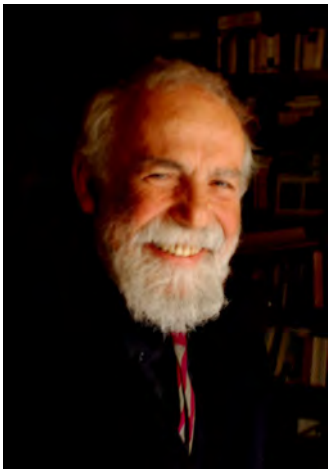
Celestino Soddu

Paper : **Logics of Imagination. Generative Art performs the Artist Style as Executable Process**



Topic: Generative Art Approach

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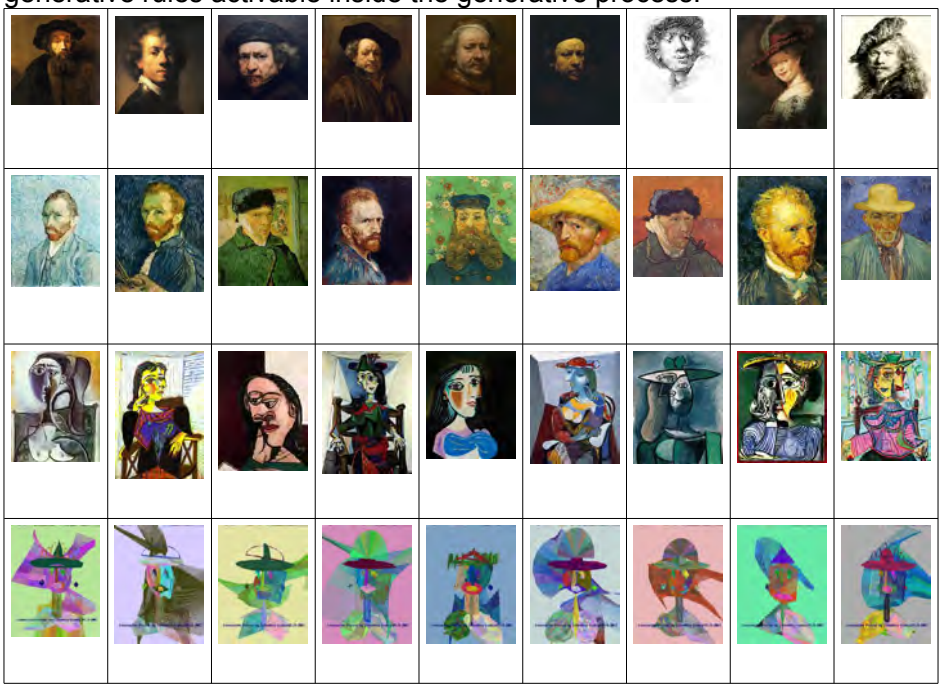
Abstract:
looking at a sequence of artworks we can immediately identify which artist made it. But only if the artist imprinting, the artist style and unicity exists.
Make own arworks recognizable as belonging to a peculiar and unique style is one of the character of each artist work.
One of the main opportunities of Generative Art is to work on defining his own style, clarifying step by step the strong relationship between own imaginary and the clear recognizable imprinting in the generated artworks.
This paper will identify how to manage own generative process and how the results could be identified as variations inside the same style. More, how generate unique and unrepeatable events as each arworks should be.
Question are related to:
> the concept of identity of the style but also identity of each artworks
> the concept of variation, the main road to perform well identifiable imprinting
> the complexity, in the generative process and in the artworks, as character to improve the recognizability of own imprinting using the casualness of the inputs from the environment
> the use of random and unpredictable starting point, or the use of random inside the executable process.
> The difference between random results and impredictable results owing to the management of generative processes.
Finally, some basic considerations for transforming own imaginary into generative rules activable inside the generative process.



Portraits: the recognizable artist imprinting in the history of Art. (Rembrant, VanGogh and Picasso, and my attempt to generate variations of women portraits referring to my interpretation of Picasso.

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Keywords:
generative, artworks, identity, variations, complexity, casuality & random, imprinting, style, recognizability, clarity

Logics of Imagination

Generative Art performs a Style as Executable Process

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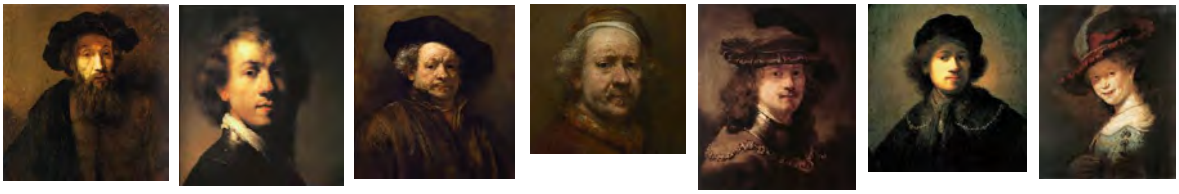
Van Gogh, a sequence of landscape "variations". We recognize his imprinting at the first glance. Rembrant, a sequence of his portraits. where imprinting is immediately recognizable



Premise*. Logics of imagination, some considerations*

From a photo of a flowerpot with sunflowers to a painting of Van Gogh there is a transforming process as an increasing identity; together with a recognizable feeling. It is not an analytical process but a transforming process based on logics of subjective interpretations: t*he logics of imagination*. The same process that we can find in each scientific discovery path.

If we look at a Van Gogh painting and at a painting of Monet, all showing a flowerpot with sunflowers, the underground process appears different. There is a different observation, a different feeling or, we can say, a different imprinting able to generate a different style.

The conceptual frameworks and the creative processes are different, because the transforming process is different: How the stem folds, how the petal ends, how the flower is divided, how....how... how . It is a discover following an observation for defining an hypothesis as a subjective identification of a possible “generative” process. Art/Science is interpreting what exists for transforming/representing it into an artwork/idea/scientific hypothesis.



A photo of sunflowers, Vincent Van Gogh and Claude Monet paintings

As we can suddenly recognize, without any doubt, the paintings of El Greco





How the bodies fold, how each people lands, how the arms involve the space, how.. how.. how . There are several possible subjective interpretations of the characters of El Greco representations. In any case we recognize them as belonging to El Greco so we identify the characters that fit our own imagination.

50 years ago, before the computer era, was used a term, *metadesign*, for identifying a peculiar creative process. Metadesign was used firstly by Adrien van Onck in 1963 for identifying the moment when an idea can develop itself before any possible subsequent final result. And the use was not limited to the design processes but involved other fields of Art. The problems were that, in that years with no computers, no tools able to execute a sequence of orders (In Sanskrit old language, Art is *Are* and means ordering) it was impossible to carry out a meta-artwork able to really work for producing artworks.

The aim was to create something like the project of the possible projects, the meta-artwork of the possible artworks with the ability to identify the character of these possible results. This metadesign needs to use the abstraction, that cannot be a simplification owing only to the theme, functions, tools, forms and so on. The used abstraction must have a high level of definition of own vision able to be correctly

used for performing the character of each result. Today, after our experience in GA, we can say for generating different but well identifiable multiple results.

In other words meta-artwork is the first identification of what today we can call Generative Artwork. Or, adopting the biological language, the artificial DNA of each possible artworks of an artist.

How we can first identify, second create and then make usable a Generative Artwork? By performing it as a conceptual framework constructed as executable process. You can do that in different ways: with a set of algorithms inside an original program, or with a mechanical, chemical or biological device able to run a complex process of subsequent transformations and increasing complexity.

The common aspect of these processes is their being dynamical, complex, not-linear systems.

It's arguable that these processes include two different parts: the subjective creative approach (the style) and the organization of the theme / precedents (the sunflowers in the previous example). The first is similar to a DNA code, the second is the logical subjective observation of the contingent occasion for performing artworks.

As well as DNA in nature, the first part is a set of multiple and different logics of transformation. Each code could be identifiable as able to represent, create and enhance a peculiar character of what exist before, able to perform a recognizable aspect of the artist style.

The second part focuses the subjective point of view used for acquiring the environment. In fact for reaching the searched results, it controls the structure of each possible topological interconnection and possible contaminations among the multiple and parallel transforming processes.

The character of this creative framework is the high level of not-simplified abstraction that, referring to Nietzsche concept of Art, create a dynamical level of complexity where the possible meanings are infinite, and where the forms could be considered as possible interchangeable formal matrices (C.Soddu, Citta' Aleatorie, Masson Pub. 1989) inside a well identified framework belonging to the artist vision.

In these last decades, with the Generative Approach and with the help of computers able to keep in memory and put inside an executable process our multiple and subsequent key of observation, we can work directly inside the increasing complexity process of the creation of a peculiar style. Because we can work inside the core of this dynamic system in the moment of its construction, applying in progress a sequence of our logics of imagination by following our subjective and contingent point of view.

Some consideration about "new"

New things, new forms cannot exist. If we are looking for a new form, we cannot go over the existing forms. The "new" belongs to possible complex transformation processes. The "new" belongs to an interpretation, a tendentious open observation of already existing events.

Many times, the transforming process is expressly applied to another existing artwork of another artist, increasing the sequence of subsequent interpretations. We can see this process in Picasso following Velasquez. Picasso interpreted the portraits of

Velasquez, particularly the "meninas", for constructing his own portraits, his own "style" that is strongly unique and identifiable, so strongly recognizable. A style that is without doubt "new", but coming from the interpretation of already existent artworks. It is new because the process is new, being a not-analytical process but a discovering not-linear path as new imaginary logics.

Forms are not an essential matter in creating a style and subsequently, their identity are not essential in the core of a generative process. They are only interchangeable possibilities that we use for managing multiple exits of a creative process. In the multiple variations, the formal matrices identifies each single result, not the species of results and consequently the style.

New is never new as a form, but as a new interpretation. As it happens in scientific discoveries.

The "new" style happens when the artist identifies own set of interpretative logics and related feasible devices being able to make them executable. Quoting Focillon, each visionary artist builds his own tools, not his own forms.



Velasquez, "las meninas" , a detail and another portrait

Picasso, re-painting by interpreting many times "las meninas" by Velasquez





In Generative approach, each generative artist builds his own logical imagination with his own tools. It's difficult to be a generative artist without constructing his own software or other executable devices.

First part. Generative Art and logics of imagination

Basically, all the Ideas are generative matters. Each one could be identified in the progressive process for generating the future from the preceding events.

The style belongs to the complex system identifiable in interferences, contaminations and reciprocal similarities and symmetries among multiple logics. This complex set of rules and their reciprocal relationships comes from our own imaginary It constructs an evolutionary code, a modus-operandi, able to characterize and make unique each act of an artist.

The Generative Process is constructed as a labyrinth, where each time we use it, we can run a different path by using, in different sequence, the same doors of transformation.

Using algorithms, the generative approach allows us to easily perform this system because we can create the transforming doors, one after the other, following our multiple references to our imaginary. We can design them with no care to their mutual relationships leaving open different possible interferences and contaminations with parallel algorithms. In this phase the only aim is to fit each peculiar character that we need to have in our artworks. So we are constructing our style. We can operate several different abductions from our imaginary, focalizing them as logics of transformation, without any need of choice but only for fitting our "style".

Only in a subsequent moment we can put them into a logical paradigm able to promote the mutual contaminations, interrelations and symmetries. We can identify the theme of our possible artworks by structuring the control paradigm of such interrelations able to manage in progress the topological structure of our observation and of our preferred references. More, as I normally do in my generative software, I fix the usable doors but I link the sequence of some of these doors to the time of beginning of the process. In other words, as happens in all chaotic systems, the flight of a fly, in this case the different starting moment of the process, can change the weather in the other part of the world.

The great possibility offered by the generative approach is the construction of own unique style with subsequent steps, by creating and modifying in progress the structure of synthesis that will perform the progressive attainment of complexity and recognizable clarity.

Complexity is necessary for attaining the wanted identity. Each single interpretative logics, or a simplification of these logics cannot succeed in going over a copy or an emulation of already experienced. The increasing of possible logics, parallel different logics oriented toward different characters and adjectives, also as alternative logics, creates the necessary complexity for moving from a linear system with predictable results to a not-linear complex system, with chaotic structure. Where we can find progressive bifurcations and, quoting R. Thom, unpredictable uniqueness and catastrophes.

With its border of casualness inside the choice, each bifurcation increases the complexity, pushing the process toward the exploration of possible. But only if the generative process will be so complex to manage these unpredictable events as

increasing identity of the style. As happens in our life, where the catastrophes can enhance our identity if we are strong enough to manage them.

The high level of complexity, and therefore a critic mass of algorithms that can work in parallel, is necessary for performing Generative Art.

Second part. Identity Codes

Just a path around possible fields for identifying own identity codes, own logics of imagination and dropping them into an executable process. For instance, by using interpretative relationships between different dimensions, or using different geometrical points of view, or multiple perspective points of view, and so on.

Images of medieval cities by Simone Martini (1 and 2) and Giotto (3)

A sequence of generated medieval cities (C.Soddu 1989) in a painting of Simone Martini.

I used, as reference imaginary, the medieval artworks by Simone Martini and Giotto. I made this choice because they are meta-perspective representations. So they can be interpreted as dynamically fragmented perspectives along an interpretable time. Quoting my book "The not Euclidean Image", Gangemi 1986, the paintings of Simone Martini can be logically interpreted as a dynamic movie along a path from outside to inside the represented medieval city. Using this interpretation and moving from the time-dimension to space-dimensions, it's possible to manage progressive

transformations from the existent city to its representation. This can give a dynamic unique character to the results, the same character that we appreciated in these frescos. These transformations can be used, performing appropriate algorithms, into a generative process. As I done for my first Italian Medieval Towns Generative project (1988).

We can find in Picasso a similar field for developing own interpretative structure. He used the possibility to perform together several different points of view, as Simone Martini done. But the Picasso process uses this multiple points of view for "exploding" the painted object. This defines his imprinting.

We can find in Balla, and in other futuristic painters the same field of interpretation but with completely different characters and results. In Futuristic paintings the presence of different points of view and related facets is not own to the interpretation of the discovery path of the space but to the representation of the speed of this progressive discovery.

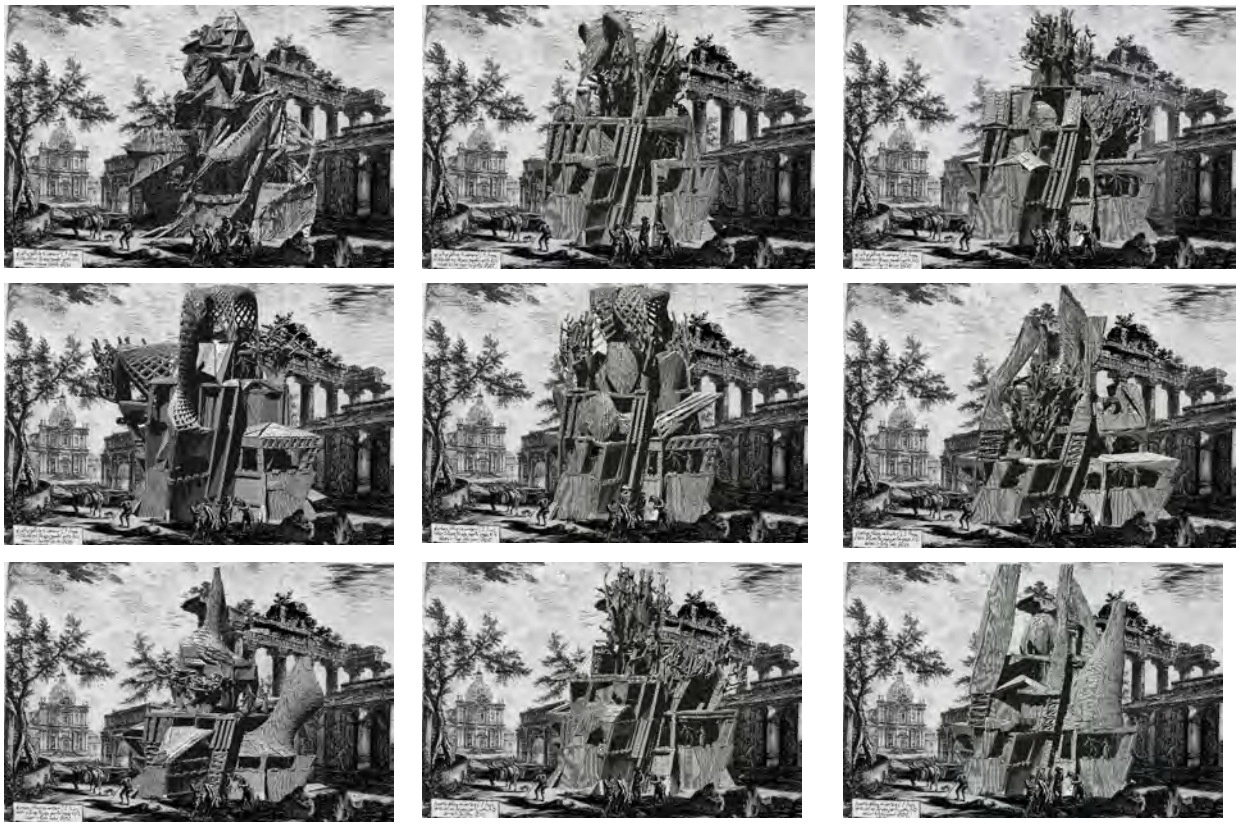
Balla Futuristic, the speed representation.

In Van Gogh paintings the transforming process related to the multiplicity of points of view is completely different, and unique. Looking at the painting of his own room, we can identify two different and conflicting perspective visions. (C.Soddu, "The not Euclidean Image", Gangemi 1986). The perspective view of the room uses a point of view from top down. But the structure of the perspective representation shows that the look is not from top down but, on the contrary, bottom up. This communicates multiple conflicting feelings that are one of the character of his whole opera. And of his unique and unmistakable style.

Van Gogh. His room in the original image (1) with the contamination of two different points of view and a transformation to a "normal" perspective (2) that looses the unique character, style and feeling of the original painting.

We can find in the artworks of Piranesi the same multiple points of view, but with different logics. In his engraves, mainly the "Le Carceri d'Invenzione". Piranesi represents the far objects by changing the rules of the perspective, by moving forward the point of view. The result is that these objects are magnified. More, he progressively slides, just a bit, the point of view on the right or on the left. This transforming logics give to his opera the unique imprinting, a strong uniqueness and identifiable clarity.

Piranesi, "Carceri d'Invenzione". In the bottom 9 variation of "Babel tower, homage to Piranesi", C.Soddu 2008 made for the covers of GA2008 proceedings, using the same multiple sliding perspectives.



If the aim is to interpret as transforming rules some characters of our surrounding world, and to run a process able to generate representations as mirror of own feelings, we need to focalize these characters.

In our teaching activity from 1989, Enrica Colabella and I firstly ask to our students to identify these characters through three adjectives. And we ask to abduct different transforming rules from the surrounding world for each different adjective. In this way the students learn how to focalize their subjective identity and how to construct their uniqueness and style. For instance, if one of them identifies an adjective able to represent one aspect of his creative identity, of his style in construction, he tries to find out when this adjective can be found in his imaginary.

For example in the artworks of other artists that seems to perform the character of the adjective.

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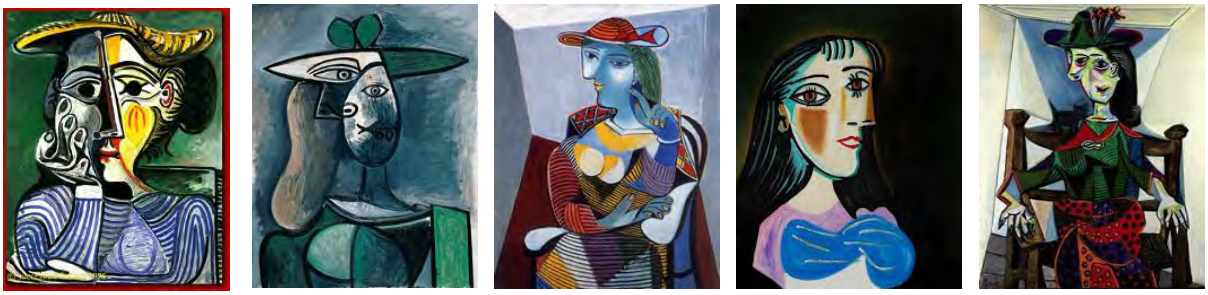
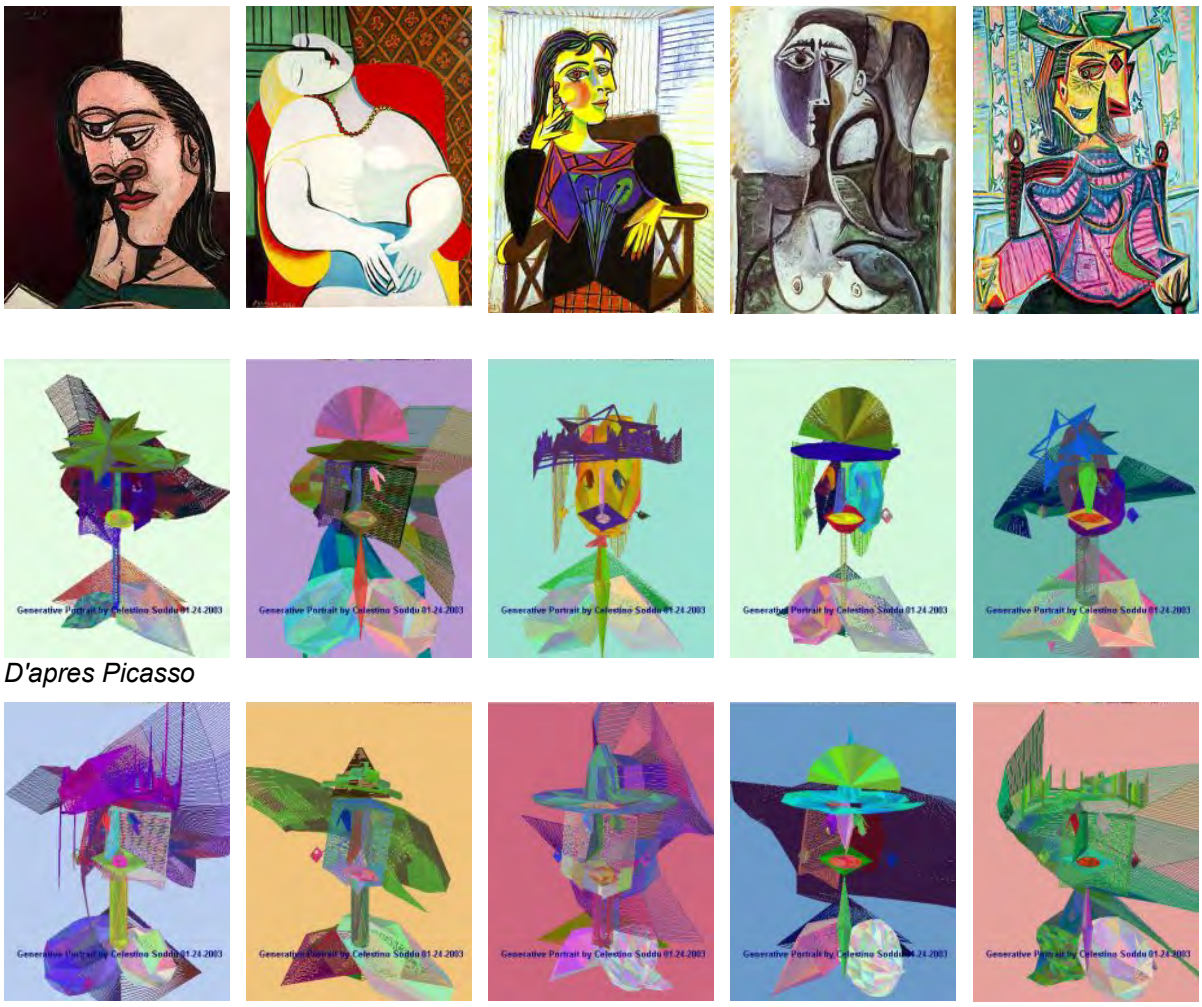
Van Gogh portraits and Francis Bacon portraits. Their logical imagination is unique and well recognizable, also if Francis Bacon made some of his paintings as "homage" to Van Gogh, explicitly referring to Van Gogh character. But he interpreted these characters following his own logical imagination.



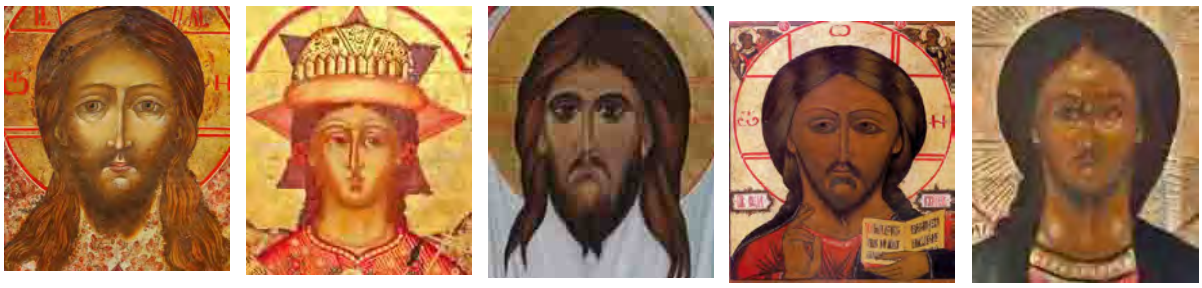
Picasso portraits



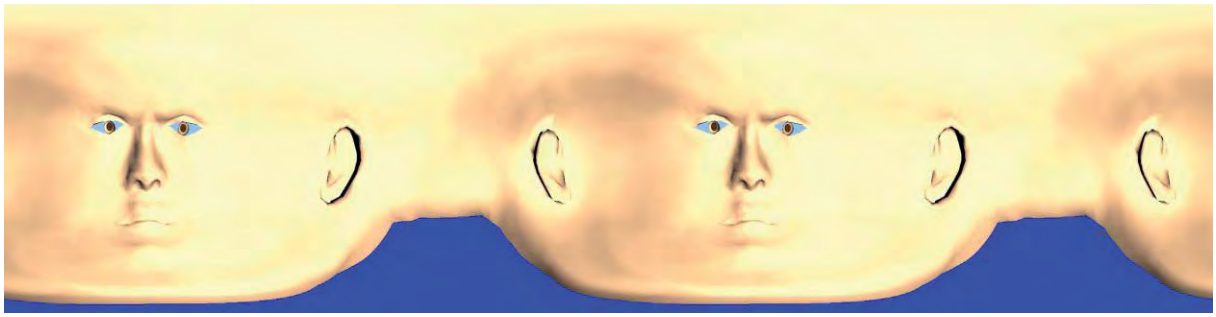
!0 portraits of Picasso and my artwork "d'apres Picasso" (1996) with 10 generated variations made as homage to this great artist.

Interpreting the Picasso women portraits I created a generative artwork "D'apres Picasso, women portraits", able to generate an endless sequence of variations . My aim was to create variations where we can identify Picasso interpreted by my particular point of view able to focus the characters that I like in these paintings. But the aim was to represent my imprinting too. Identities can come together, as happens when Picasso interpreted Velasquez

For constructing possible interpretative codes as algorithms inside the generative process we can use, one time more, the perspective geometry tools. For instance by defining, inside the perspective representation, the variation of point of view. The example that I like to explain is the Russian Icons. These images have, following my subjective interpretation, a peculiar character, something that seems to be far but in the same time able to involve, This character is common to Velasquez and Picasso and it is designed by the presence of multiple points of view.



Faces of Saints in Russian Icons. Represented with reverse perspective.



The use of reverse perspective. The image is a perspective at twice 360 degree from the inside of the face. C.Soddu.

In the Russian Icons the double point of view is one inside and one outside the head of the represented Saint. The image of the saint is like the image of his face when it is seen from a point of view inside his head. So we can identify a double vision but, on the contrary of what happens in Van Gogh, Piranesi, Balla and Picasso, one point of view is from outside and seems to be in front of the Saint and the second one is from inside the head of the Saint improving the involvement of the observer.

This approach refers to the reverse perspective identified by Florenskji, and to the operative interpretation that I done in my article (Soddu C., 2010. Perspective, a Visionary Process: The Main Generative Road for Crossing Dimensions. NNJ v 12, n.1, Springer Pub.) by constructing the algorithm of this particular representation.

The possible outlet of these algorithms of reverse perspective into an executable generative process is in the possibility to upgrade the involvement power of the generated artworks. In my experiments I tried to define some rules of transformation by directly operate on the 3D model and not on its representation, by transforming it using anamorphosis.

By the way, many of my generative algorithms were done using transformations based of contaminations among different points of view and different dimensions. But these transforming processes operate directly on the three-dimensional geometry of each event. A movement pendulum-like between 2D, 3D and 4D that can increase the complexity of each possible result and gives the opportunity to enhance the wanted identity and its clarity and recognisability.

These contaminations between different dimensions are used in all the creative fields, not only in generative processes involving visual art, design or architecture.

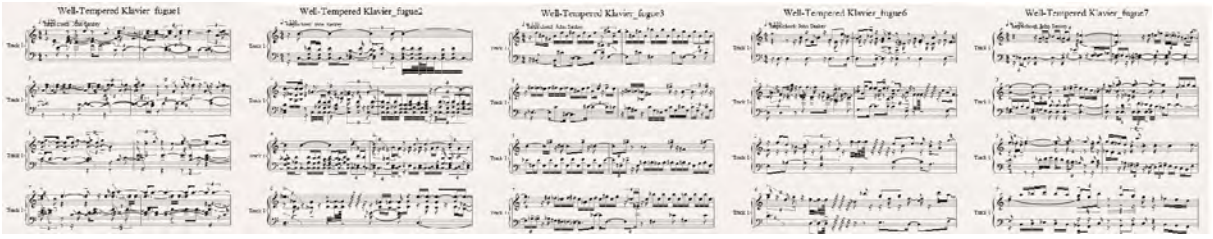
In music this increasing complexity approach involves different possible points of view that we can identify as different melodic lines running together with symmetries

and mutual contaminations, As well as different solos in Jazz pieces where the different subjective interpretations run together. Enhancing the style of each musician.

In Bach, in his Art of Fugue as well as in his Well-tempered Clavier fugues and in Goldberg Variations, the rules were rendered explicit by the structure of the counterpoint. The logical structure of counterpoint seems to be univocal but, as it's possible verify in many different theories about counterpoint, are substantially subjective different interpretations of the basic rules involving the resonance between sequences, the symmetries and reciprocal contaminations.

The Bach fugues are unique and un-repeatable. Each fugue is different, all together are strongly identifiable as belonging to Bach style. It's a wondering Generative Artwork.

J.S.Bach, Well tempered Clavier Fugues. The beginning of fugues #1, #2, #3, #6, #7.



In the same way we recognize the songs of the Beatles. There are not codified rules that we can discover analyzing their songs. We can try to interpret them by constructing, one after the other, possible algorithms able to represent the different characters that we appreciate. No analytical processes can be useful. Also if we identify some relationships that seems to be useful, for instance the relations between the last two notes of a sequence and the beginning of the next one, and we try to construct an attractor, we cannot use it. It's not an algorithm, it cannot be used inside a generative process. The only way is to identify, in progress, a set of algorithms and set up this executable process until the results will fit our interpretation of the character (the subjectively pre-identified character) of Beatles music. At the end, we cannot say to have written the Beatles generative algorithms, but our interpretation of Beatles.

Third part. *Some considerations about subjectivity, casualness, variations and complexity*

The results, together, represent a set of Variations. Each result is different, unique and un-repeatable, by depending from the contingent moment or environment in which the process is running. But all variations together represent the artist idea, his own unique style.

In Generative Art there are many different ways to perform variations inside each generative artwork.

1. the environment changes-evolves each time the process will start. This can be managed by using a random number in the parameter used for starting up the process or, as I do in my generative artworks, by using the time and the date to

make the difference among all the results without having two times the same starting point.

In this way, each different starting point will identify the uniqueness of each result.

2. the environment changes-evolves owing to an external interaction made by the user. As happens in the interactive installations.

3. there is a third way to perform variations inside a single generative artwork: using the random inside the logical structure and compositive rules. This possibility could be extremely dangerous. It should be done only if the results continue to represent the artist idea, and these results are recognizable as variations belonging to the same subjective vision.

The two possibilities are:

A. Random inside the compositive algorithms manages only the possibility to use a fuzzy approach. That is the possibility to manage only a minimum variation of some parameters that can be valuated as wide tolerance, as grey margin between black and white, as fog. This approach could perform the possibility to manage bifurcations in the dynamic not-linear system of our creative process. And to manage singularities, following the concept of R. Thom. As all creative acts, the generative process, by simulating the creative process, must evaluate possible alternatives that seem, at first, to be adequate to the artist idea. Once chosen, this choice determines the subsequent ones and the uniqueness of each variation.

B. Random is used to produce main changes inside the generative algorithms or inside the geometrical structure of the generated forms. This approach performs casual results that cannot be recognizable as belonging to the artist aims. In this case we could identify the process as generative process, but it cannot be called Art because the strong link artist-artworks disappears. So it is my opinion that it's better to call it Generative (Emergent) System. We can verify it simply looking at the management of these results. Following this random approach, the artist needs to directly interact with the results by choosing the results that seems to represent his own idea and by discarding the most because they will be strongly divergent from his aims. This "final" act seems to represent more a shopping act than a creative act.

4. Variations and Complexity

Quoting G.N.Ilya Prigogine, each system is adaptive to the surrounding environment. In other terms, several alternatives are possible for the same process. Only the casualness of the context will decide which of these alternatives will be adopted. This fact gives to the system its *historical dimension,* a *memory of the past by performing the evolution*.

Complexity grows in parallel with an history. For giving complexity to our artworks we need to run a (virtual) history. Generative Artworks are virtual histories that will run everytime in a different way but with the same style.

Complexity is inside the ability of generative processes to manage the unpredictability of "observed" surrounding environment. The complexity appears with the ability to satisfy not predicted expectations and un-predictable requests. So we can see that the quality of the results is not static but dynamic. This ability, proper of the generative processes, belongs to its auto-organization potentiality. It

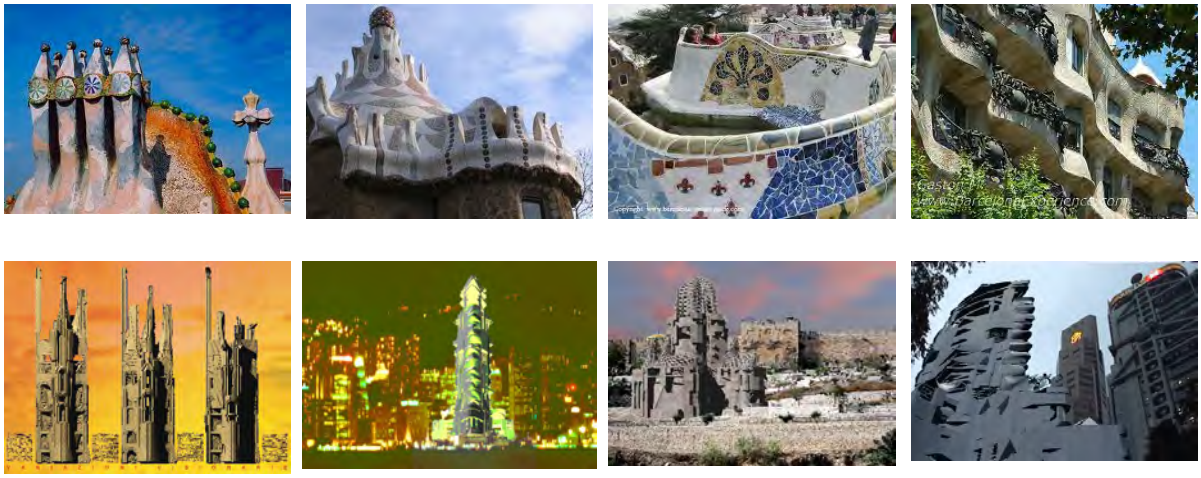
keeps alive or, better, enhances the identity, recognisability and uniqueness of the generative artwork. We can experience that:

1. More the interaction with the environment is unpredictable, more the identity of the result is high;

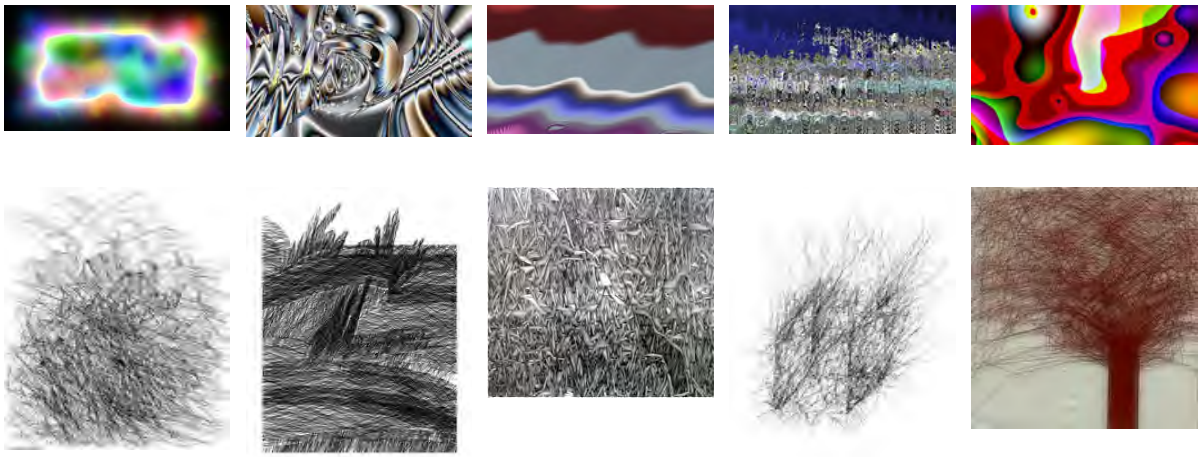
2. More the random factors involve the logical process, more the identity and complexity of the results is low;

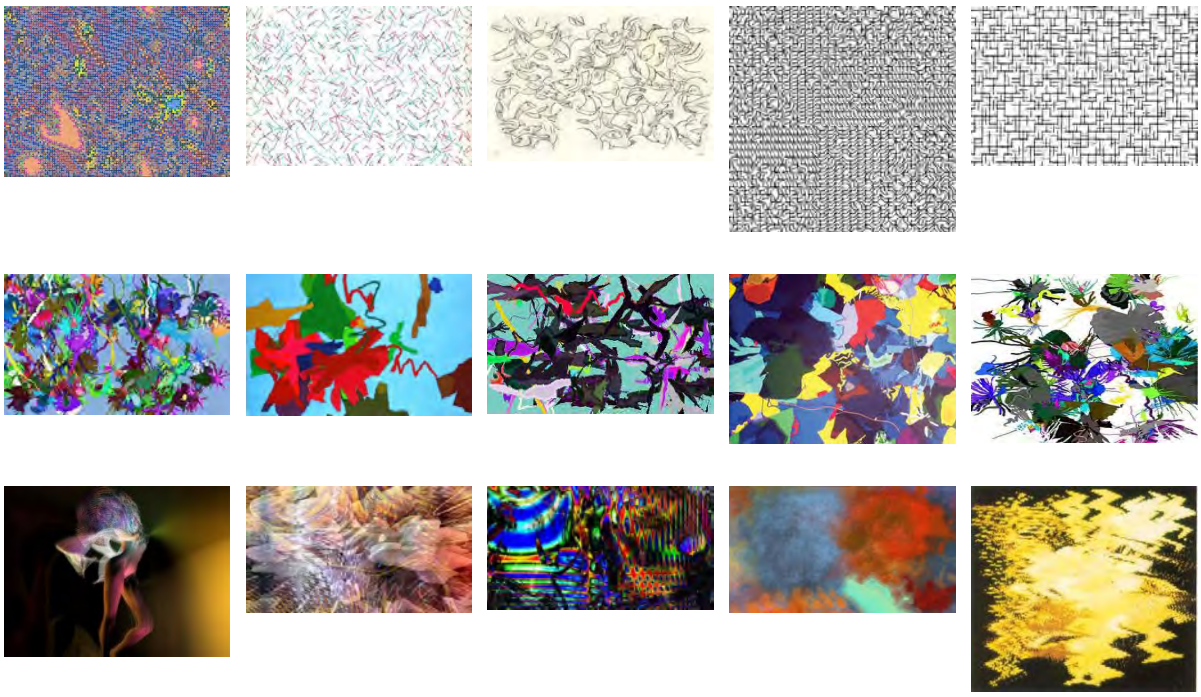
Generative Art, putting aside the Art path based on the oneness of creative acts as well as optimised single forms, can run an "open" creative path by creating a not-linear system.

This Generative Approach defines again the similarity between Art and Science. Following the concept of T.Kuhn, (the structure of scientific revolution, 1969), The generative approach is not an analytical approach but it is something similar to a scientific discovery path.



In the 1st row four images of the architectures by Gaudi, my great master, and, in the 2nd row, my homage to Gaudi together with 3 other architectures (Hong Kong, Jerusalem and Hong Kong Central) made by me referring to Gaudi.





5 artworks of generative artists like Yoshi Abe, Hans Dehlinger, Peter Beyls, Harold Cohen, Alan Lioret . The style is recognizable.

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