## Visualization of Music: Comparison of Theories, Artworks and a Proposal

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Doctoral Thesis Summary



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## Visualization of Music: Comparison of Theories, Artworks and a Proposal

Vizualizace hudby: Srovnání teorií, uměleckých děl a návrh

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#### **SUMMARY**

This research's primary objective is to seek, find, analyze, and compare the notable or underrated artistic videos on music visualization in the light of relevant film theories and propose an experimental artistic concept.

After providing a brief introduction about the terms, history, along with the background, which is composed of categorization and revision for previous academic research, this thesis starts analysing notable short or feature films, animations, and interactive medias which offer some artistic values regarding music visualization. The analysis methodology is mostly based on Zbikowski's Leitmotif, Eisenstein's diagrams, Kandinsky's colour theories, and Chion's audiovisual analysis. The reason why these factors have been chosen is that they are indeed the core of music visualization theories that have been created by artists, directors, and scholars for over a century. Additionally, the music visualization here is limited by classical music due to its artistic values comparing to other genres, and the intense use of classical music by the theoreticians and artists above. The blockbuster or highly artistic movies and videos regarding music visualization, such as Stanley Kubrick's Clockwork Orange, will be considered as a point of reference along with the important scholars' theories such as Deleuze, Cook, and Adorno.

These analyses may enable us to see not only the improvements but also the deficiencies in this field. In this way, the creation of a new artistic concept in the light of related artworks and theories can be possible and it may have different and more immersive solutions in the framework of music visualization. Moreover, the findings of comparisons and analyses will be converged altogether, and a new artistic concept, in conjunction with the relevant computer graphics-based animation artworks with video game elements, will be offered as an additional result of this study.

#### **SOUHRN**

Primárním cílem tohoto výzkumu je hledat, analyzovat a porovnávat významné umělecké animace a filmy o vizualizaci hudby s přihlédnutím k teoriím a dosáhnout nového uměleckého návrhu ve světle experimentálních uměleckých děl.

Po stručném představení termínů, historie a pozadí, které se skládá z kategorizace a revize pro předchozí akademický výzkum, tato práce začíná chronologicky analyzovat významné krátké nebo hrané filmy, animace a interaktivní média, která nabízejí vysoké umělecké hodnoty týkající se vizualizace hudby. Metodika analýzy je většinou založena na Zbikowského Leitmotivu, Eisensteinových diagramech, Kandinského teorií barev a audiovizuální analýze Michela Chiona. Důvodem, proč byly tyto faktory vybrány, je to, že jsou skutečně jádrem teorií vizualizace hudby, které vytvořili umělci, režiséři a učenci po více než století. Vizualizace hudby je navíc omezena klasickou hudbou kvůli vysokým uměleckým hodnotám ve srovnání s jinými žánry a také kvůli intenzivnímu používání klasické hudby výše uvedenými teoretiky a umělci. Kasové trháky, vysoce umělecké filmy a videa týkající se vizualizace hudby, jako je Mechanický pomeranč (Clockwork Orange) Stanleyho Kubricka, budou považovány za referenční body spolu s důležitými teoriemi vědců jako jsou Gorbman, Cook a Adorno.

Tyto analýzy nám umožní vidět nejen vylepšení, ale také nedostatky v této oblasti. Tímto způsobem může být v rámci hudební vizualizace možné a estetičtější vytvoření nového uměleckého konceptu ve světle souvisejících uměleckých děl a teorií. Kromě toho budou výsledky srovnávání a analýzy zcela konvergovány a jako konečný výsledek této studie bude nabídnut nový umělecký koncept ve spojení s příslušnými uměleckými díly založenými na počítačové grafice s estetikou videoher.

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#### I. ACTUAL TEXT OF THE SUMMARY

#### A. Introduction

In this section, the summary will be revealed in detail. Moreover, objectives, theoretical framework, processing methods, limitations, complications, and the experimental side of the thesis will be clarified briefly.

#### B. Current State of the Issues dealt with

The human infant is born into a sort of "sonorous envelope," says Claudia Gorbman, one of the best scholars on visual music, in her book *Unheard Melodies*. The mother's voice, her songs, and maybe the music she plays provide the baby his first auditory environment, and he practices it for the first time by crying as he is born (Gorbman, 1987). As we can see, we hear first before seeing. Furthermore, the memory of this fusion with the mother never vanishes, and our illusions are largely accompanied by sounds. She thinks that music accompaniment has both technological and narrative functions: 'to cover projector noise, to mediate between live audience and "dead" mechanically produced shadows on the screen, to augment moods, and to compensate for the screen's lack of spatial depth' (Stilwell and Powrie, 2006, p. 168). Finally, the use of pre-existing classical music can engage with all three types of code (pure, cultural, and cinematic), thus increasing the music's polysemic range, particularly since Shepherd's argument suggests that Gorbman's 'purely musical codes' are themselves profoundly social and historical in application [7, p. 21].

As Wierzbicki (2008, p. 4) notes, discussion of how film music works -or how it ought to work- dates to before World War I, when columnists for various trade magazines regularly offered both criticism and practical advice to musicians who accompanied "silent" movies. He further notes that the current discussion on how film music works, or how it seems to work in particular films or types of films, is fascinatingly complex because it draws its examples from more than a hundred years of international filmic repertoire, and it interweaves strands from a great many lines of argument as in today.

Film critic James Monaco refers to the English art critic quote, "All art aspires to the condition of music", and relates this quotation with his spectrum of art table. (Table. 1). As we can see here, comparing to other art forms, "music" has its own space, and music can only be placed under the table of "musical" but nothing else due to its abstraction and spirituality. Other forms mostly try to reach music's spirituality by visualizing it, and renowned art critic Walter Pater provocatively

supports this idea by saying that all art aspires to the condition of music (Gracyk and Kania, 2011, p. 44).

Table 1: A spectrum of the arts (Monaco, 2000, p. 28)

Practical	Environmental	Pictorial	Dramatic	Narrative	Musical
design					EVERS.
archit	ecture scu	  Ipture			
		painting drawing graphics			
			stage drama	novel story nonfiction	
				po	etry ince   music

Moreover, James Monaco describes the elements of a film by using musical analogies: he regards film's narrative as a melody, which is organized in rhythm, a temporal element, and he also believes that a film can have a vertical dimension, that is, harmony, through special temporal arrangements of the narrative. (Stilwell, 2000, p. 61). John Whitney investigates this problem further by simply asking: What are the essential components of time and temporal organization in poetry, dance, and music? (Whitney, 1980. p. 39). He finds the answer in his software-based music visualization graphics: Metrical order is an important part of the structure of poetry as it is important to the harmonic structure of music. Pitch pattern and rhythmic pattern are interrelated and interwoven in music just as a syllabic, rhythmic pattern and meaning interweave in poetry [8, p. 39]

Today, artistic visualization of music or sound can be currently seen in many contemporary art forms and disciplines. Mostly many artistic short or feature animations and films related to music can be followed on *Vimeo, Youtube, National Film Board* (Canada), and other similar media platforms. An official website and archive called "centerforvisualmusic.org" are dedicated to visual, experimental, and abstraction on music visualization. Contemporary arts such as Fluxus, sound installation or sculpture, kinematic art, postmodern painting, and optic art are also dealing with this issue in order to create harmony between visuals and music. These art movements are also using video as a medium. Symphony orchestras around the world are playing the classical masterpieces with the

accompaniment of video shows, projectors, and interactive media as "performance." It can be easily observed that even industrial arts, such as many Hollywood movies, are trying to visualize the music in its own way. Aesthetically high music visualization may enable the audience to understand and absorb the content and visuals better. Technological advancements in computer graphics such as fractal simulation and video mapping add another layer to this vibrant field both in terms of technic and artistry. Video games also add their own aesthetic values to music visualization. To sum up, since the invention of cinema, music and visuals have been inseparable elements from each other.

Last but not least, the idea of aligning sound with picture (or the other way round) is not unique to film only. This sensory pairing may occur and affects each other in any given situation of everyday life. The unique quality of transsensoriality in the film is that it can be employed, deployed, and manipulated in artificial ways that do not often occur in the 'natural' form of everyday life. This transcendence of senses metaphorically can parallel Jung's 'Transcendental Function', a function of the psyche that arises from the tension between consciousness and the unconscious and supports their possible connectivity (Nagari, 2016, p. 35).

#### C. Objectives of the Thesis

The central question of the thesis is:

"How different theories and methodologies about the visualization of (classical) music have integrated with different types of experimental films, and in the light of those, is it possible to reach more immersive solutions from this incorporation?"

Some minor questions which are related to the primary objective can be found below:

- 1. What are the notable but underrated movies and animations regarding visualization of music? (Selected films in the context of hypothesis section)
- 2. How to take advantage of video game elements for the sake of artistry in music visualization?
  - 3. How do the leitmotif ideas contribute to the artistry of films?

#### D. Theoretical Framework

The theoretical framework is interlaced with selected processing methods that can be found in the next chapter.

### **E. Selected Processing Methods**

Below, these methods will be used in this research.

- -Comparative: Comparison of selected artistic videos,
- -Qualitative Evaluation: Artistic comparison,
- -Literature and Movie Review: For the introduction part of the thesis and analysis of the movies,
  - -Practice-led research: To support the experimental artistic concept,
  - -Practice Technic: Animation with computer graphics.

As for the film analysing section, a combination of many analysing methods will be used. Since the audiovisual analysis of a movie is complicated due to its complex structure, some of the methods will be used for specific movies while some of the methods for others. For instance, not all the analysed movies have a clear leitmotif, and for this reason, the leitmotif analyses for these types of films are not necessary. The author prefers using Michel Chion's Audiovisual analysis from his book 'Audio-vision,' where he used it for analysing Bergman's Prologue scene from his movie *Persona* (1965) as the main body of my methodology (numbers 3,4,5,6,7 below).

#### 1. Background

The author starts his analysis with the background of the film's director. He briefly mentions the director's era, previous works, awards, and his life as a profile.

#### 2. The Plot - Story

The author briefly tells the story or plot of the selected film.

#### 3. Locating Dominant Tendencies – Overall Description

Locating lasting noises that extend through the whole of a sequence, such as ringing church bells. Also, locating punctual noises that are isolated events such as hammer blows. Identifying the music with the listener's cultural references and making the distinction between music and noise.

#### 4. Spotting Important Points of Synchronization

Locating the important synchronized scenes.

#### 5. Narrative Analysis

What do I hear of what I see? and What do I see of what I hear? General analysis of narration in the framework of sound and visual relationship.

#### 6. Comparison

Seeking the visual forms and textures in the context of music. Here the author also adds Kandinsky's colour theories, where he outlines the musicality of colours in his *Concerning the Spiritual in Art*. Here Kandinsky's explanation of the direct psychic effect of colour, which causes the vibration of the human soul, has no scientific basis but is "founded purely on spiritual experience" (Hoover, 2008, p. 33).

#### 7. Audiovisual Canvas

Overall evaluation and General audiovisual structure of the film. Is it jerky-smooth, sharp-diffuse, regular- irregular, ordered-disorderly?

#### 8. Graphical analysis

The author will briefly analyse the montage in selected films and their relationship with the sound along with Eisenstein's diagrams, if applicable.

According to Eisenstein, there are five types of montages:

Metric montage: Cutting to the next shot no matter what is happening within the image.

Rhythmic montage: Cutting based on continuity.

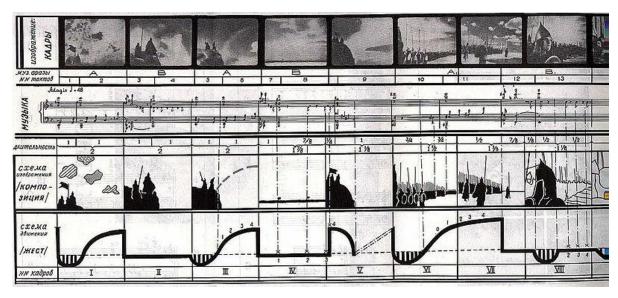
Tonal montage: Cutting depends on emotional integrity.

Overtonal montage: Exaggerated mixture of metric, rhythmic, and tonal montages.

Intellectual montage: Conflict between images based on content to produce new ideas.

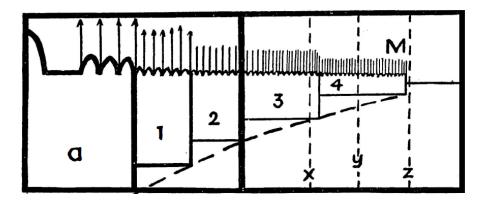
Eisenstein also used diagrams and graphics for audiovisual analysis in his movies. His most important original diagram for his Alexander Nevsky movie can be seen below:

Table 2: Alexander Nevsky / Battle on the Ice Scene Diagram (Eisenstein, 1957, appendix)



On the table, Eisenstein reveals the new "vertical" factor of intercorrespondence, which arises the moment that the pieces of the sound-picture montage -are connected. Montage removes its last contradictions by abolishing dualist contradictions and mechanical parallelism between the realms of sound and sight in what we understand as an audiovisual (vertical) montage. Eisenstein analyzes some specific parts of his diagram (Table.3). Surely not all the movies here have vertical montage or similar ideas; as a result, the use of this diagram is limited to few movies in the thesis.

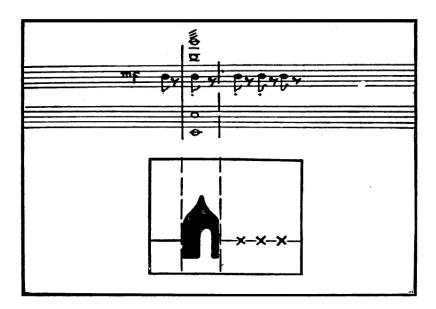
Table 3: Detail from Alexander Nevsky Diagram / Battle on the Ice Scene Diagram (Eisenstein, 1957, p. 183)



Here Eisenstein tries to find a correspondence in the music to that glimpsed cut of horizon x, y, z, and as a result, the abrupt musical break was visualized as a fall. The plastic equivalent to such a sharp break in the music can be assumed under these conditions to appear as an analogous jolt-now not from top to bottom, but perspectively, inwards.

Eisenstein also points to another kind of correspondence between music and picture solved through the same graph-and with the same motion. This is spatial correspondence. This analysis of Shot VIII and its corresponding musical movement can be diagrammed as below.

Table 4: Detail from Alexander Nevsky Diagram / Battle on the Ice Scene Diagram (Eisenstein, 1957, p. 189)

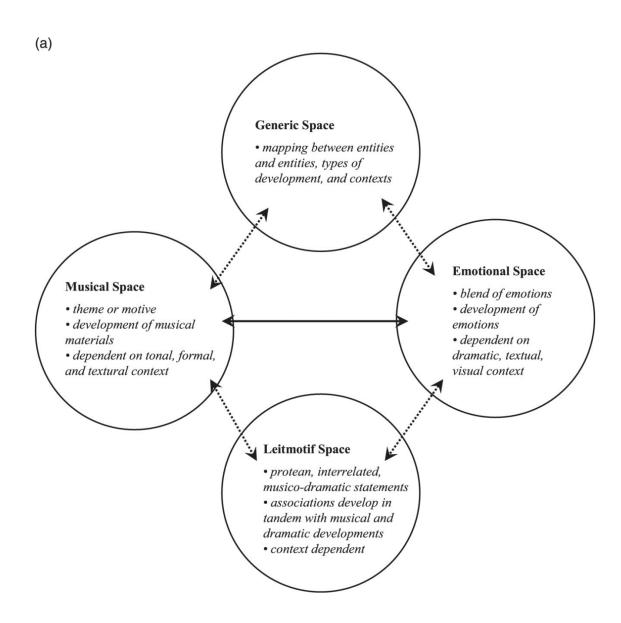


While the diagram analysis can provide a different, graphics-based perspective for the film sound readings, it also provides insights into the double problematic of the technical instrumentalization of the cultural work and technically assisted authorship and reception of time-based media (Tobias, 2004, p. 35).

#### 9. Leitmotif

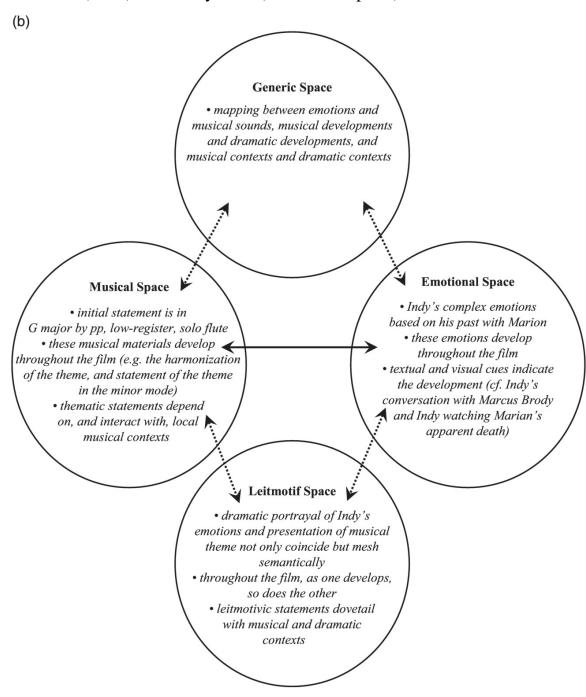
If the film has a distinguishable leitmotif, the author prefers Lawrence M. Zbikowski's CIN (Conceptual Integration Network) (Table.5) that provides schematic and precise interpretation for leading motives in films. This diagram includes four sets, and here the combination of musical and emotional readings provides us leitmotif interpretation.

Table 5: Leitmotivic Conceptual Integration Network (CIN) Model (Stull, 2015, p. 12)



Matthew Bribitzer-Stull applies CIN to John Williams' score in Steven Spielberg's *Raiders of the Lost Ark* for analysing the leitmotif of film's protagonist Indiana Jones' complex emotions (Table. 6).

Table 6: Leitmotivic Conceptual Integration Network (CIN) Model for *Raiders of the Lost Ark* (1981) created by Stull (Stull, 2015, p. 13)



#### F. Experimental Part

Under the main results and findings of comparisons and analyses, a new artistic concept on the visualization of music will be proposed. This proposal will also be supported by experimental artworks that will be created in computer graphics and 3D animation with the help of video game aesthetics (atmosphere).

#### G. Limitations, Hypothesis and Complications

Even though there will be four methodologies for movie analysis, these elements and movies can be interlaced and blurry due to movies' complexity. The term "notable artistic videos" refers to movies, short movies, animations, and short animations here. The popularity of these videos sometimes can also be blurry, and for this reason, the official IMDb list and Film Festival's websites have been taken into consideration with the order of less popularity. In the theoretical framework section, only the written theoretical works, especially only their specific chapters or pages that have mentioned music visualization, will be taking into account for movie analyzes. Because, for instance, not all the chapters of Kandinsky's On Spirituality on Art are about music visualization. For the artistic framework section, from short animations to movies, the most distinctive, artistic, important, and related selected artworks will be taken into consideration regarding music visualization. As expected, almost all the theories and artworks deal with classical music as a genre. Thus, only classical music visualization is the main focus here. The blockbuster with highly artistic or cult movies and animations regarding music visualization such as Stanley Kubrick's *Clockwork* Orange, Godfrey Reggio's Qatsi Trilogy, or Milos Forman's Amadeus will be considered as a point of reference along with the theories. Finally, experimental artworks are only based on 3D animation with the use of classical music.

Questioning the general problem of "What is motion-picture music?" can be found in Moore and Carroll's article based on philosophy. (Gracyk and Kania, 2011. p. 456). However, here, the author will only question the limits of classical music use in the movies.

If we need to categorize the selection limitations for the films in this thesis;

- 1- The films that have never been analysed before,
- 2- The synchronization between music and visuals must be clear; in other words, one cannot consider the use of another music or music must not serve as a background or mickey-mousing (detailed synchronization of every

action) element for that film, because doubtlessly, crude cadential mickeymousing may produce music that is incoherent outside of the context of the individual film (Lehman, 2013, p. 5). Surely, synchronization and asynchronization are, as Kracauer puts, ambiguous borderline cases (Kracauer, 1960, p. 112). For him, synchronism-asynchronism and parallelism (sound and image carrying same meanings)-counterpoint (sound and image carrying different meanings) pair but do not assert themselves independently of each other [1960, p. 113]. Moreover, following Karel Reisz's and Gavin Millar's suggestion, these two possibilities may be labeled "actual sound" and "commentative sound," respectively (Reisz and Millar, 1953). Synchronism inevitably involves the former, whereas asynchronism admits both varieties [1960, p. 112]. Here, Kracauer's table "The Four Types of Synchronization," which extensively describes and simplifies the complexity of sound and music use in films regarding synchronization can be seen below. This thesis will analyze the movies that fall into anywhere of this categorical table (IIIa, IIIb, IVa, IVb).

Table 7: The Four Types of Synchronization (Kracauer, 1960, p. 114)

	SYNCHRONISM	ASYNCHRONISM
- 1-	Actual Sound	Actual Sound
PARALLELISM	I	IIIa  Commentative Sound  IIIb
COUNTERPOINT	Π	IVa  Commentative Sound  IVb

- 3- The films must include artistry such as the use of leitmotif, synaesthesia, vertical montage, experimentality, or combination of all,
- 4- The films must be underrated or unpopular. In other words, they must not be a blockbuster; in other words, there should not be, or there should be, any Hollywood Aesthetic at minimum. What the author meant by Hollywood aesthetic is, as Harwood mentions, The Hollywood aesthetic has also been termed classical cutting, also known by its French equivalent 'Decoupage Classique.' Hianetti (1987) describes this style as 'editing for dramatic intensity and emotional emphasis rather than for purely physical reasons' (p. 13-114). (Harwood, 1998, p. 43). On the other hand, for instance, while Hans Zimmer's soundtrack works are aesthetic, he has arguably been the most influential composer in Hollywood since the 1990s, being in near-constant demand for blockbuster tent-poles and prestige pictures alike (Lehman, 2016, p. 1). As a result, blockbuster composers are also not being taken into account in this dissertation.
- 5- The music in the films must be classical music. Classical music here comprises the famous composers' works such as Mozart and Dvorak, but also the individual works or folk songs that have been composed in the format of classical music, the modification or distortion of a classical music piece are counted. Surely, when using pre-existing or classical music in the soundtrack, the modification or distortion is not a 'violence to the original' (Kerman and Tomlinson, 1992, p. 125) but is often a necessity.

The author believes that, despite these limitations, it is hard to sacrifice or select many artworks due to their complexity and their stance between artistry and corniness; moreover, especially Experimental film is a slippery category. For this reason, the author also briefly mentioned some of them for comparison in the analysing section. As McAllister puts it, Preexisting, autonomous art music is, by its very nature, resistant to thematic transformations. Unlike originally composed film music, where musicians were expected to vary themes blatantly to fit the mood or setting, the modification of art music was discouraged. He emphasizes that this lack of flexibility, along with the common practice of repeating music several times per film, led to what Altman terms "thematic abuse" (McAllister, 2012, p. 30).

On the other hand, as Volt notes, introducing classical music in the film, therefore, enables to signify persons, objects, places, situations, ideas, etc. belonging to high(-brow) culture (as opposed to, for example, mass culture), or to the middle class (as opposed to low class). He continues, for example, in Federico

Fellini's *E la nave va* (Italy/France, 1983), it is not necessary to identify each piece of classical music used; yet recognizing the introduced music's status as classical is highly beneficial since music in this film is part and parcel of the artistic image of Occidental Culture or the Old World (Volt, 2009, p. 37, 47). Therefore, movies have their own aesthetic and style, which constitute a substantial part of their cultural meaning (Casanelles, 2015, p. 182).

The author provides links for each analysed movie as superscripts with footnotes that can be seen on related titles or subheads. As a result, in the framework of these limitations, the selected films below have been analyzed:

#### Soviets:

- The Pioneer's Violin (1971) by Boris Stepantsev
- Plus Electrification (1972) by Ivan Aksenchuk

#### Indie:

- Pictures at Exhibition (Mussorgsky's) (1966) by Osamu Tezuka
- Pictures at Exhibition (Mussorgsky's) (2011) by USC School of Cinematic Arts
- The Monk and The Fish (1994) by Michael Dudok de Wit
- Sleeping Betty (2007) by Claude Cloutier
- Preston (2007) by ISART

#### Interactive Media:

- Ballet Robotique (1982) by Bob Rogers
- Audi Sinfonie (2007) by Bauhouse
- Symphonic cinema (2011-Today) by Lucas van Woerkum
- Beethoven Recomposed (2020) by WDR
- Jeroslaw Kapuscinski's works (2000-2011)

#### I. Results

The results of this research can be divided into three parts:

- Findings of comparisons and analyses of the artistic videos.
- Artistic concept proposal under the light of findings.
- Experimental artworks which are related to findings and artistic concepts.

# II. CONTRIBUTION OF THE THESIS TO SCIENCE, ART, AND PRACTICE (REASONS)

The 20th century was considered to be the era of modern and postmodern art movements. Among those, many artworks shed new light on the relationship between visuals and music or sound. Serious research about artistic music visualization was carried out in the early 1980s, and they are still being written. Although this field is interesting, few researchers have addressed the issue of comparing the notable artistic videos along with the theories both in the past and present-day and finding the improvements and deficiencies in the field to create something new. Moreover, much research has revolved around blockbusters and ignored the independent short and feature movies on visual music. The author hopes that his research will be helpful and constructive in creating more immersive artistic music visualization to fill this gap. His work clearly has some limitations due to its immense artistic variations. But at the same time, he tried to put everything together as much as possible for the sake of creating inclusionary research. We have come this far from Kandinsky's abstract paintings to Kapuscinski's interactive works. Finding more or fewer connections between them can lead us to new dimensions. The author hopes he could reflect these findings in my proposal and artworks, and he believes the comparison and analysis method could bring along interesting results.

Practically, in the author's 3D animation-based artworks, the author will inherit the elements from Dadaism, Surrealism, Minimalism, Futurism, Steampunk, and Abstract Art by mixing natural, industrial and organic visuals with the aesthetic and absurdity of video game elements together. However, before anything else, the author prioritized the spiritual connection between my subconscious and music; in other words, the forms that music created in his mind concerning to boost artistry and individuality. The author only visualized classical music regarding its limitations and its high artistic value. Technically he used the most popular computer graphics software such as Autodesk and Adobe. The

author tried to minimize visual effects, and in the meantime, data use to avoid showing off and also timesink. To sum up the contributions:

- Briefly reviewing and analysing previous research to see what has been done in the past,
- -Comparison and analysis of unknown artistic videos and bringing them to the surface in order to see improvements and deficiencies from a different point of view.
- -Interesting findings and final unique inclusionary evaluation,
- -A new artistic proposal with the help of relevant experimental artistic products.
- -Filling a sore gap in the literature, music, sound, and filmmakers.

#### III. CONCLUSION

In this doctoral thesis, the author tried to analyze underrated but important films based on classical music visualization and propose a concept and short animated film as a result.

The organization of the contents of this research also reflects the historical development of music visualization art. Comparing the unknown artistic movies under the light of pioneers' theoretical works can be an approach that is as scientific as possible. This comparison also enables the artistic side of the thesis to be built. The creation of new knowledge after colliding with many different theories and artworks can lead to the genesis of a new artistic concept with experimental artworks. So too, analysing pre-existing film music is a kind of archaeology of the undertone, historically and materially bound, that aims to work through the layers of connotations to reach the effects lying under the concretions of time (Stilwell, 2000, p. XIX).

First of all, the author briefly explained the methods he used for my analysis; he takes advantage of Michel Chion's audiovisual analysis method as the main approach. He supported this method with Wassily Kandinsky's colour theories for the colour use in the films. While Lawrence Zbikowski's CIN method provided me a clear leitmotif analysis with schematics, Sergei Eisenstein's graphical analysis method was very suitable for detecting vertical montage ideas.

The author briefly explained the similar thesis and papers to my main idea, and right after that, he provided the definition of some words he used in the thesis.

Finally, the author started the main part of the thesis, film analysis, with the aforementioned methods for selected movies. Despite intertwining, he attempted to categorize the analysed films in chronological order, and the author believes these categories capsulate the field as a whole;

"Soviets" as traditional and state-controlled propaganda based media,

"Indie Animations" as Avant-garde and independent media,

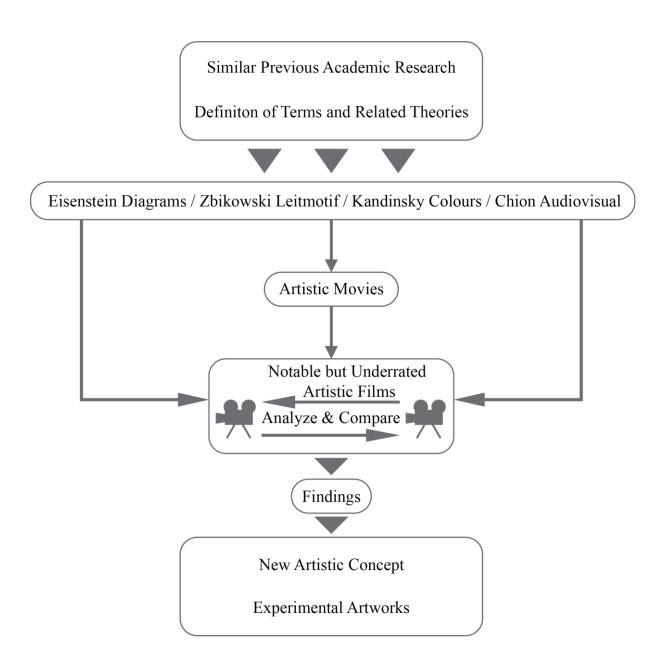
"Interactive Media", as the use of advanced technological tools such as projections and video mapping.

After the analysing section, the author proposed a concept named "Kinomodule" with the introduction section of "Video Games" and related short animated film "Seismic Echo Chambers", which is completely based on classical music visualization.

The author reached a conclusion and explained the findings in the "Results" section, and he gave some recommendations based on author's experiences and knowledge.

The author provides the doctroal thesis' structural map below for better understanding the pipeline of the dissertation.

Table 8: The doctroal thesis' structural map



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Vizualizace hudby: Srovnání teorií, uměleckých děl a návrh

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