner in a programme to Beethoven's Ninth Symphony (Dahlhaus, 1991).

For visual artists, the composition of a frame is “the arrangement of graphic elements and characteristics within a defined area, a groupement of related components that make sense together and balanced by an overall appearance of continuity” (Bowers 1999). In video works, composition is also defined by the choreography of the frame (Payri, 2018), in other words, the rhythm and the direction of movements of elements within the frame and how they are interacting with each other. In each part of the artwork, the artist seeks to go from visual dissonance to what is called rightness of the frame, which is the visual consonance, and doing so constructs a tension/release relationship within the image which creates movement through time with visual materials. It’s clear now that visual cadence points can be established in the artwork, and therefore we can articulate units of time and develop larger temporal units, such as motifs and phrases, within the video art piece.

Creating visual composition, and choreography, starts from the production phase. It's either in set using all elements that enter in visual recording or in virtual space using software to generate CGI[1], where the artist begins to depict the first shape of the artwork. However, the composition creation won't be finished until it reaches the post-production phase where other types of tools and techniques are applied.

Particularly, video art creation that relies in greater part of it on abstract elements, gets its real shape in the editing stage. In fact, many post-production processing operations are non-lineare in time or in image (Payri, 2018), and that means a reproduction or deformation of the original input, which creates a new choreography surpassing or the original one created in production phase. For instance, we can find many operations in the post-production that generate a new composition of the image by creating symmetrical or asymmetrical repeated reflexions of the frame, and this operation is known as kaleidoscope[2] effect (see figure 11). The outcome of this processing is a different composition that could be described as abstract, and therefore, a non-representational image.

[1] CGI: computer-generated imagery, special visual effects created using computer software.

[2] Kaleidoscope: a toy in the shape of a tube, that you look through to see different patterns of light made by pieces of coloured glass and mirrors. See Dic Cambridge.

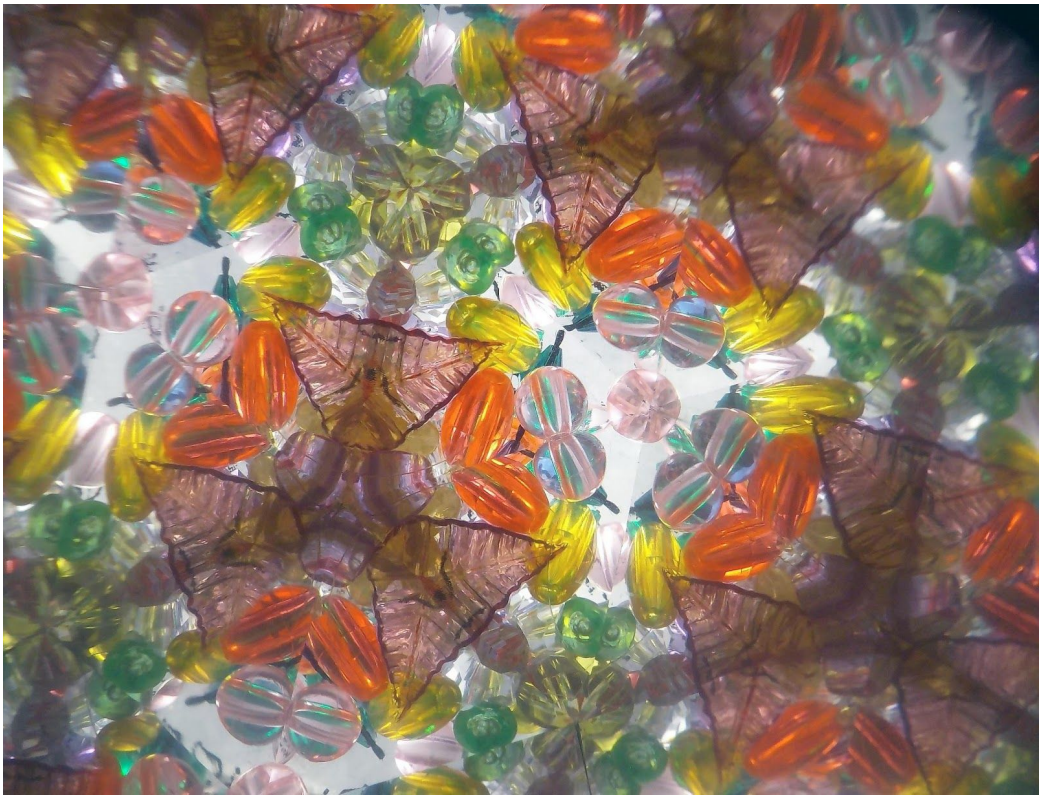


Figure 11: A view of reflections of glass beads inside a kaleidoscope.

The echo effect is also a processing operation that permits the generation of a new choreography of the original material. Whether it's applied on sounds or on visual elements, the echo effect generates repetitions of the original input with a certain intersection between the generated elements, and consequently changes the perceived rhythm. In audio elements, the echo could be described as reverberation or delay depending on the parameters that define the number of repetitions and the time period that separates them. As a result of changing these parameters, the rhythm and the dynamique will change (Payri, 2018). In the same way, the result of an echo effect applied on the image is determined by its initial parameters. Increasing the number of repetitions of the frame within the same period will lead to a fluid effect that is called motion blur. This effect has a similar fluidity as does the long exposure effect that could be achieved in the filming stage by superposing the light projected over the censor of the camera or the film frame. Otherwise, for a certain number of frame repetitions, in which the superposed frames could still be differentiable by the human perception, changes of the rhythm and the dynamic of the internal movement of the visual will be noticeable.

Creating audiovisual rhythm:

In literature, rhythm is defined generally as a "movement marked by the regulated succession of strong and weak elements, or of opposite or different conditions" (Anon. 1971, p 2537).

Even though the term " rhythm " is commonly linked to ideas about music, this general meaning of regular recurrence or pattern in time can apply to a wide variety of cyclical natural phenomena having a periodicity or frequency. The visual music instrument designer and composer Fred Collopy concludes that:

> Rhythm has played a particularly important role in the thinking of painters who have been interested in the relationship of music to their work. There is a rhythmic element to each of the three dimensions. The changing of colors is rhythmic, the ways in which forms are arranged (even in static images) is often described in terms of rhythm, and movement in time is inherently rhythmic. This suggests that rhythm constitutes a particularly rich point of entry for the design of instruments and for the development of technique for playing visuals in performance with music. (p, 2000)

Therefore, rhythm is also a vital component in creating a meaningful synthesis of audiovisual artworks.

In music, the term rhythm consists of meter[3], rhythmical structure[4], tempo[5], and timing[6]. According to Michel Chion, audio-visual rhythm has some similar effects as in music:

> Rhythm, for example, is an element of film vocabulary that is neither one nor the other, neither specifically auditory nor visual …the phenomenon strikes us in some region of the brain connected to the motor functions and it is solely at this level that it is decoded as rhythm .(1994, p136)

[3] Meter: In music, it refers to a beat, either single or compound.

[4] Rhythmical structure. Shorter groups of sequential patterns of emphasised beats that are grouped into a long hierarchically based grouping of groups.

[5] Tempo: The impression of speed or change of speed.

[6] Timing: Nuances of when notes are played, slightly 'early' or 'late' or mechanically regular.

In her book Cutting Rhythm, Karen Pearlman said that “Pulse is the smallest, the most constant, and perhaps the most ineffable unit of rhythm in film” (2009, p28). These pulses are shaped into *phrases* by editors in post-production phase, which also described in her book as “a composition of movement into a perceptible and intentionally formed rhythmically expressive sequence.

Audiovisual synchronisation

Audio-visual synchronisation is the coincidence of a visual movement with an auditory emphasis, such as a beat or accent. These coincidences are what Chion defined as ‘sync points’: an ‘audio-visually salient synchronous meeting of a sound event and a sight event’ (1994, p233). The most obvious audiovisual synchronization is at the level of a pulse, when an image event coincides with a short duration audio event.

Many tools and techniques are used in the post-production phase in order to create a coarticulation of sound and image. For instance, the time remapping tools of sound and film, such as changing velocity of the video, the tempo of the music, give editors the ability to adjust the beats of the sound with the movement within the frame.

Part Three:

Experimental part: Creation of the in interactive video art product:

1. Description of the concept and methodology:

1.1. Description of the interactive video art:

The interactive video art product is an independent work led by students of the Digital Postproduction master degree in The Polytechnic University of Valencia (2019/2020), in which various modifications had been made to finally arrive at its actual shape.

The idea starts from a narrative story, written by the student Jianqiao Li, in which the events were ramificated to provide the viewer with the possibility to change events and create different stories. From the various events of the narrative structure, we tried to generate different abstract videos that evoke certain emotions that correspond to the narrative story (see figure 12).

Through the final shape of the ramified structure of the interactive product, we tried to represent emotions where their levels of energies and affects are located in different areas inside the circumplex of Energy/Valence proposed by James A. Russell.

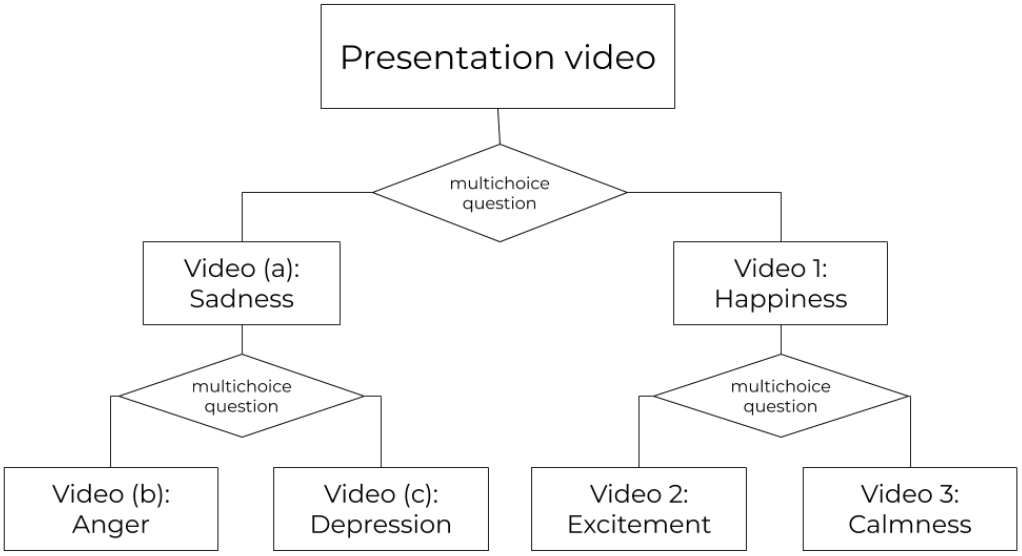


Figure 12: The structure of the interactive video art "Dance of the Dawn".

With that structure, we needed to create 6 clips in which we represent in each clip each one of these emotions, and that by taking advantage of all the tools and techniques in the post production phase.

1.2. Representation of different emotions using a circumplex model of Energy-Affect:

From that new emotional based story structure, it seemed necessary to classify each emotion using a specific model or grid in order to have a clear and concrete representation of each one of these emotions and then have a starting milstone to create corresponding audiovisual elements and also facilitate the process of its creation.

For that reason, a two-dimensional emotion model proposed by J.A. Russel was selected to classify each emotion. This model suggests that any emotion can be classified through a spatial model with two axes of low/high Energy and positive/negative Affect (see figure 13).

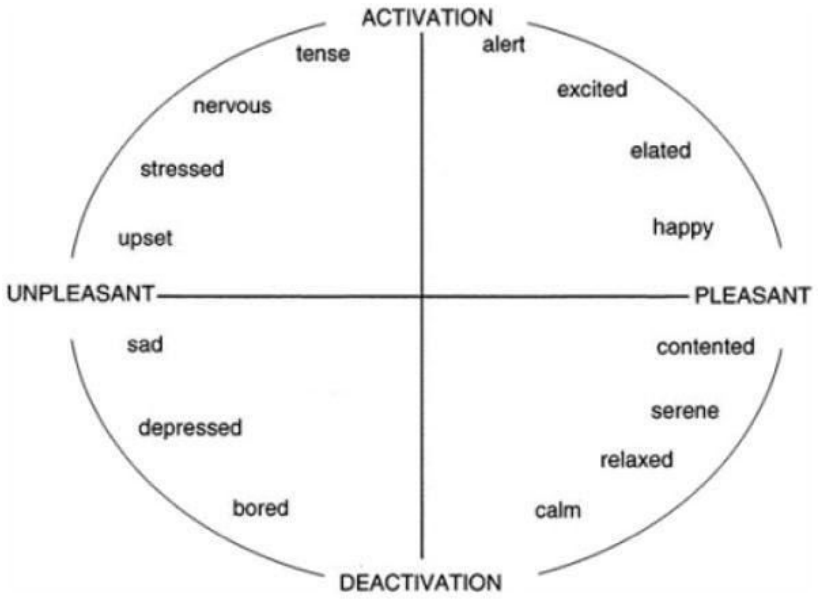


Figure 13: A graphical representation of the circumplex model of affect with the horizontal axis representing the valence dimension and the vertical axis representing the energy dimension.

Using that diagram, it's now possible to classify each emotion of the story and begin to create the audiovisual components of the interactive video. In figure 14, we can see that the parts of the interactive video are distributed all over the spatial model.

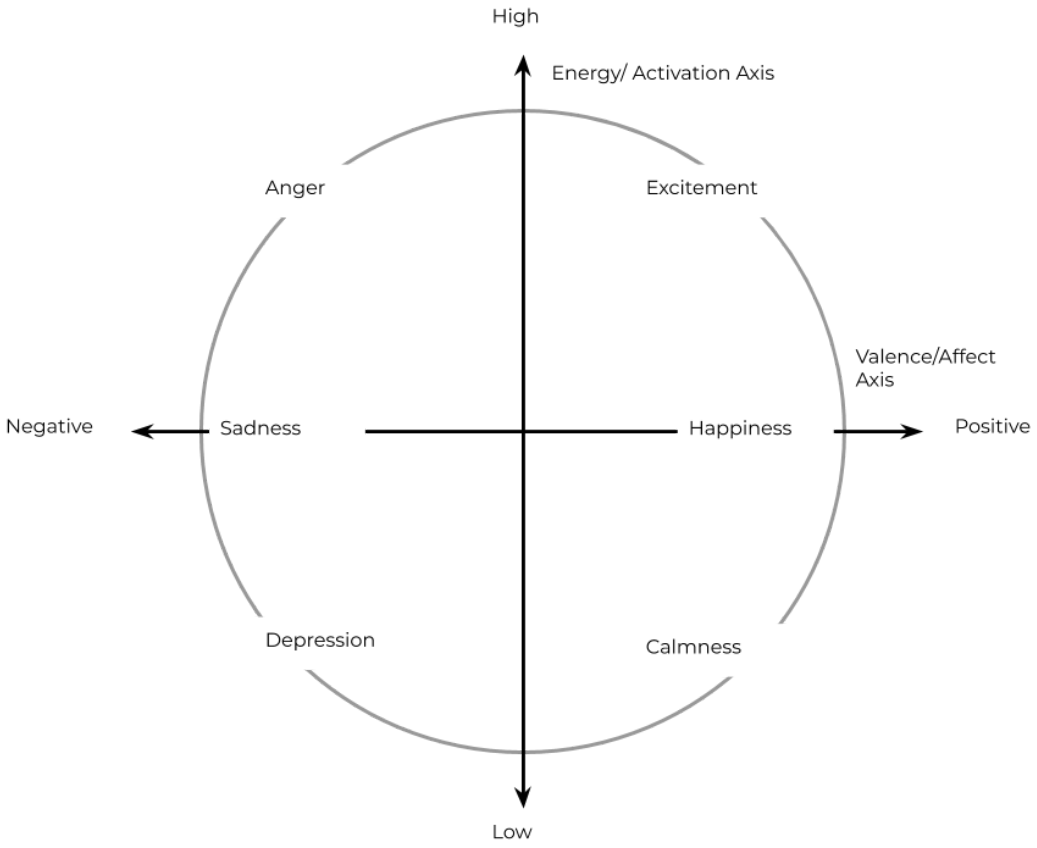


Figure 14: A graphical representation of different emotions that will be represented in the interactive video.

1.3. Interactive structure of the product:

Through the course of the video, the user will be asked two questions in each one will be able to choose one of two provided options. As a result, there is in total four possible endings that the viewer could get from the choices he makes:

Storyline 1: Presentation video -> Video 1: Happiness -> Video 2: Excitement

Storyline 2: Presentation video -> Video 1: Happiness -> Video 3: Calmness

Storyline 3: Presentation video -> Video (a): Sadness -> Video (b): Anger

Storyline 4: Presentation video -> Video (a): Sadness -> Video (c): Depression.

In each question presented to the viewer, a timer is shown on the screen to indicate the remaining time to make a choice, otherwise the selection is done automatically to one of the shown options.

2. Creation process of video clips :

2.1. Preproduction and workflow:

The workflow:

Each audiovisual production work needs to be planned in advance in order to have a clear vision of the direction of the artwork and to quantify the amount of time and effort in each stage of the creation process.

For this interactive art video, we established a workflow that allows us to understand the different processes the product needs to go through and how each one of the participants in this project will successfully achieve his part (see figure 15).

After classifying the emotions and atmospheres that will be represented in the clips of the interactive video using the circumplex model of Energy/Affect, the next step was the selection of themes and subjects of the artwork.

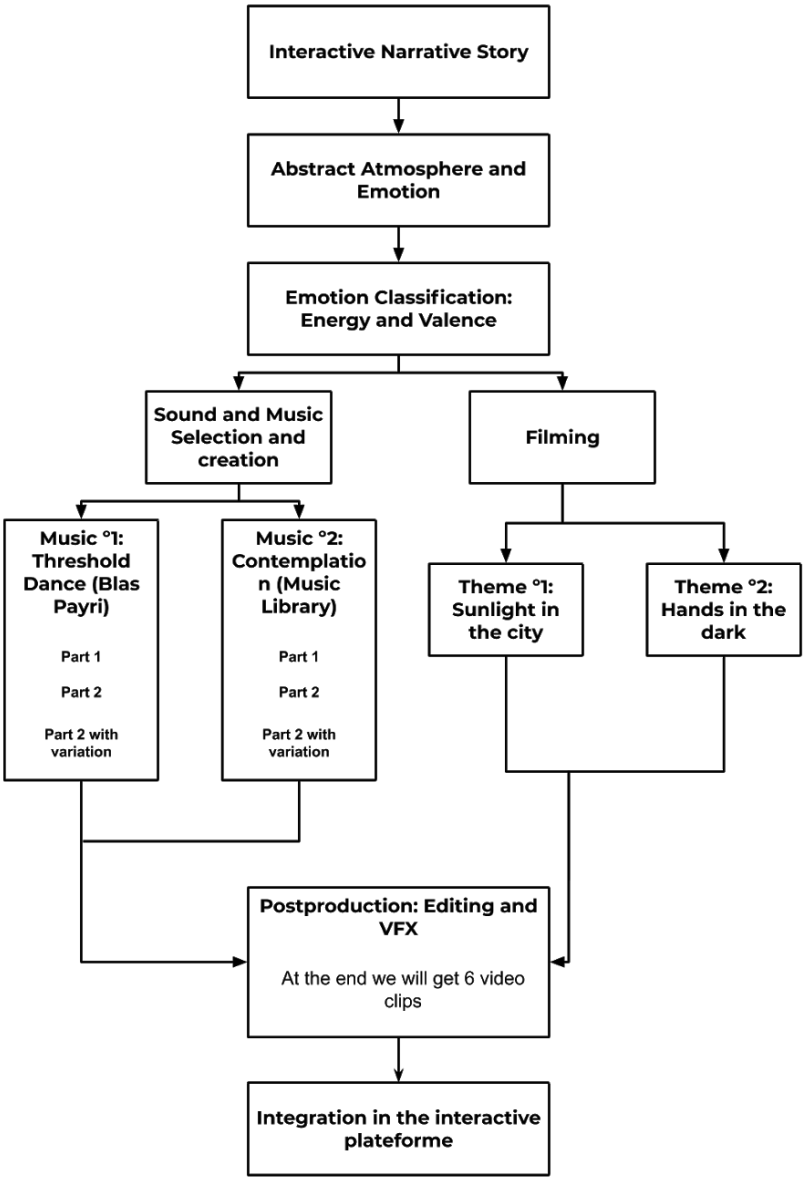


Figure 15: A diagram of the workflow of the interactive video art.

Abstract visualisation:

In order to generate the emotions mentioned previously in this part of the dissertation, abstract visual elements and sounds are used as base material through all the process of the video creation. The idea of using abstraction in this project came from the necessity to eliminate any possible distraction to the viewer related to prejudiced meanings that the shown subjects could have, and redirect the attention to the pure symbolism of images and sounds.

The video clips could be divided into two main themes. The first one contains the clips that represent the positive affect according to the spatial model, and the second one represents the negative side of the axis.

In each theme, there are 3 video clips that have different energy levels: Low, medium and high. The positive and negative aspect of the themes are mainly represented through the nature of the footage filmed during the production phase alongside with the selection of the music track, and the different levels of the energy axis are represented with different variations of the video, and that is done through differents stages and sub-processes of the post-production phase such as editing, mixing, visual effects and color correction.

In order to emphasize the positive affect of the first theme, the used main footage contains a palette of bright colours and unsharp shapes interacting fluidly with each other . Regarding the negative affect theme, achieving more contrasted and disaturated images is sought. In both themes, different levels of movement velocity is filmed either by changing the speed of elements inside the frame or by changing the movement speed of the camera.

Equipments used in the creation process:

In order to film the raw footage that it is used as the base material for the clips, an entry level of equipment was used in the creation process. Any other high performing equipment wasn't necessary as the objective of the production phase was creating abstract footage that is modified and edited later with effects and recomposition in the post-production phase. The following list contains all the equipment used for that purpose (see figure 16):

- Camera:

The camera used in all the process was the mirrorless digital camera Sony Alpha a6000, it can film with a frame rate up to 60fps, which is used mostly in the filming operation.

- Lighting:

The available light was the Amaran AL-H198a, a small on-camera light that utilizes LED technology, produced by the company Aputure, alongside natural ambient light.

- Camera support and stabilisation:

The majority of footage was filmed in handheld method, however, for the shots needed stabilisation, a monopod support was used for that purpose.

Figure 16: List of equipment used in the production process. From Left to right: 1) Sony a6000 camera. 2) Amaran Aputure198 LED light. 3) Monopod.

The following table (see table 1) shows the camera settings used during the production days, the choice of these settings is due to the limitation of the available equipment which didn't propose any technical problems as the final product is aimed to be shown in web platforms that are using a different codecs :

Video resolution	1920 x 1080 pixels
Recording frame rate	59.97 frame per seconds
Recording codec	AVCHD format - MPEG-4 container
Light temperature (artificial light)	5400 - 5600K

Table 1: Camera settings used in creating the footage.

In the postproduction phase, the softwares used for audio and video editing are:

- Adobe Premiere Pro: this software is mainly conceived for video editing and visual effect, but it also has many other features related to audio editing and graphic element creation.

- Audacity: it's a software designed for audio editing, it's used to execute modification on the music tracks that is used in the video clips.

2.2. Production:

Music Selection and creation:

Two music tracks are selected for the interactive video art, each one has different characteristics in terms of melody, used instruments, tempo and dynamics.

For the positive theme of the interactive video, the music track "Threshold Dance", composed by the professor Blas Payri, is used as the main audio element. The music track could be divided into two parts that have different levels of energy. The first part has a neutral energy level which makes it suitable to be used in the first video clip of the first and second storyline in order to represent the positive affect and neutral activation. The second part could be described as a more energetic track that contains strong beats and accents with uprising and downrising rhythms. This part is used in the second video clip of the first storyline. Regarding the third video clip within the first theme, which represents a lower energy, the music track that is used is a variation of the first part of the "Threshold Dance" music track, in which a series of audio editing effects is applied upon in order to get the slow pace and blurred shape of the soundtrack. These effects are achieved using the software Audacity, and they are as following:

- Changing tempo:

The tempo of music is changed using the "Change Tempo" effect within the software, it allows the modification of parameters related to tempo modification of the soundtrack. For this example, a reduction of 28% of the tempo is applied in order to get the desired effect (see figure 17).

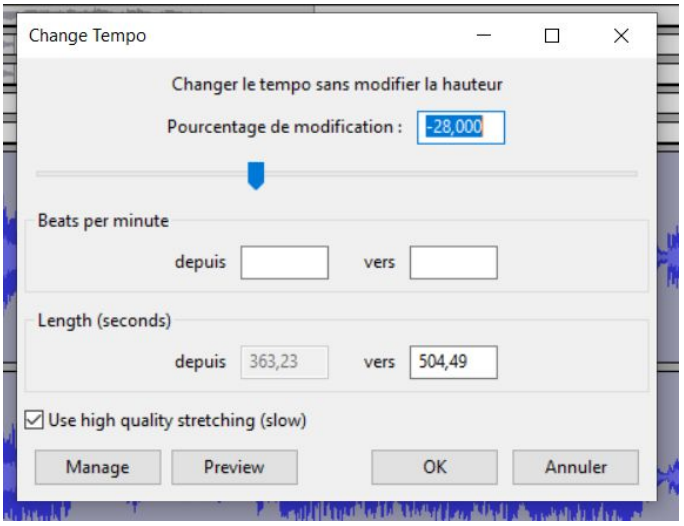


Figure 17: Settings of the "Change Tempo" effect applied to the first music track.

- Adding reverberation:

Another important effect used in this process in order to achieve the blurred effect of the sound, is the reverberation effect. The "Reverb" effect provided by the software proposes a series of parameters related to the reverberation effect, for instance the delay and pre-delay parameters, the size of the room, and the percentage of the dry and wet sound. The parameters shown in the figure 18 are used in order to obtain the desired result.

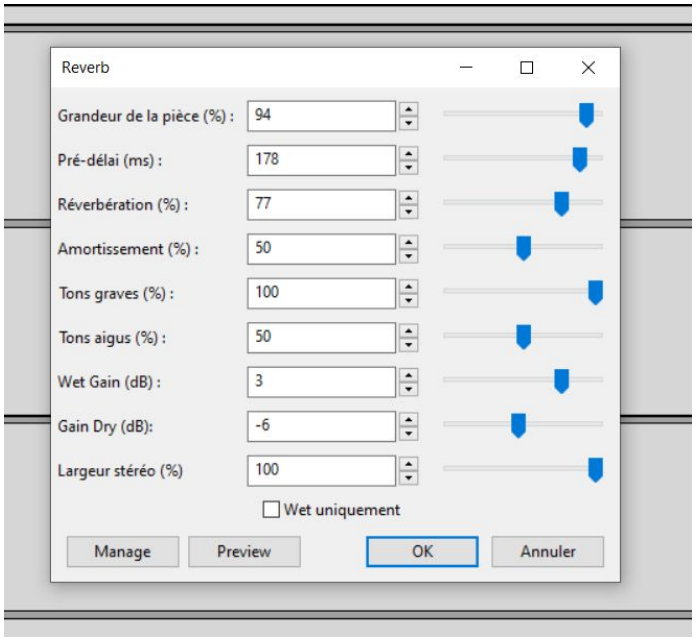


Figure 18: Settings of the "Reverb" effect applied to the first music track.

The music track selected for the negative part is titled “Comtamplation”, and it’s composed by Christophe Goze. The music is characterized by a negative valence with energy variation through the course of the track. It begins with phrases of a duduk[7] instrument (see figure 19) that creates a mood of mystery, and after that rising beats of arabic percussion start to appear, leveling up the energy of the track. Therefore, and in the same way as the previous music track, this music could be divided also into two parts, the first one only contains the duduk instrument, and the second one contains in addition the arabic percussion.

Figure 19: A duduk instrument.

These two parts are used respectively in the first and the second video clips within the negative valence theme. As regards the third video clip, a variation of the first part of “Contemplation” music is used. For that purpose, similar effects as in the first music track are applied on this part in order to emphasize the slow pace of the rhythm. The effects of “Change Tempo” and “Reverb” were used to lower the speed of the soundtrack and to create a silky effect over the music, the figure 20 shows the parameters applied in order to achieve the desired effect.

[7] Duduk: is an ancient Armenian double reed woodwind instrument made of apricot wood.

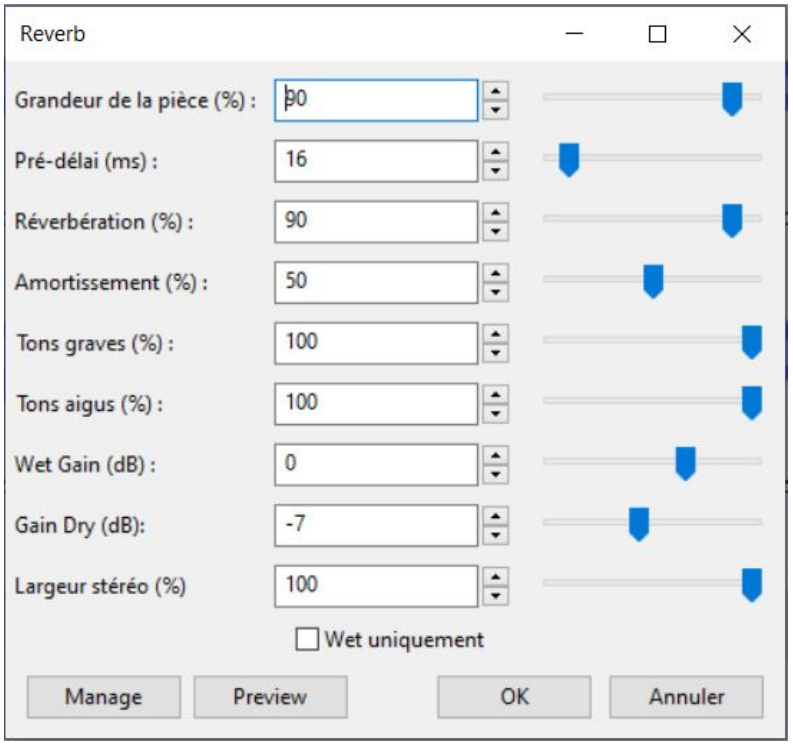


Figure 20: Settings of the "Reverb" effect applied to the second music track.

Filming process of video clips of the first theme:

As mentioned earlier in this section, the videos within the first theme should reflect a positive affect, but with different levels of activation or energy. A bright and unsharp visual composition of the videos is sought.

The footage is filmed using lens distortion technique, where a transparent element with refraction index is placed in front of the camera lens. This operation distorts the light beams coming into the camera, and as a result, a distorted image is captured depending on the roughness and the shape of the transparent element (see figure 21). The main subject filmed is direct sunlight of early morning reflected over the buildings of a city. A piece of glass is placed in front of the lens, which creates a practical effect of distortion .

Figure 21: Image that shows the distortion effect made by glass.

The camera was mostly handheld, and panning and tilting movements were used in many shots, with various speeds of the movement. The result of the filming operation was footage with high key (annotation) exposure and bright shades of yellow, orange, and light blue. (see figure 22)

Figure 22: frames from the footage of the first theme.

Filming process of video clips of the second theme:

To represent a melancholic mood characterised by negative affect, the idea was to film hand gestures and try to create abstract images from the texture of hands and complex gestures.

The process of creation started with a curation of different references through previous works made by other artists: filmmakers, photographs and dancers. The majority of these artists were using the complex shape and movement of hands to create their masterpieces. For instance, the photographs in the figureX shows hands tangled together creating a complex shape and texture, and therefore, it could be considered as an abstract photography (see figure 23).

Figure 23: A black and white photograph that shows two hands holding each other.

In the screendance of “Dance of Her Hands”, by Tilly Losch (1930-1933, many scenes show close-ups of the dancer's hands making a complexe gesture and movement. These movements, which are considered as hand dancing, evoke a certain emotional reaction in the viewers.

The next step of the process was filming the performance of hand dance. Due to unexpected circumstances, the shooting of the footage was made with limited resources and in a domestic location, the dancers were substituted with regular participants. The shooting started with one hand performing solely, and then filmed multiple hands interacting with each other. (see figure 24)

Figure 24: frames from the footage of the second theme.

2.3. Post-production:

Postproduction of the first theme

After gathering the needed footage in the previous stage, a series of post-production operations had been applied.

The first operation in the workflow was to sort the footage and then select the useful parts of each clip. After that came the editing phase, which was mainly focused on audio-video coarticulation and the creation of compositions with different complexity. The purpose was to explore the influence of the internal rhythm created by the visual element over the external rhythm created by artificial cuts made using the software. In all the three clips of the first theme, the rhythm of transitions between segments was following the rhythm of the music (see figure 25).

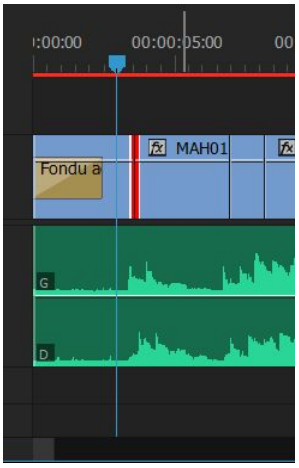


Figure 25: Cuts synchronized to music accents.

Additionally, another operation used in the process was the application of mirror effect provided by the software in order to achieve the kaleidoscopic effect. The symmetrical shape created by this effect was repeated in different positions in all the three clips, changing each time the complexity of the reflection and the number of mirroring axes.

Another important technique used in the process was the digital superposition of images. This effect enables the editor to create more complex and contrasted compositions using superposed images with different textures. To achieve this effect in the editing software Adobe Premiere Pro, different blending modes could be applied over superposed layers of footage. Incrustation and Lighting modes help to display all layers equally in the frame and therefore creating an homogenous complex shape, adding to that the impact of the velocity and evolution of the movement (see figure 26).

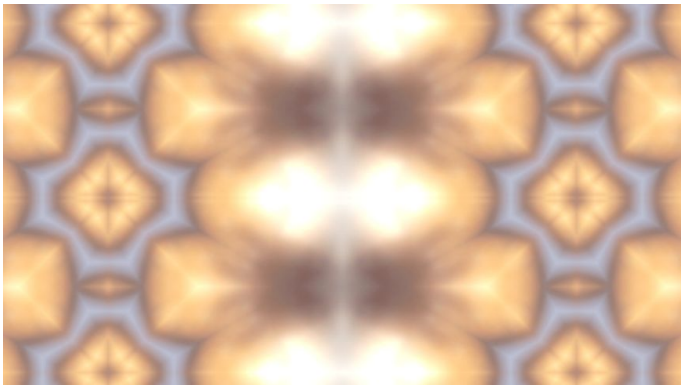


Figure 26: A complex kaleidoscopic effect made using Mirror tool in Adobe Premiere Pro.

The rhythm of the editing and the evolution of image complexity were following the rhythm of the music. However, in each video clip within the theme there had been many variations and different techniques had been used in order to achieve the corresponding level of energy for each clip.

First video clip:

(The video is uploaded in the following link: https://media.upv.es/player/?id=9340a670-bfcd-11ea-a88f-6b1e71503836)

In the first video clip, the cuts were synchronized to the music accents, but the frequency of transitions were slower than the frequency of the beats. This rhythm was maintained throughout the clip, and a medium complexity of the compositions was applied to the segments. The achieved energy in this video clip could be described as medium to low energy with affect level varying from neutral to positive (see figure 27).

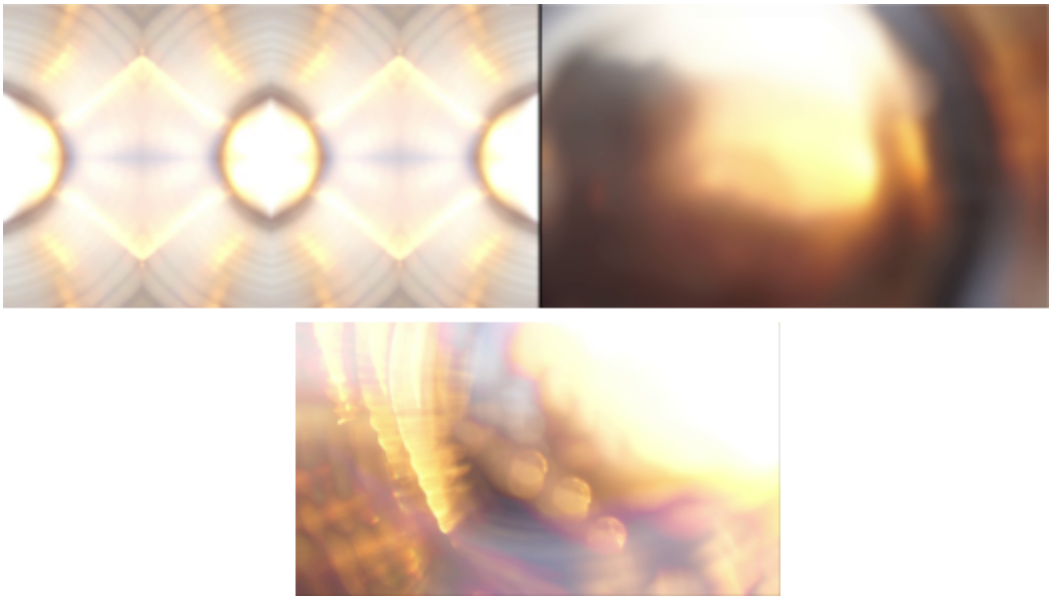


Figure 27: Frames from the first video clip of the first theme.

Second video clip:

(The video is uploaded in the following link: https://media.upv.es/player/?id=ca7668a0-bfcd-11ea-a88f-6b1e71503836)

With the entrance of the second video clip, the rhythm of cuts between the segments tries to match the uprising beats, and the velocity of the segments is augmented in order to get faster movement of the shapes within the frame. In order to raise the complexity of the composition, both effects of mirroring and superposition were used most of the time. To emphasize the high energy concept in this video, a color correction effect was applied that raised the contrast and the saturation of the images (see figure 28).

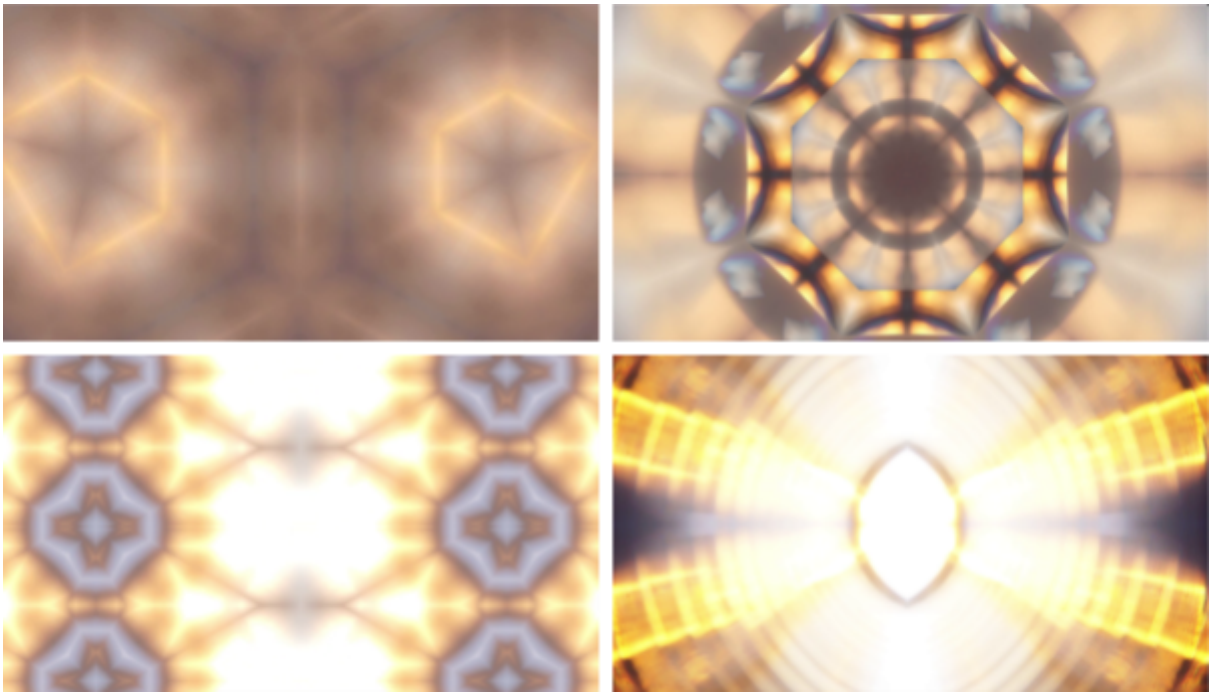


Figure 28: Frames from the second video clip of the first theme.

Third video clip:

(The video is uploaded in the following link: https://media.upv.es/player/?id=e9efcff0-bfcd-11ea-a88f-6b1e71503836)

Regarding the third video clip, less rough cuts were used, and crossfading effects were applied to most transitions between segments. An adjustment layer was added above all tracks in which a flou effect and a color correction effect were applied to it in order to achieve a smooth look and less saturated image (see figure 29 and 30).

Figure 29: Color correction effect and blur effect added to the adjustment layer.

Figure 30: Frames from the third video clip of the first theme.

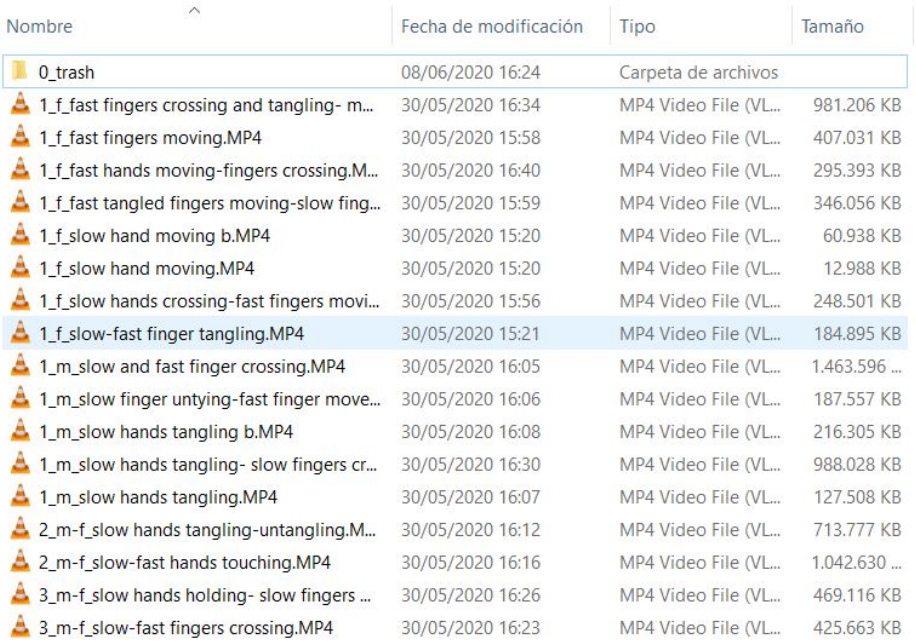
Postproduction of the second theme

As in the first theme, the post-production phase started with the operation of sorting and selecting the footage. In this phase, it is crucial to have in mind an idea about the final shape of the video in order to select the right segments and clips that are used later in the process of video art creation. In order to make this process easier and more structured, the

footage selected is classified and named in such a way to facilitate the recognition of its contents without the necessity to visualize it each time.

the naming structure used for this clips follows this pattern:

(number of participants)_ (Male or female)_(Brief description of the pace and nature of the moment).(see figure 31)



Nombre	Fecha de modificación	Tipo	Tamaño
0_trash	08/06/2020 16:24	Carpeta de archivos	
1_f_fast fingers crossing and tangling- m...	30/05/2020 16:34	MP4 Video File (VL...	981.206 KB
1_f_fast fingers moving.MP4	30/05/2020 15:58	MP4 Video File (VL...	407.031 KB
1_f_fast hands moving-fingers crossing.M...	30/05/2020 16:40	MP4 Video File (VL...	295.393 KB
1_f_fast tangled fingers moving-slow fing...	30/05/2020 15:59	MP4 Video File (VL...	346.056 KB
1_f_slow hand moving b.MP4	30/05/2020 15:20	MP4 Video File (VL...	60.938 KB
1_f_slow hand moving.MP4	30/05/2020 15:20	MP4 Video File (VL...	12.988 KB
1_f_slow hands crossing-fast fingers movi...	30/05/2020 15:56	MP4 Video File (VL...	248.501 KB
1_f_slow-fast finger tangling.MP4	30/05/2020 15:21	MP4 Video File (VL...	184.895 KB
1_m_slow and fast finger crossing.MP4	30/05/2020 16:05	MP4 Video File (VL...	1.463.596 ...
1_m_slow finger untying-fast finger move...	30/05/2020 16:06	MP4 Video File (VL...	187.557 KB
1_m_slow hands tangling b.MP4	30/05/2020 16:08	MP4 Video File (VL...	216.305 KB
1_m_slow hands tangling- slow fingers cr...	30/05/2020 16:30	MP4 Video File (VL...	988.028 KB
1_m_slow hands tangling.MP4	30/05/2020 16:07	MP4 Video File (VL...	127.508 KB
2_m-f_slow hands tangling-untangling.M...	30/05/2020 16:12	MP4 Video File (VL...	713.777 KB
2_m-f_slow-fast hands touching.MP4	30/05/2020 16:16	MP4 Video File (VL...	1.042.630 ...
3_m-f_slow hands holding- slow fingers ...	30/05/2020 16:26	MP4 Video File (VL...	469.116 KB
3_m-f_slow-fast fingers crossing.MP4	30/05/2020 16:23	MP4 Video File (VL...	425.663 KB

Figure 31: list of filmed videos after the naming process.

As explained previously in this document, the video clips of this theme are characterized in general by a negative affect, and each clip differs from the other ones by its level of energy. For this reason, the selected footage contains different paces and complex movements, which provided more possibilities to emphasize the needed valence and energy, later in the creation process.

First video clip:

(The video is uploaded in the following link: https://media.upv.es/player/?id=21365b00-bfce-11ea-a88f-6b1e71503836)

The first video clip of this theme is characterized by medium energy and a negative valence, therefore, and in addition to the low key exposure of the created footage, the selected segments have a slow pace and a less complex composition.

The initial steps of this process was extracting the right segments from the selected footage and making a rough cut. The segments and the cuts were placed in the timeline in a way that matches and emphasizes the slow pace and the low energy of the used music track.

Since there are no strong music accents in this part, many slow crossfading and fade to black transitions were added between the segments. In a few parts of the clip, the time remapping was used to co-articulate the movements of the subject inside the composition with the nature of the melody (see figure 32).

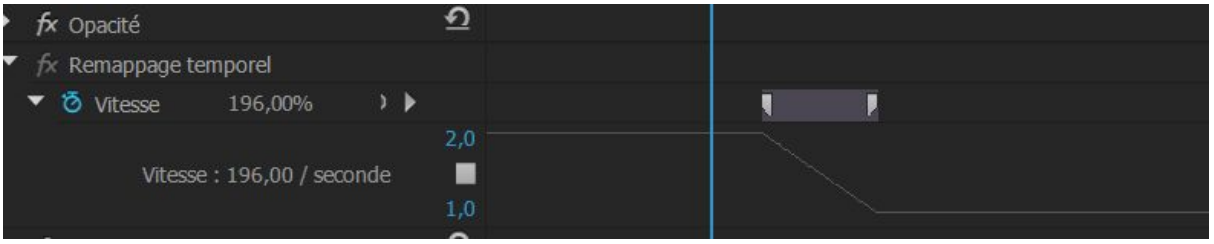


Figure 32: A time remapping applied over a segment.

The echo and mirroring effects were used many times in order to give more depth to hands movement within the frame. For instance, in places where the daduk instrument can be heard clearly, the echo effect was added to the segments, and as a result, a repeated pattern was generated, which added a waving motion to the hand (see figure 33).

Another important effect in this process was creating a monochromatic and low key color grading. For that purpose, an adjustment layer was placed above the tracks of the sequence since all the segments used in this sequence have approximately the same exposure and contrast (see figure 34).The first operation was having a monochromatic image by adding a desaturation tool from the Adobe premiere pro effect palette called “Colour balance”. The next step was adjusting the luminosity of the image by affecting the output of the RGB colour channel, thus creating more contrast and emphasizing specific areas over others. For doing

so, the “RGB curves” effect was added to the adjustment layer and several tweaks were done to each channel in order to get the final result (see figures 35 and 36).

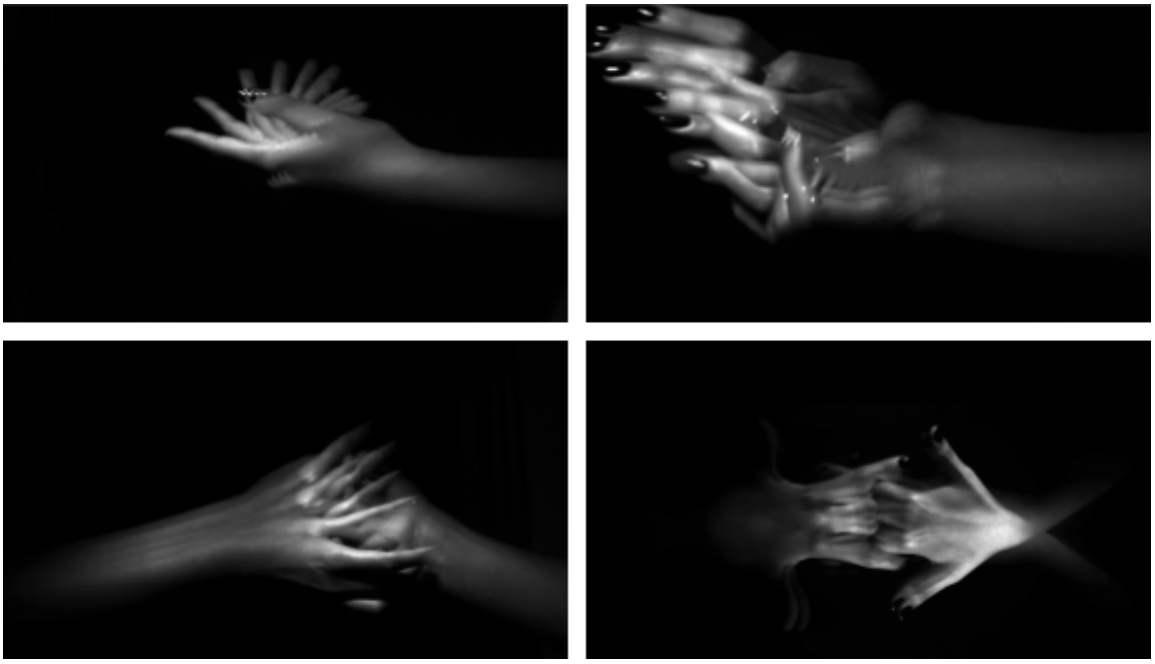


Figure 33: Frames from the first video clip of the second theme.

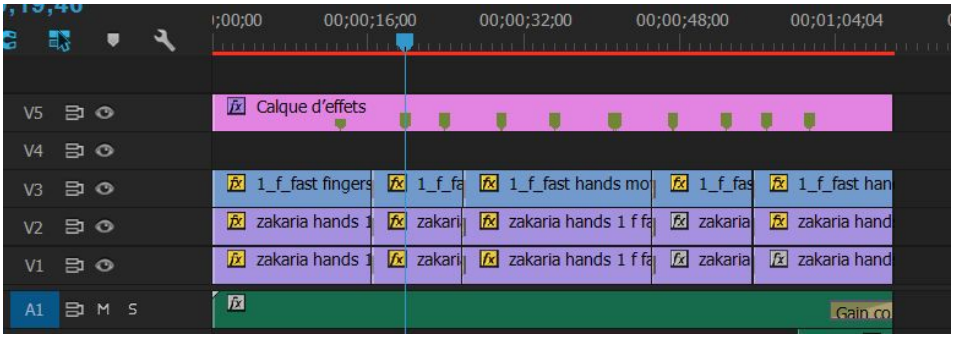


Figure 34*:* An adjustment layer placed above all the video tracks in the timeline.

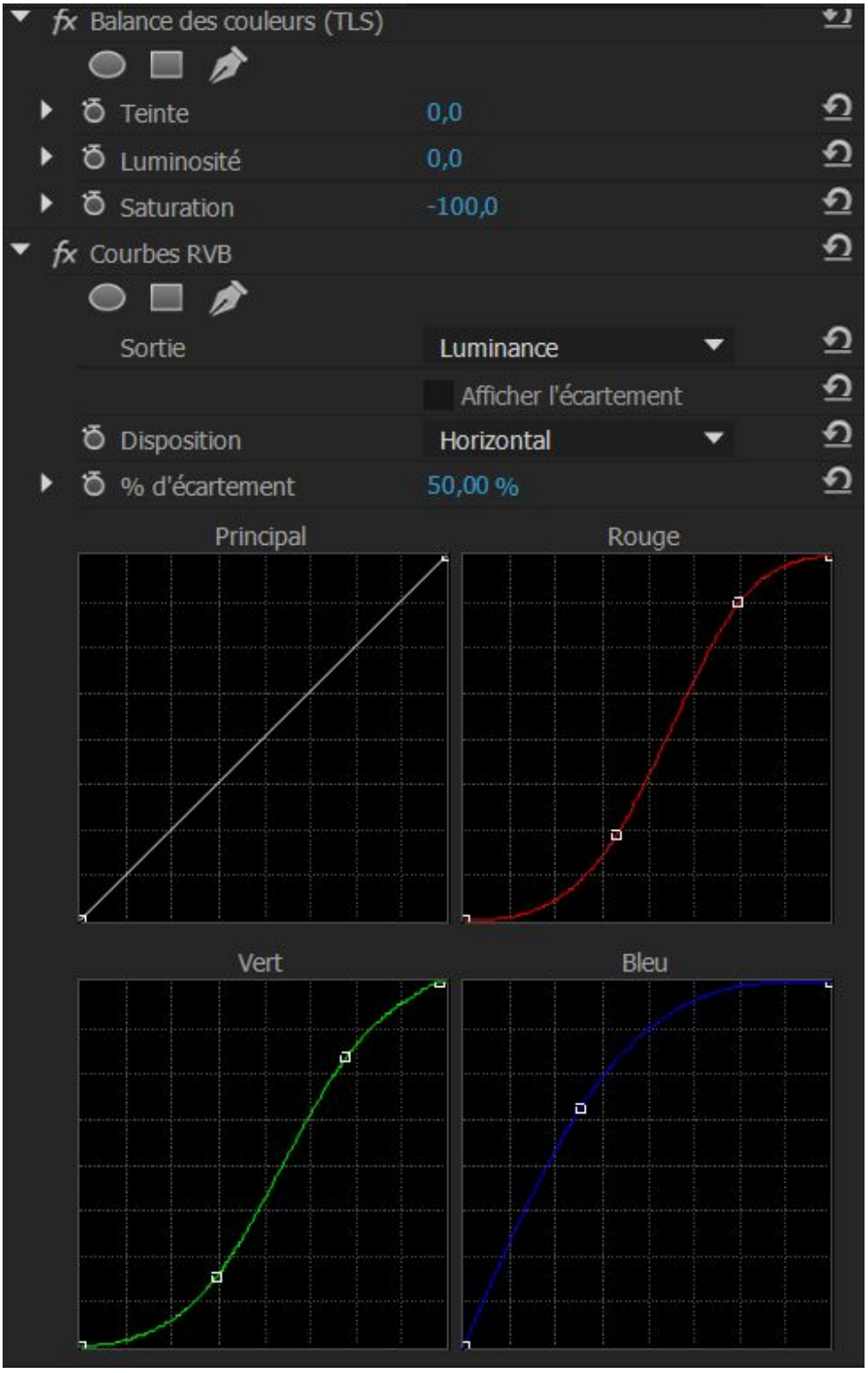


Figure 35*:* a color correction effect applied over the adjustment layer.

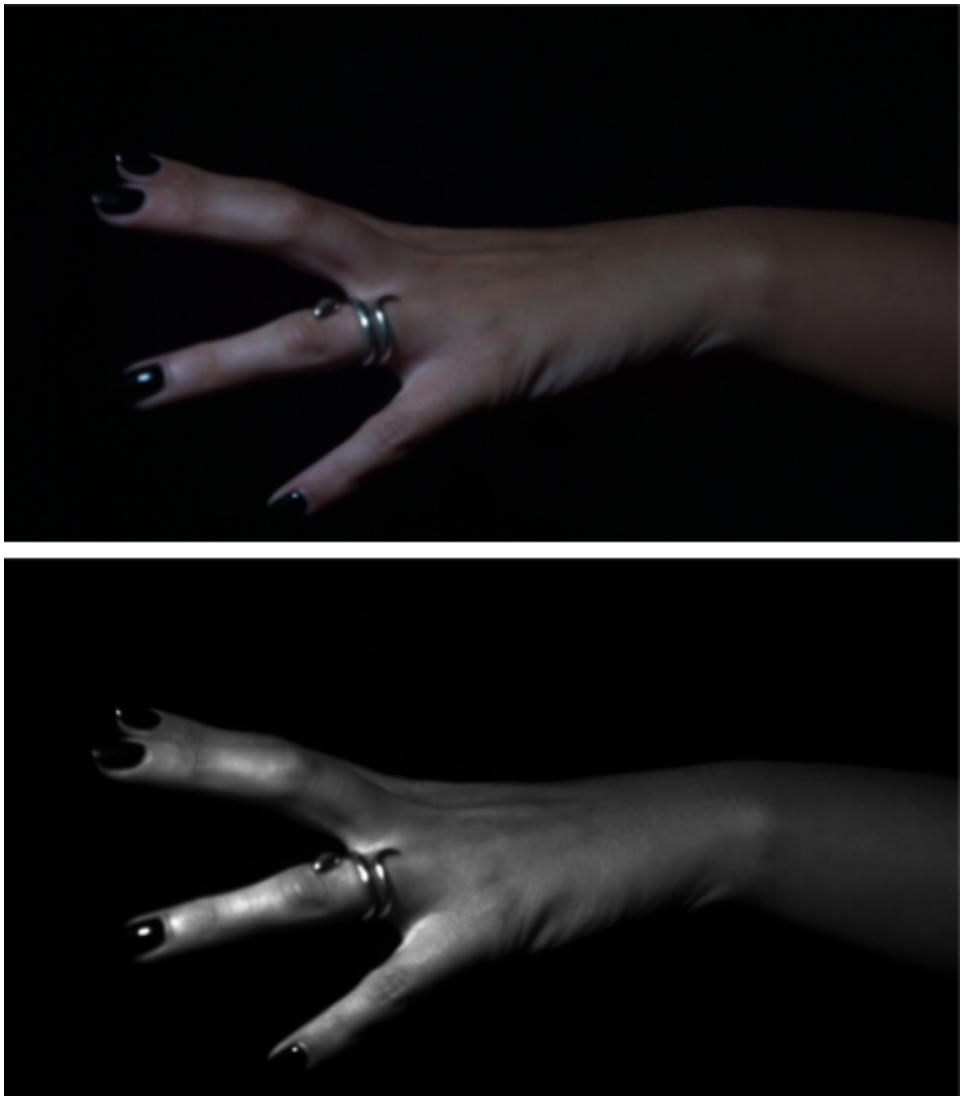


Figure 36*:* A frame from the footage 1) before and 2) after the process of color correction.

Second video clip:

(The video is uploaded in the following link: https://media.upv.es/player/?id=4046c750-bfce-11ea-a88f-6b1e71503836)

The second segment has to have the same valence but with higher energy level, which means that more action in movements and more sound-image co-articulation are needed in this part. Thereby, the first step was the selection of segments of the footage that have

exaggerated and complicated movements such as finger crossing and tangling, firm hands locking or more fast movements.

The music used for this segment is the continuation of the music track used in the previous segment, Contemplation. This part of the music is characterized by a raising of rhythmic percussion starting from a low volume until it takes over the general atmosphere. However, a slight emphasis on the beats was needed in order to give the percussion the full domination over the music. To do so, an equalizer filter was added to the music track and the volume level of the percussion frequency was increased (see figure 37).

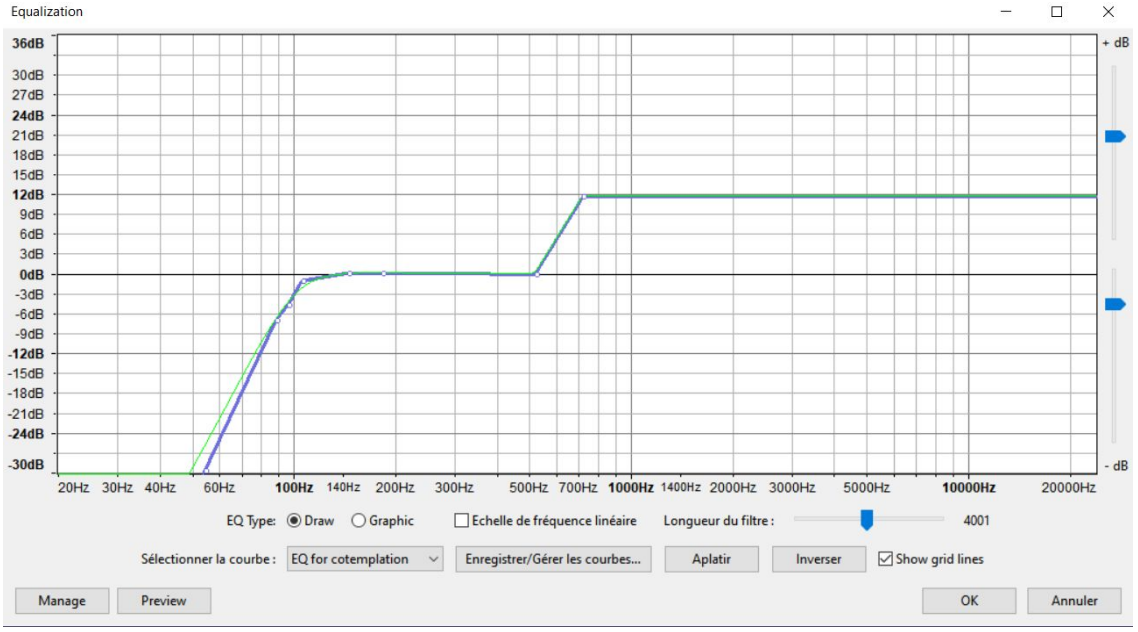


Figure 37: Settings of the equalization effect applied to the music track.

The editing of the clip was majorly a cut-to-beat editing style, but the rhythm of image succession and the duration of segments was changing throughout the timeline according to the phrases of the music. In addition, the video clip starts with a cutting rhythm similar to the previous one in order to ensure continuity between the clips, and the adjusted-to-beat segments are appearing gradually with the raising of the percussion volume (see figure 39).

In some places in the video clip, fade to black transitions were used at the end of the small segments, which create a flashy effect and accentuate the percussion beats (see figure 38).

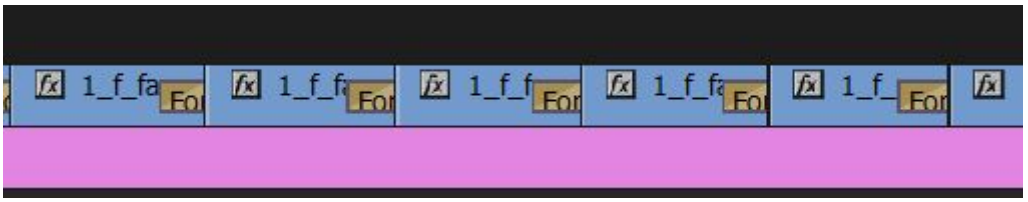


Figure 38: juxtaposed segments with fade-to-black transition effect applied at the end of each one.

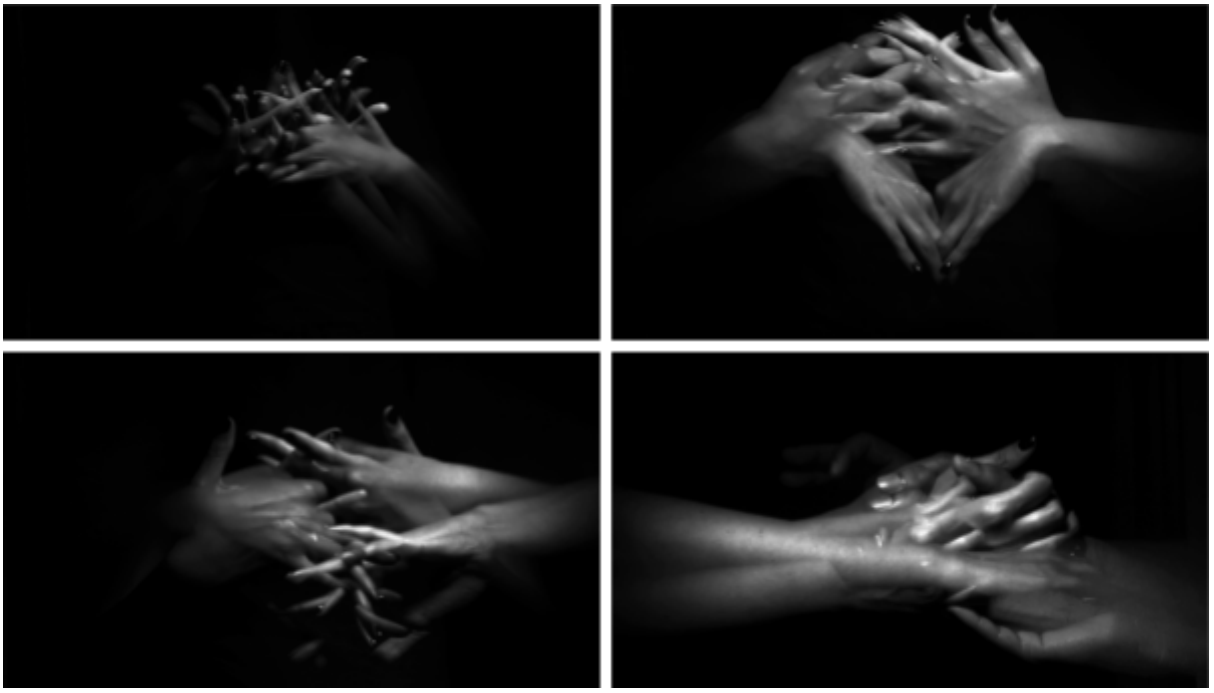


Figure 39: Frames from the second video clip of the second theme.

Third videoclip:

(The video is uploaded in the following link: https://media.upv.es/player/?id=68467e80-bfce-11ea-a88f-6b1e71503836)

In this part of the interactive video, the level of energy must be lower than the previous clips while maintaining the negative affect of the atmosphere.

For that purpose, the music used in this segment is a modified version of the first part of the "contemplation" music track. The modifications consisted of reducing the tempo of the music track, and adding a reverberation effect to it. As a result, a new smooth effect with feathered sounds was created, which added an ambiguous and slow paced atmosphere to the segment.

In order to keep the same flow and effect throughout the video, various animated effects were used on the segments, emphasizing a certain amount of ambiguity and unsharpness. Four different fragments from the footage were used in this clip in which the hands are moving slowly and smoothly, and the crossfade effect was used as a transition between the cuts. In order to ensure the continuity between the video clips within the same theme, the same color correction and color grading effects were added to an adjustment layer placed on top of all tracks of the video.

To get a silky look of the image, a motion blur with multi-exposure effect was applied to the segments of the clip. The plug-in Pixel Film ProShutter is used to generate this effect. This plugin is provided by the Pixel Film Studios company and it's available for Final Cut Pro software. This effect gives a similar result as the echo effect but with more fluidity and blended repetitions of the image. It creates multiple copies of the footage with a delay between each two consecutive copies, and the blending mode of the generated frames can take different shapes such as addition mode in which brightness of the superposed images is summed up to give at the end an image with high gamma. This effect is similar to the effect generated optically by lettering the shutter of the camera open for a relatively long time (a few seconds) which makes a significant amount of continuous light "paint" the image in the censor or the film (see figure 40).

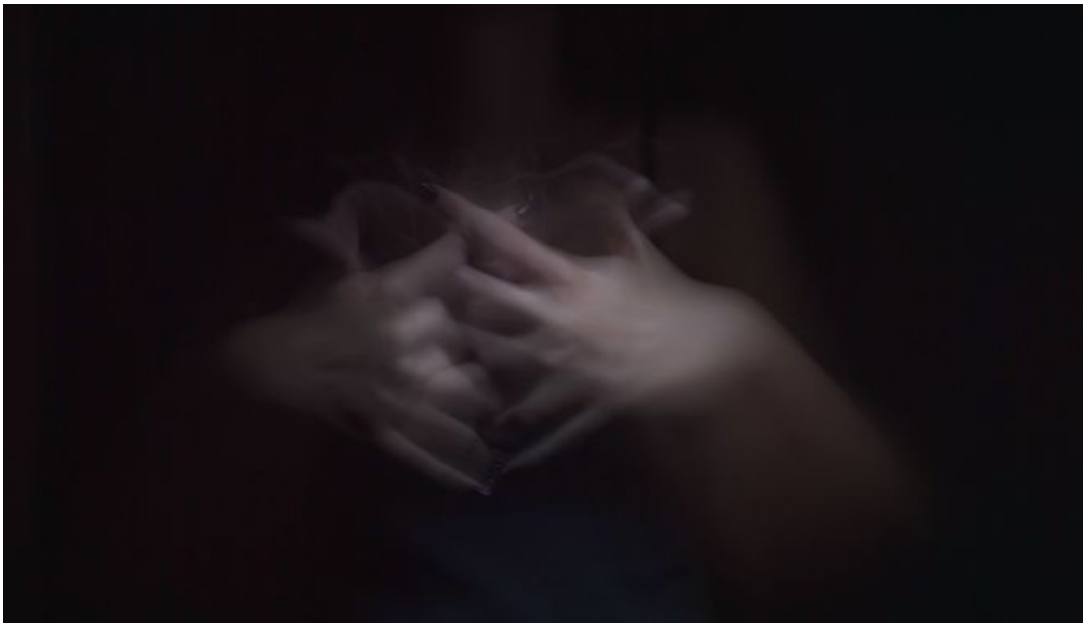


Figure 40: A frame from the footage after applying a motion blur effect.

After generating a copy of the footage in which the motion blur effect was applied, they were imported in Adobe Premiere Pro in order to edit the segments and add more effect.

Also an important effect that was used in this process was the “Blur Effect” in which the amount of blurring was animated according to the flow of the music. In the parts where there is a clear duduk sound, the amount of blurring is reduced, and vice versa (see figure 41).

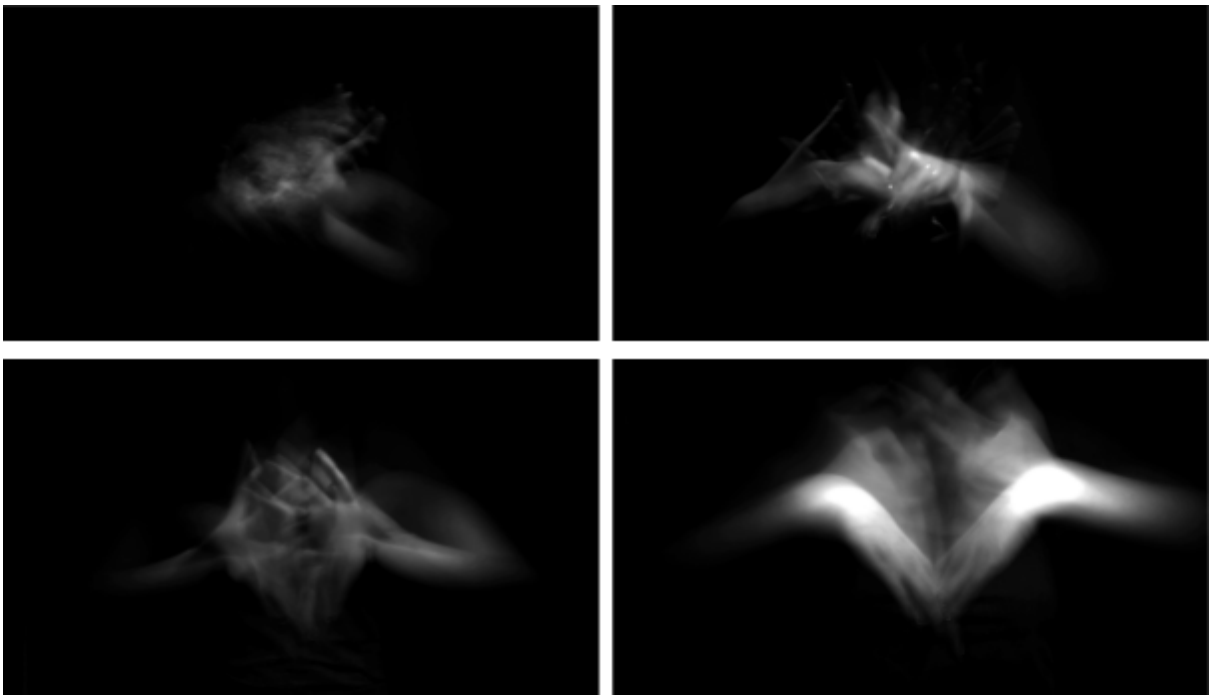


Figure 41: Frames from the third video clip of the second theme.

Conclusions:

After creating all the clips needed for the interactive video art, a re-evaluation of the achieved levels of energy and affect was done to see how accurate the achieved result was with the energy-affect distribution done at the beginning of the project. The music had the biggest impact on creating the emotional triggers than the image. However, more variations could be done to this impact using the visual elements. Therefore, in the first theme, the music had the major role in classifying the video clips in the positive side of the affect axis on the circumplex, and the visual effect played an important role in variating the energy levels of

the clips. The figure shows the positioning of the created video clips in the energy/affect circumplex (see figure 42).

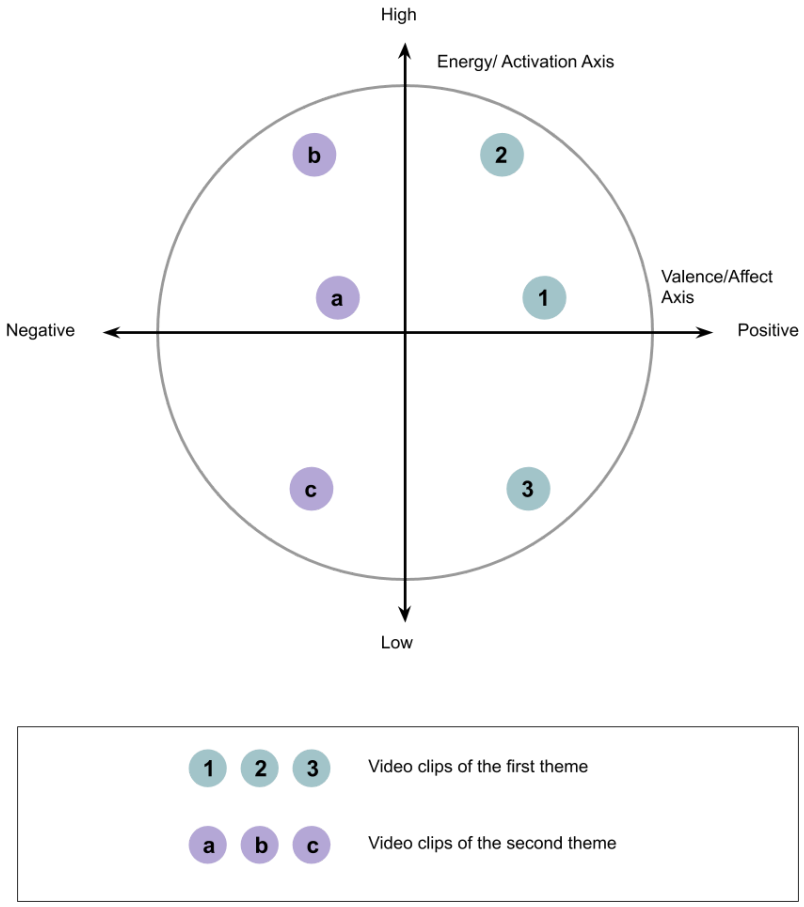


Figure 42: The distribution of the achieved video clips over the circumplex.

3. Integration of video clips in the interactive product

After preparing all the video clips needed for the interactive video, the next step was the integration of all these clips into an interactive support using a programming software. The process of integration was led by the student Jianqiao Li, in which he used the software Unity and implemented a binary tree structure.

Unity software:

Unity is a multiplatform 2D / 3D game engine developed by Unity Technologies. It supports all basic platforms, like Android, iOS, macOS, Windows, Linux, etc, it extends to the HTML5 web platform based on WebGL technology, as well as to new generations such as tvOS, Oculus Rift, ARKit Multimedia Platform. The main programming languages are C #, UnityScript (mainly called "Javascript", derived from ECMAScript), BOO (derived from Python) and C ++ (only used in the core engine). This game engine excels at combining video and programming, and it can add special effects to the integrated video, also the built-in video editing plugin can adjust the color and edit the video timeline (see figure 43).

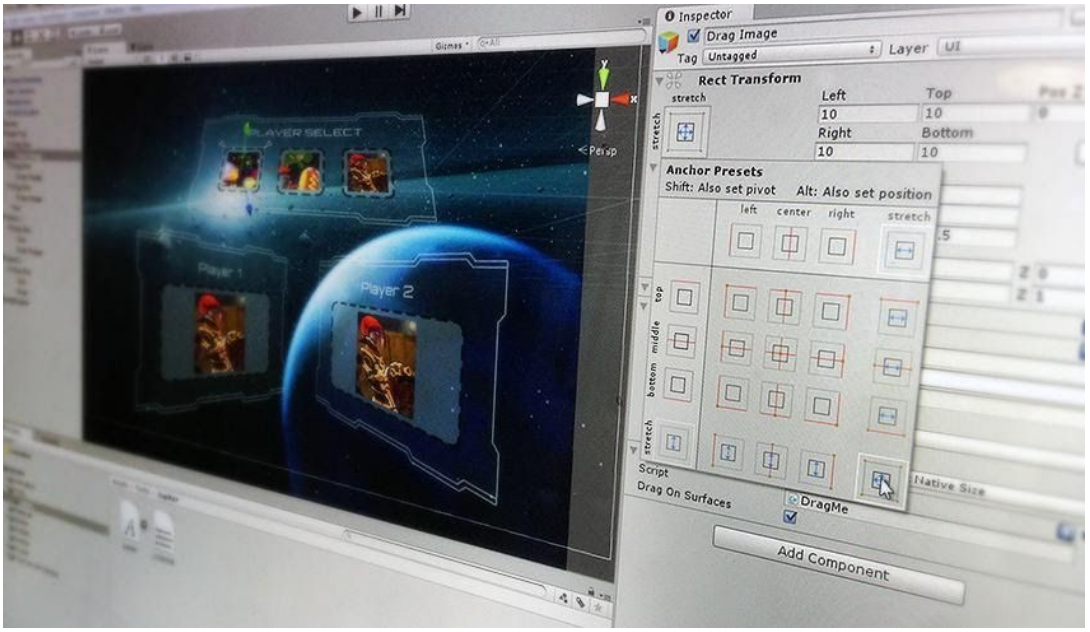


Figure 43: The User Interface of Unity.

Binary tree structure:

The logical principles of software are based on the concept of the tree structure, which is a way of representing the hierarchical nature of a structure in a graphical form. A typical tree structure can be expressed simply as a root and subtrees, and each subtree could also have its own subtrees in arborescente way. When this structure uses at most two children, it becomes a binary tree (see figure 44). This form of representation is a nonlinear structure, which means that the integrated videos are arranged according to the structure of nodes rather than being assembled linearly in a timeline.

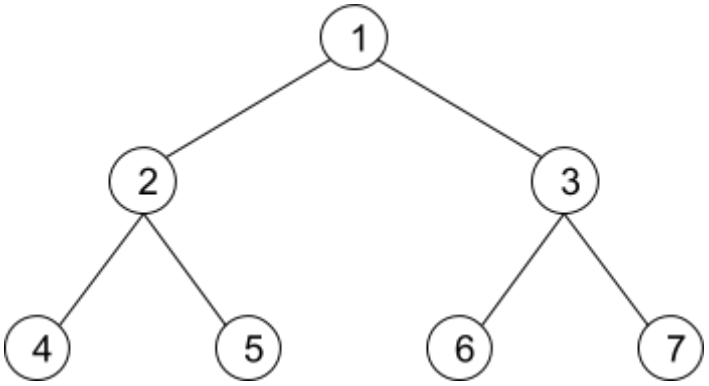


Figure 44: Example of a binary tree structure.

Exporting the final product:

The exporting process came after the integration of all audiovisual elements in the software (video clips, images, graphics ...) and adding the necessary instructions that explain the concept and how to use the interface (see figure 45).

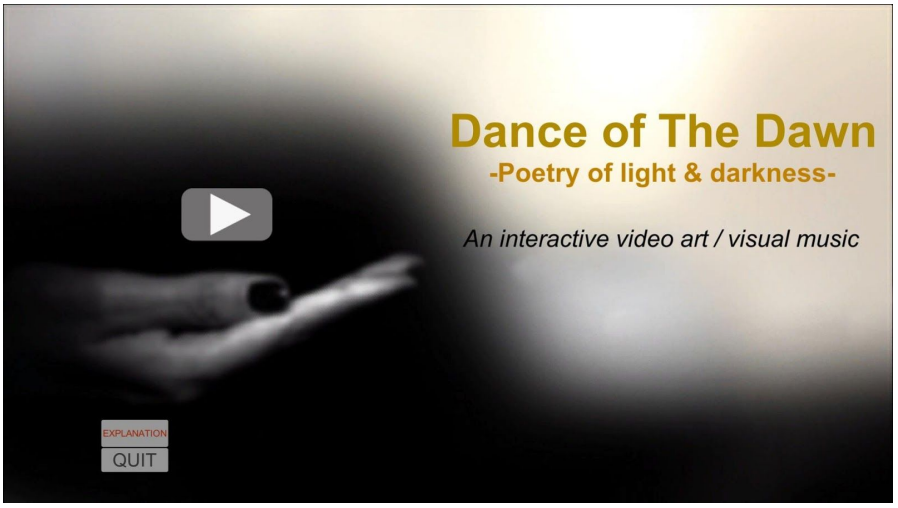


Figure 45: Interface of the application.

For this project, a basic user interface was built inside the application to enable the user to perform necessary operations such as displaying the interactive video, executing the desired choices, and restarting the operation (see figure 46).

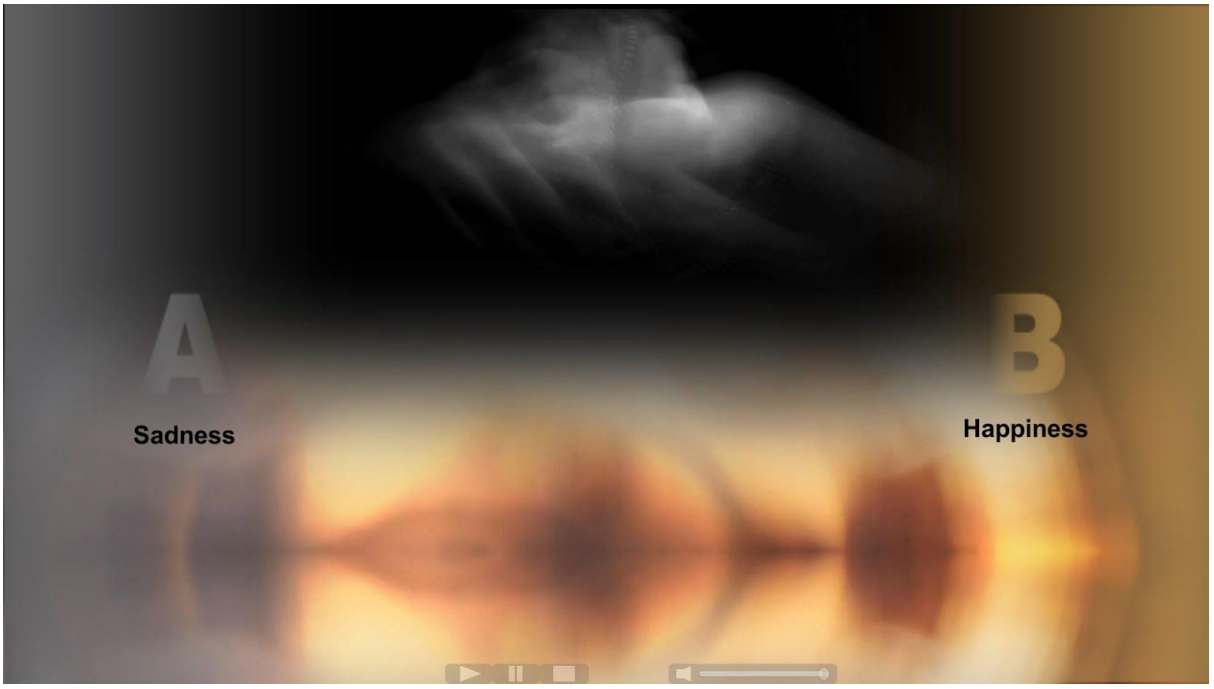


Figure 46: A screenshot from the application that shows the options to select.

The interactive video art was exported and embedded in an application with .exe extension, and it has two versions for both Apple Mac and Windows systems. At that moment the complete interactive video art product was accomplished.

Conclusions and Perspectives

Conclusions:

This project of interactive video art has gone through many changes and modifications until it got its actual shape. The original idea of the project was to create an interactive music video with classical narrative, starting from story elaboration and screenwriting, until the color grading and the exportation of the music video. However due to special circumstances that faced the project in this period corresponding to its elaboration (March 2020 - June 2020), we decided to change the path of the project and adapt it to the new situation. On 16 March 2020, the Spanish authorities declared a state of emergency due to the covid-19 pandemic, which led to a cancelation of all activities judged unnecessary, and the communication with the university was made virtually. As a result, we decided to adapt our project to the new situation and focus on the parts that could be made with the available resources. Therefore, I proposed the idea of exploring the relationship between the audiovisual elements, and how the auditory rhythm and the visual rhythm are affecting each other. For that purpose, I decided to create abstract videos instead of the narrative story, which would provide more options to explore the pure rhythm and symbolism of the sound and the image. This idea led me to explore more concepts related to the video art form, and acquire new information related to the visual rhythm created by the cut or by the image itself. Since the sought videos are categorized under the screendance and musical video forms, I have been able to achieve the greater part of artwork creation in the post-production rather than in the filming phase. Indeed, the creation of abstract shapes and motions were done using digital effects and editing techniques such as sound-image coarticulation, echoing and mirroring effects, layers blending modes…

Differently from the conventional use of post-production tools to enhance the reality of a movie or a documentary, in this project I used these tools to create the content of the video, and thus creating meanings and figures that evoke emotions, as if in the production stage of the film making. By doing so, I had the chance to explore more findings about the effect of audiovisual rhythms on how a piece is perceived, and the way a specific atmosphere could be created using abstract sounds and images.

Perspectives:

In the future, this project could be developed into a more extended artwork that gives the viewer the possibility to explore more combinations and storylines. It could also be a base material to do a research project on how the interactivity within the audiovisual products could increase the engagement of the audiences. For example, I developed a business model for a startup that provides audiovisual services using interactive technologies. The project is a B2B company that provides various solutions under the interactive video category. These solutions will help other companies elaborate audiovisual products using the interactive technology, in order to achieve a higher impact and gain more engagement from their clients. A series of services will be proposed such as generating screenplays and ideas, audiovisual production and postproduction, and implementing interactive technologies. Some of the key elements of the business model are as following:

- Key Activities: The activities of the project are: audiovisual consulting, audiovisual production and postproduction, integrating interactive solutions in the audiovisual product. However, the main feature that provides the company is the development of interactive systems and implement them in digital platforms.
- Key Partners:Many partners will be consulted in this project, but the suppliers providing audiovisual equipment related to the interactive technology (360º scanning, virtual and augmented reality...) will be the main partners.
- Value proposition: The core value of the proposed services resides in helping companies achieve their goals in terms of audience engagement, through enhancing the interactivity of all elements that constitute their visual identity.
- Customer segments: The main value proposition targets of this project are companies who need to add interactivity to their advertising campaigns in digital platforms. Another target market of this project is the e-learning sector, in which the interactive feature has become a necessity.

Interactivity has gained a broad reputation in various fields, especially in audiovisual products such as advertisements, e-learning courses, artworks... As a result, an increasing

demand for such products has been perceived in recent years alongside the advancement in digital technologies, artificial intelligence, and informatic systems.

References

Bibliography

Alena Činčerová. (2010). *About Kinoautomat* [Blog post]. Retrieved 09 june 2020 from http://www.kinoautomat.cz/index.htm?lang=gbr

Aguilera, Purificación; Morante, María; Arroyo, Eva. (2011). Vídeo digital (Aplicaciones ofimáticas). *Editex*. Madrid. ISBN 9788490030806.

Anon. (1971). The Compact Edition of the Oxford English Dictionary II. *Oxford University Press.* Oxford, New York.

Austvoll, André (2004). Choreocinema. (Master's Thesis). *Department of Dance Studies & Labannotation Institute*. School of Arts. University of Surrey.

Berrier, Sylvie. (1991). La Vidéo-danse: Essai de définition (Master's Thesis). *Université de la Sorbonne*. France.

Bowers, J. (1999). Introduction to Two-Dimensional Design: Understanding Form and Function. *Wiley*. New York.

Chion M . (1994). Audio-vision: Sound on Screen (C. Gorbman, Trans.). *Columbia University Press*. NewYork, United States.

Collopy F. (2000). Color, form, and motion: Dimensions of a musical art of light. *Magazine Leonardo*, *33(5)*, 355-360.

Dahlhaus, Carl. (1991). The Idea of Absolute Music. *University of Chicago Press*. p.18.

Demand Metric. (November 2015). Interactive Video: Defining and Measuring Performance. *Demand Metric Research Corporation*. Retrieved from https://www.demandmetric.com/

Edmonds, E, Muller , Lizzie Muller, Mathew Connel. On Creative Engagement. *Visual Communication*, *5(307),*p3. Retrieved from https://www.researchgate.net/publication/240697261_On_creative_engagement

Gress, Jon (2015). Visual Effects and Compositing. *San Francisco: New Riders*. p. 23. ISBN 9780133807240.

Hartney, Mick. 2017. *Video art.* Archived 2011-10-17 at the Wayback Machine, MoMA. Retrieved June 12, 2011 from

https://web.archive.org/web/20111017023139/http://moma.org/collection/details.php?theme_id=10215.

Higgins, Steven. (2006). Still Moving: The Film and Media Collections of the Museum of Modern Art. *The Museum of Modern Art*, p.199. New York.

HubSpot. *What Is Inbound Marketing?* [Blog post]. Retrieved 10th June 2020 from https://www.hubspot.com/inbound-marketing

Judkis, M. (12 December 2012). Nam June Paik at the Smithsonian American Art Museum opens Dec. 13. *washingtonpost.com*. Archived from the original on 9 August 2017. Accessed on 9 June 2020.

Paul, C. 2003. Digital Art. *Thames & Hudson Inc*, p11.

Payri, B. (2015). Figuras de coarticulación música-imagen en la video-danza: Figures of music-image coarticulation in video-dance. *Arbitrated magazine of Facultad Experimental de Arte de la Universidad del Zulia*. *10(19)*, 36-44. Maracaibo, Venezuela

Payri, B. (2018). Une approche de la chorégraphie en post-production numérique. *Repères, cahier de danse*, *40(1)*, 43-45. doi:10.3917/reper.040.0043.

Pérez Porto J. and Merino M. (2015). Definición de videoarte. *Definicion.de.* Retrieved from https://definicion.de/videoarte/

Rubio Alcover, A. (2006). La postproducción cinematográfica en la era digital: efectos expresivos y narrativos. *Tesis Doctorals En Xarxa*. Spain.Retrieved from http://hdl.handle.net/10803/10457

Russell J.A., Posner J., and Petersona B.S. (2005).The circumplex model of affect: An integrative approach to affective neuroscience, cognitive development, and psychopathology. *Cambridge University, 17(3)* p.715-734 . DOI: https://doi.org/10.1017/S0954579405050340

Soler-Adillon, J. (2015). Emergence as Self-Organization and as Generation of Novelty. A Framework for Understanding Emergence in the Context of Interactive Art. *Universitat Pompeu Fabra*. Retrived from https://www.tdx.cat/bitstream/handle/10803/314388/tjsa.pdf?sequence=1&isAllowed=y

Stravinsky, I. (1956). The Poetics of Music in the Form of Six Lessons. *Vintage Books*. New York.

Williams R . (9th October 2017). *Study: Interactive video ads boost viewing time 47%*. Retrived from https://www.mobilemarketer.com/news/study-interactive-video-ads-boost-viewing-time-47/506780/

Willoughby, I. (14th june 2007). Groundbreaking Czechoslovak interactive film system revived 40 years later. *Radio Prague International*. Retrived 09 june 2020 from https://english.radio.cz/groundbreaking-czechoslovak-interactive-film-system-revived-40-years-later-8607007

Filmography

Ahtila, E-L. (1999). *Consolation Service* [motion picture]. Helsinki.

Ahtila, E-L. (2006). *The Wind* [motion picture]. Helsinki.

Castle, W. (1961). *Mr. Sardonicus* [motion picture]. United States.

Colomer, J. (2005). *Arabian Stars* [motion picture]. Barcelona.

Colomer, J. (2008). *En la pampa* [motion picture]. Barcelona.

Colomer, J. (2006). *No future* [motion picture]. Barcelona.

Crispin, Porter + Bogusky, David (Creators). 2001 - 2012, 2014. *The Subservient Chicken [advertisement]*. Miami, United States.

Eko (Producer). (2019). *Clothes Call with Nina Garcia* [video file]. New York, United States.

Hoover N. (Creator) . 1980. *Color pieces* [motion picture].

Hoover N. (Creator) . 1980. *Fields of blue* [motion picture].

Hoover N. 1982. *Light and Object* [motion picture].

Kalas, L. (Producer). Radúz Činčera, Ján Roháč, and Vladimír Svitáček (Directors). *Kinoautomat* [motion picture] 1967. Czechoslovakia.

McLean R. (Producer). Slade D. (Director). 2018. *Black Mirror: Bandersnatch* [motion picture]. United Kingdom.

Oncotype (Producer), Morten S. (Director). 2003. Switching [motion picture]. Danemark.

UNIT9 (Production). Percy M. (Director). 2014. *National Theatre: A Conversation with Sir Ian McKellen* [video file]. United Kingdom. Retrived from https://www.unit9.com/project/a-conversation-with-sir-ian-mckellen/

WMG; LatinAutor, UNIAO BRASILEIRA DE EDITORAS DE MUSICA - UBEM (Producers). Wiz Khalifa, Nick Ruth, Henry Walter (songwriters). (26 Oct 2014). *Wiz Khalifa - Stayin Out All Night* [video file]. Retrieved from https://www.youtube.com/watch?v=BoxkNJocqWQ

List of Figures

List of Tables

Appendices:

- Dance of Light and Darkness, theme 1, video clip nº1: https://media.upv.es/player/?id=9340a670-bfcd-11ea-a88f-6b1e71503836

- Dance of Light and Darkness, theme 1, video clip nº2: https://media.upv.es/player/?id=ca7668a0-bfcd-11ea-a88f-6b1e71503836

- Dance of Light and Darkness, theme 1, video clip nº3: https://media.upv.es/player/?id=e9efcff0-bfcd-11ea-a88f-6b1e71503836

- Dance of Light and Darkness, theme 2, video clip nº1: https://media.upv.es/player/?id=21365b00-bfce-11ea-a88f-6b1e71503836

- Dance of Light and Darkness, theme 2, video clip nº2: https://media.upv.es/player/?id=4046c750-bfce-11ea-a88f-6b1e71503836

- Dance of Light and Darkness, theme 2, video clip nº3: https://media.upv.es/player/?id=68467e80-bfce-11ea-a88f-6b1e71503836