V MAGIS Gradisca Spring School
"Cinema and Contemporary Visual Arts II"

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Investigating Film Algorithm
Transtextuality in the age of database cinema

Today my lecture aims to explore some peculiar passing modalities, so to say some "transtextual and transmedial migrations" among traditional narrative cinema and a group of digital artworks, in the context of what Lev Manovich has defined the "era of database", to demonstrate that the acts of transcription from the filmic form into new media forms (the passage from film to interactive text, software, videogame and so on) is quite always a research practice towards what I will soon define "the film algorithm".
More generally, I would like in these minutes to think about the concepts of remediation and transtextuality in the transition from the so called paradigm of narrative to the paradigm of database, questioning their functioning, using for this objective on the one hand some theoretical indications coming from Manovich's reflections upon the database form, end on the other hand a recent theory by Ian Bogost about "Unit operations".

The works which will help me along this path are basically two: the *Cinema Redux* series by the british artist Brendan Dawes, which translates into static images a set of films, and *The Battle of Algiers* by the French artist and filmmaker Marc Lafia in collaboration with the Taiwanese new media artist Fang Yu Lin, an interactive work based on the original film by Gillo Pontecorvo.
In different ways, and leading to different outputs (a series of static images in the case of *Cinema Redux*, an interactive online installation in the case of *The Battle of Algiers*), the two artworks well represent the modalities in which the so called new (digital) media deal with contents that come from traditional media, trying to RE-WRITE them in a way that is the most peculiar to the interactive and procedural vocation of the digital medium.

However, it is necessary to start clarifying what do I intend with the concept of "database era" or "database paradigm". Let us help with some words of Lev Manovich which come from a 1998 article, "Database as a symbolic form":

> After the novel, and subsequently cinema privileged narrative as the key form of cultural expression of the modern age, the computer age introduces its correlate – database. Many new media objects do not tell stories; they don't have beginning or end; in fact, they don't have any development, thematically, formally or otherwise which would organize their elements into a sequence. Instead, they are collections of individual items, where every item has the same significance as any other.[1]

On the one side, so, he places the so-called "modernity", the age of novel and of cinema, which has its peculiar forms in narration and rigid sequentiality, and on the other side he sets the "computer era", in which the narrative form is superseded by database. Now, we certainly could argue that both novels and films have often tried to react "from the inside" to the regime of narrative sequentiality, inventing new forms of narration, subverting orders, frequencies, lengths and so on. It remains the fact that the film which is watched by spectators, and the novel which is read by the reader remains fixed in their only possible sequences, and are static and linear texts (obviously to be filled and interpreted by the user).

[1] Lev Manovich, *Database as a Symbolic Form*, 1998, disponibile online: www.manovich.net

So, every subversion must remain inside the narrative paradigm. We could also call this situation the "textual paradigm".

In opposition to the textual and narrative system, it stands the database, the characteristic paradigm of contemporary creativity and of its aesthetics, the symbolic form of computer based artworks. With the term "database", in information technology we define a structured set of data, organized to be searched in a quick and logic way, to be compared, linked, and used for particular operations. For Manovich, the user experience of new media is practically always tied to the concept of database: digital objects (and we will come back in a while to discuss the term "objects" related to computer things), should be seen as complex collections of instances more than linear texts (even where the output is a linear text, a clip), on which the user, or the machine autonomously, can make a large series of operations.
Even when the user experience seems close to the one of traditional and narrative media, as for example in the case of narrative videogames which tell a story, under the interface (surface) there is always a database of elements that the software uses (manipulates, combines, links and so on) to generate in every moment the output with which the user deals. One more time, we could argue that also the cinema is always, at the basis, a sort of database of elements (i.e. takes, voices, noises, titles, graphics and so on), that are combined during the editing process, but also in this case we should answer that the database component of the cinema belongs just to the productive phase, and for this reason remains "outside" the object. There can be "cinema" without editing (like in the case of structural camera-edited films), and in any case editing precedes the final object (the movie). In other words, when the elements of the database are combined in a structure, that constitutes the artwork that the user experiences every time. Vice versa, digital media are procedural and calculate their contents in real time, operating on the elements collected in a database.

Another quotation from Manovich will help us to clarify the idea of database not only as technological apparatus but also as symbolic paradigm of contemporary age:

> If after the death of God (Nietsche), the end of grand Narratives of Enlightment (Lyotard) and the arrival of the Web (Tim Berners Lee) the world appears to us as an endless and unstructured collection of images, texts, and other data records, it is only appropriate that we will be moved to model it as a database. But it is also appropriate that we would want to develop poetics, aesthetics and ethics of this database.[2]

Thus, the database represents something more than just a working modality: it is also a cognitive model through which we interpret the complexity of the reality we are living in.
Besides the concept of database, the other fundamental term useful for our reflection is the one I have used in the title of this lecture: "algorithm". Commonly, an algorithm is defined as a procedure that permits to obtain a certain result, executing, in a particular order, a series of simple steps or actions. A series of finite instructions, that lead to a result and are materially executable and not ambiguous. In computer science, an algorithm is the set of operations which have to be implemented in a program to become "performative".
Every construction that belongs to the digital *regime* (audiovisuals included…) is thus OR a packet of data in a database, OR an algorithm, a rule that can be used to make something with those data. On this point, Manovich says that:

> Algorithms and data structures have a symbiotic relationship. The more complex the data structure of a computer program, the simpler the algorithm needs to be, and vice versa.[3]

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[2] *Ibidem.*
[3] *Ibidem.*

The concepts of database, data, algorithm, are therefore at the basis of every artistic and creative process in the era of computer. While historically every artwork constituted a sort of *unique specimen* in the context of a particular medium, now *form* and *content* are two entities which can quite completely be untied. Digital objects always distinguish between their *material* (organized according to the database logic), and their *interfaces*, which are the modalities of formatting and presentation of the material.

It follows an aesthetic conception based on the separation between data and structures, that detects the key characteristic of new media not (or at least not ONLY) in the interface, but also in the set of potentialities organized in the database. It is again Manovich who underlines that in the cinematographic (and literary) tradition, the database of materials with which the diegesis is built, - what we could call "the paradigm" - , is something *implicit*, and the narration, what we could call "syntagm", is the only tangible and concrete entity. In new media, the relation is reversed, and the paradigmatic axis of possibilities (the base of data) is something that is *more real* than its potential syntagms, interfaces or significant surfaces.
Manovich, through his reflection upon the cultural paradigm of database, and perhaps unwittingly (since even the author stops on the analysis of interfaces in his main publications), says something more. He is saying that every new media theory until now has been too often limited to the analysis of outputs and interfaces and quite never has dealt with the working dynamics of what we could at most define "terminal texts", that is the final results of an interactive "conversation" between user and machine.
Contemporary digital theory, then, handles new media objects according to the modalities and methodologies that are still typical of the narrative paradigm, and that is why it often becomes a fruitless analysis under theoretical models that cannot explain the peculiar dynamics of digital objects. The era of database needs new theories, able to deal with the working modalities of software, not only concentrated on the interface.

One of these "new theories", which focus on the object quality of new media, comes from the American theorist and independent game designer Ian Bogost: in his *Unit Operations. An approach to videogame criticism* (2006), Bogost uses the concepts of "object" and "procedurality" to build a theory that aims to analyze every media content (not only videogames) as a complex configurative systems able to operate on discrete unities (the so called "unit operations"). I quote: «unit operations are modes of meaning-making that privilege discrete, disconnected actions over deterministic, progressive systems».
Mixing suggestions and concept coming from physics and cybernetics, from computer science and literary theory, and linking with the philosophy of Plato, Aristotle, Leibniz, Spinoza and Badiou, Bogost refuses a structural approach to textual criticism, and proposes the definition of "unit operations" in antithesis with the so-called "system operations":

> I contend that unit operations represent a shift away from *system operations,* although neither strategy is permanently detached from the other. In literary theory, unit operations interpret networks of discrete readings; system operations interpret singular literary authority. In software technology, object technology exploits unit operations; structured programming exhibits system operations.[4]

The metaphore of object oriented programming is often used to describe new media things: object oriented programming is a programming method that uses "objects" to design applications and computer software. A program can be see as a collection of cooperating objects, as opposed to a traditional view in which a program may be seen as a list of instructions to the computer. OOP is not linear programming, and well describes the logic of the database age.

[4] Ian Bogost, *Unit Operations,* The MIT Press, Cambridge MA, 2006, pag. 1.

Turning back to our considerations on database, I would like to remind that Manovich does not restrict himself to the theoretical dissertation, but with the series of installations *Soft Cinema* (made in collaboration with Andreas Kratky) he realizes a project that invites us to think concretely about the aesthetics, the technologies and the poetics of the database age. *Soft Cinema* is a project thought to generate different kinds of output: films, dynamic visualizations, installations, architectonical environments, prints, catalogues and DVDs. Made of a large database of audiovisual materials, and of a real-time automatic editing software that creates clips using that stock, *Soft Cinema* is an environment able to create autonomously a set of movies using a system of rules defined by algorithms, drawing out video portions, sounds, texts, voices, and combining them into short narrative (or not narrative) films, music videos and so on. According to the author, the system intends to explore the creative possibilities at the intersection between software culture, cinema and architecture.
The software attends to choose a series of elements from the database and to mix them both in a syntagmatical way (the editing of the clip), and paradigmatically (multiple screens, concurrence of different materials at the same time, layering, etc.) according to the rule system of the algorithm. Different algorithms produce different films, and every of them can then produce a particular output using a specific medium. *Soft Cinema* also permits to decide the automation degree of the process, giving the user the opportunity of modifying some of the choices made by the computer, or of controlling entirely the editing operations.
In this sense, *Soft Cinema* can represent an attempt to build "in a test tube" a sort of audiovisual archetype of the database age. Above all, it makes us think about the modes in which digital authors reason (or, so to say, are *forced* to reason) in creating their works. What interests me more, today, however, is to reflect upon how the relationships between database paradigm and narrative paradigm work, observing with the help of some case studies, the possible transtextual relations between digital artworks and the films which some of them refer to.

Let us think briefly about what happens typically in the so-called "transtextuality". Traditional authors reason in terms of textual patterns (to be transposed into a new medium, or to subvert creating something different…); of stories to tell and re-tell, of text portions to make explode or implode. They reason in terms of story and discourse, of *representation*, of organization of a paradigm of possibilities in a well defined syntagm.
Digital authors of database era, on the contrary, are invited to think using different codes; they reason in terms of algorithms and data, they act reducing a text to its working logic, to its set of rules. Digital authors work to extrapolate the working rules of a reference universe, and often re-construct them in detail. Their object *par excellence* is the videogame, an interactive system that more than for the stories it tells, attracts the users for the interactive *experience* it offers. They are used to think in terms of *simulation* more than *representation*, and here I use the word simulation to define the reproduction of a reference system, of its rules, of its components, of its dynamics, in a simplified system. Digital authors program physical and climatic routines, model both their characters and their behavior (movements sets, interactive capabilities, levels of interaction with the universe and so on). In short, they neither deal so much with representations (or rather, they do, but just partially, in the moment they have to "cover" their artworks with interfaces), nor with syntagms (because the syntagm is always built by the user that interact with the game), but with *simulations* and *paradigms*. Usually, they arrange a database of objects and program the rules in which these object can interact. (This subject could take us far from the main topic of my speech, and perhaps make us take position in the debate between the so called narratology and ludology, discussing of the narrative (or not-narrative) vocation of digital media.

Let us rather remain on our "track". The dialectic between database and interface does not deal only with a productive and concrete level, but mirrors in the contemporary artistic and aesthetic

practices. What happens when a new media artist relates to a film, to create a new artwork? It happens, we could say, that he thinks of that film not in terms of textual patterns and narrative actions, but in terms of *software*. He sees the film as a formalized program; and, as we have considered, every program is the concrete formalization of one ore more algorithms. What the new media artist does, then, towards a narrative text, is a sort of "extraction" of the rules that govern the various aspects of the film: the narration, the form, the audiovisual language choices and so on.
In a simulation regime, the film becomes the reference system from which he extracts the minimal rule patterns that make it work. This operation is (so to say) a sort of "reverse engineering" act, with which the author investigates and tries to isolate the *algorithms* of the film, to build an alternative universe starting from these sets of rules.
The digital artwork (both interactive or simply *dialogic*) is then a simulation of an original system; a simulation that re-formalizes one or more fundamental algorithms (or, more concretely, the ones the artist is interested in to work on or manipulate) in an alternative program, that this time is really made of computer code.
It follows that the transtextual passages between narration regime and simulation regime can be read as an investigation, extraction and rewriting of algorithms and data in new systems that simulates some of the rule sets of the reference objects.

Let us know verify this position using the artworks of Dawes and Lafia-Lin.

Cinema Redux, by Brandan Dawes (2004), starts from a very simple but peculiar question: can a film be represented in just one image? At the basis of the *Cinema Redux* series stands an application, written in Processing, able to transform a film in an image, according to a quite simple process: the software samples the audiovisual flow of the movie once per second, generating a very small screenshot (8 pixel per 6) starting from the first frame, and visualizes all this stills one besides the others, in rows. The final image is so a big collage made by small frames, and every one of them stands for a portion of one minute of the film. The examples published on Dawes's website concern the films *The French Connection* (William Friedkin, 1971, fig. 26), *Deliverance* (John Boorman, 1972), *Serpico* (Sidney Lumet, 1972), *The Conversation* (Francis Ford Coppola, 1974, fig. 27), *Taxi Driver* (Martin Scorsese, 1976), *The Man Who wasn't There* (Joel Coen, 2000) e *Road To Perdition* (Sam Mendes, 2002). A previous web version of the project presented also the elaboration of Hitchcock's *Vertigo*.
Seen from close up, the outputs of *Cinema Redux* send back to the original film: the frames are quite recognizable, the timeline and narrative line are clearly evoked. But, if we move back from the image (that can be on the screen, or on the wall), we can perceive it in its wholeness, losing the direct references to the film sequences, but gaining an original "total view".

> The end result is a kind of unique fingerprint for that film. A sort of movie DNA showing the colour hues as well as the rhythm of the editing process. Compare Serpico to The Conversation. You can see there's far more edits in Lumet's classic compared to the more gentle slower pace of Coppola's Conversation[5].

The image of *Cinema Redux* is an interesting example of investigation and extraction towards an algorithmical component of the film (editing, chromatic course, and so on). The final output, as in a diagram, visualizes the starting data (the sampled frame) in a new structure that underlines characteristics and relations which cannot emerge from the original shape. The film is *at once* in front of the spectator. Dawes's work shows its structure, the editing rhythm, the chromatic trend, and so on.

[5] http://www.brendandawes.com/sketches/redux/index.html

The other interesting example I would like to present is *The Battle of Algiers* by Marc Lafia and Fang Yu Lin. *La battaglia di Algeri* (1966) by Gillo Pontecorvo is the source on which the software *The Battle of Algiers* operates. The movie, awarded at the Festival del Cinema of Venice in the 1966, is a portrait of the Algerian anti-colonialist struggle which led to the independence of the north African country in 1962, after 8 years of fights between the French army and the National Liberation Front. The facts told by Pontecorvo focus in particular on the period 1954-1957, and on two main characters, on the one side the Algerian Ali La Pointe (symbol of the anti-colonialist struggle), and on the other the French colonel Mathieu. Despite the presence of these main figures, *La battaglia di Algeri* gives up to concentrate on the single characters, and prefers to show collective actions mostly.
Marc Lafia and Fang Yu Lin transform Pontecorvo's film in computational matter, formalizing in a set of rules the behavior models of the French army and the Liberation Front as described by the Italian director. Renouncing to a linear audiovisual structure, *The Battle* elevates the choral dimension of the artwork, and becomes an interactive board, made of a grid on which the frames of the movie interact as pieces of a strategic videogame, representing the French authorities and the Algerian nationalists. Every piece moves according to a set of rules programmed by the authors: when the different fronts collide, the software plays in that board position a fight sequence of the original film. The struggles between the Algerians and the army become in Lafia's and Lin's work a sort of image-system that auto-regulates itself, in which the internal elements originate, proliferate, fight and end autonomously. In clear opposition of the relative stability and immobility of French unities, stand the fast moves and the sudden appearance and disappearance of the nationalist units. The empty spaces of the map are progressively filled at every move. In every moment, the user can clean the map and start again using a different disposition of the two parts, observing the different behaviors and development strategies. As noticed by Danil Coffeen in a short essay dedicated to *The Battle of Algiers*,

> This The Battle of Algiers deemphasizes the film's dramaturgic components, focusing on the film's modes of movement, its meanderings and collisions, its speeds and drifts, its points of intensity, its lines of force, its fluxes and flows. This The Battle of Algiers brings the database to the fore, articulating and amplifying the film's multiple trajectories[6].

If every movie is naturally computable, because it is originated by a database of elements (every portion of impressed film, and so on), *The Battle* is an operation of *reverse engeneering* starting from Pontecorvo's work. Instead of dramatizing the narrated facts, the software uses them as samples from which gets the basic behaviors, in order to recreate the French-algerian struggle as an image-system.
The dramatic force of the battle is not completely canceled by the rationality of the operation: zooming on the various areas of the grid, the original sequences attract again user's attention. The image recovers in this sense its narrative ability, and quits being just a mark of recognizability of the game units.
With this software version of *La battaglia di Algeri* Lafia and Lin stage the multidimensionality of the French-Algerian conflict. They underline its strategic dimension and the simultaneity of the events. Emptied of the filmic typical linearity, the artwork becomes a system of rules which does not tell a story anymore, but rather simulates the conflict modes: the battle of Algiers happens here and now, in front of the user. The software of the two media artists denies the uniqueness and singularity of historical events, and shows rather the plurality and the interrelations of the narrated events. In other words, Lafia and Lin amplify the choral dimension of Pontecorvo's film, and bend the narration to the algorithm:

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[6] Daniel Coffeen, *Film, Play, Power and the Computational, or Byting Celluloid: On Marc Lafia's and Fang-Yu Lin's The Battle of Algiers,* disponibile online: http://www.tate.org.uk/netart/battleofalgiers/coffeen.htm

> Pontecorvo's film tells us that cinema can articulate the multiplicity of power and politics. Marc Lafia and Fang-Yu Lin tell us that the computational can multiply the cinematic. As the byte metabolizes celluloid, the film's multiplicity is given free reign. While the reel is constrained to its linear track and its finished product, the computational remains open, a perpetual event. The algorithmic dynamics of this The Battle of Algiers move beyond cinema to become a cinema-machine, remaking itself again and again: a veritable reign of images[7].

Both *Cinema Redux* and *The Battle of Algiers* represent the attempt of formalizing the algorithm of film into different programs, and make us question the concept of transtextuality. Digital artworks are objects more than texts, and should be analyzed for their simulation modalities more than for their representative vocation. This conception open a range of questions on the materiality of digital code and on the meaning of the concept of "virtuality". I want to conclude with an important consideration: investigating the film algorithms and reasoning in term of databases and data does not absolutely mean to forget the human experience. It does not mean to focus only on the machinic aspects of interactivity and new media: what is to be underlined is that the user experience in the era of digital media is more linked to the paradigm of database than to the narrative one, and needs new theoretical models to be understood and analyzed.

[7] *Ibidem.*