

Futurism, Geometry of “Photodynamism” and Digital Photography

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Abstract

Under the light of new scientific discoveries of XX Century (Relativity, Quantum Mechanics, Fractality) we discuss how Digital Photography (and in particular the technique known as “Painting with Light”) can give a new “Future to Futurism”, incidentally implementing what the father of “Futuristic Photodynamism” (Anton Giulio Bragaglia) called the “Algebra of Movement”

At the beginning of XX Century new scientific discoveries contributed to change our perception of the World: Einstein’s Special and General Relativity (S, 1905; GR, 1916); Fractals; Quantum Mechanics. SR introduced new mathematical structures and gave a central role to light in Physics; GR went beyond to make room to “gravity”: light follows curvilinear paths so that Euclidean Geometry had to be replaced by a non-Euclidean one. Einstein’s work gave also birth to “Quantum Mechanics” and the understanding of Chaos. New Mathematics finally emerged: notions of continuity and dimension were challenged; “fractals”, self-reproducing at smaller and smaller scales, were born. Einstein’s revolution was a “revenge of Time and Dynamism against Space and Staticity” as well as a “revenge of light as universal”.

All these new views had a direct influence on XX Century Art and this change of scientific vision had a parallel revolutionary development in Art. The absolute “Space-rigidity” of Euclidean Geometry was wiped away by Impressionism; in Cubist painting single views were glued together, introducing an extra “spatial” dimension into 2D paintings. In the same years Technology was changing the World: new feelings on “Distance” contributed to focus on the “*reality of velocity*” (see [1],[2]). Photography was just able to capture a precise instant of Time into a single image; “dynamism” was undertaken by Cinema “giving motion to pictures” collected into a single film in order to create a “virtually continuous movement” (a discrete set of frozen images [3]). Dziga Vertov wrote in 1923: *“I’m [...] a mechanical eye. [...] in constant movement [...] freed from the boundaries of Time and Space”*.

About 100 years ago “Futurism” had a new artistic vision, aimed at creating new forms of imagery containing and expressing “movement“. Traditional Art had almost ignored movement in its depictions, but Futurists wanted to make it central; their “Manifesto” [4] claims: *“All things move, all things run, all things are rapidly changing. A profile is never motionless before our eyes, but it constantly appears and disappears”* [5]. Futurists explored all possible forms of expressive Art, following the rapid technological revolution and *“exalting an unlimited confidence in progress”*. Futurism was influenced by the ideas in Art that already changed “traditional painting“: Divisionism had begun to investigate the Physics of Light, Futurism borrowed from it the “explosive” use of contrasting colors. In [4] a leading idea was to abolish the traditional perspective in favor of a “simultaneous vision” able to “capture dynamism” [6], adding de-facto an extra temporal dimension to artworks, dually with respect to Cinematography: static images of a movie are compressed into a 2-dimensional object, seen all at once; motion is “virtually embedded”. They were able to *“insert and compress Time into their Artworks, so to oblige the mind to reconstruct Time and motion from a single impression”* [7]; they introduced an “Aesthetic of Velocity”, in a *“more expressive space that contains velocity and simultaneity”*.

There were crucial differences with Cubism and Impressionism; [7]. While Cubism represents a static 3-dimensional subject as embedded into a space containing a “spacelike fourth dimension” (views seen at the same Time) in Futurism real Spacetime appears. The spatial decomposition is used to embed a 3D

object into a 4D continuum where Space and Time entangle: images at different instants of Time are seen together. Impressionism tried to eliminate staticity caring the image-evolution and concentrating on “capturing the moment” (freezing a never returning instant). Futurist embraced into artworks not a single shot, but motion; as stated by Boccioni: *“I want to synthesize the unique forms of continuity in space.”* Futurism had strict relations with the new possibilities offered by Photography. Bragaglia wanted to create the same kind of imagery based on direct observation of the real World. He took photographs using slow shutter speeds, to record people in motion; in his *“Photodynamism”* [8] he set the crucial notion that an Artwork *“should show the continuity of motion, a picture of a subject over a period of Time, rather than a series of still sharp images taken in sequence”*. The *“Manifesto”* [8] declared that traditional Photography as *“Science”* was going to become *“pure Art”*, through a series of new composition possibilities, related to a new way of perceiving the contemporary reality; realizing what de Lamartine had predicted in 1859: *“Photography is an Art. Photography is more than an Art. It is a solar phenomenon, where the artist collaborates with the Sun”*. Bragaglia *“was attempting to liberate the art of photography from the slavish imitation of reality to which it had been relegated”*. He spoke of an *“algebra of movement”*: the potentiality of the *“Group of Rigid Motions”* of Euclidean Space was inserted in Photography, fixing rotations, translations and their infinite combinations into artworks [1]. Futurist painters worked on this: straight lines and circles do form in Futurist paintings a substantial core of imagery, further enhanced by the *“extra emotional dimensionality”* offered by explosions of bright colors. They introduced their own concepts of *“absolute”* and *“relative”* motion: *“absolute”* movement was the overall direction that a subject was moving toward, while a *“relative”* movement was the internal movement of the subject, independent of the absolute movement. Futurist’s photo experiments were extremely modern and far-reaching; however, they clashed with the inherent difficulties of rather expensive technology that required an increasing number of shots to capture dynamism in *“frozen time”*. Futurist Photography left a cultural mark, somehow forgotten for some time because of a pretended *“cultural proximity”* with pre-war dictatorships; fortunately enough Futurism has been rehabilitated in recent times: its heritage is becoming increasingly important for understanding the evolution of Contemporary Art; [2],[9]. Digital Photography allows nowadays a great variety of new capabilities, letting artists to pick up where the Futurists had to stop because of the lack of instruments.

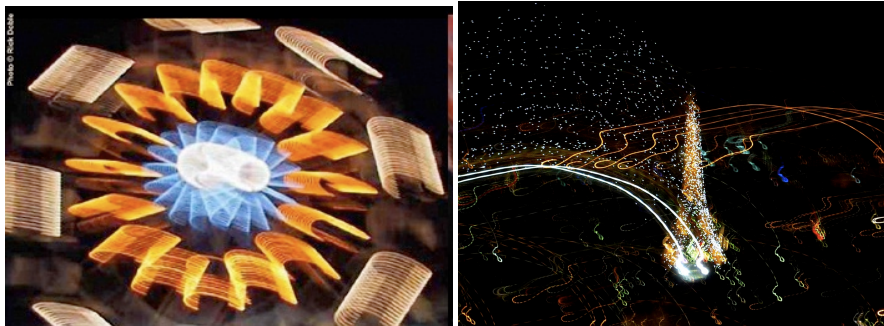


Figure 1: *Painting with Light and Futurism: (left) Rotating Wheels, photo by R. Doble ©; (right) Tour Eiffel by Night, photo by M.G. Lorenzi ©*

Digital Photography can refresh the ideas, the concepts and the innovative vision that Futurists had in early XX Century, bringing this new imagery into being at the turn of the Third Millennium. *“Photography may be the visual Art best suited to creating still images of subjects in time. This is because a photograph is made by recording an object (via the lens) over time (by opening the shutter for a specific duration). Therefore, a photographic exposure is a combination of space and time, a recording of space and time”*; [10]. As is well known the word *“photography”* comes from Greek and means literally *“light drawing”*: *“Photography is not about objects or people or scenery, rather it is about how the light reveals those things. The action of light on a light-sensitive material (film or electronic devices)*

creates the image. An object can be lighted so that it almost disappears or so that it is virtually three dimensional" [11],[12]. The new technique "Painting with Light" arose; a "Generative Art process" [11] in which the Digital Camera is used as a brush. The artist chooses a static or moving subject, usually with multicolored (or monochrome) lighting to generate a light pattern, with component of shades and foggy effects, by putting the Camera in motion along suitable trajectories that his mind envisages to create ad hoc the wanted shapes (or in an erratic way to create unexpected patterns). As said in [7] "to photograph a space/time image is quite complex. For example, the correct shutter speed to depict motion varies considerably depending on the motion of the subject and the artistic intentions of the photographer."



Figure 2: *Painting with Light and Futurism:* (left) **The Eye of London**, photo by M.G. Lorenzi ©; (right) **Thunderball**, photo by R. Doble ©

The "Algebra of Movement" can be thus revisited by "Painting with Light" and Digital photographers working on movement have added new impulse this Futurist idea. The craft of Photography defines in fact two fundamental kinds of movement: "subject movement" and "camera movement". This idea is implicitly based on Galilean Relativity: two "frames of reference", one in motion with respect to the other. In the "subject movement" the camera is fixed while the subject moves; "camera movement" corresponds to interchanging the role of the two frames, shooting multiple images of a fixed subject by a moving device (the art of the image is created by choosing the camera motion in an appropriate way). In both cases the resulting image (formed by superposition of a few static images, the number and distance of which depends on the velocity and settings of the brush-Camera) is obtained by a single (usually rigid) motion. As in [10] a third kind of movement is the combination of subject and camera movement; in this last case both frames move around and the artwork becomes an "algebraic combination" of two (rigid) motions. In this sense Digital Photography provides a framework in which Bragaglia's idea turns directly into the "Algebra of Composition of Movements". As long as motions are rigid enough this composition algebra is nothing but the algebra of rigid Euclidean motions (rotations, translations); but whenever the picture refers to subjects that do not move rigidly (e.g., when an explosion is shot) larger groups of transformations enter the algebra. An exploding firework will generate dilatations and even more complicated topological transformations can be obtained when shooting at moving subjects that evolve in a quite more complicated way.

According to [1],[7],[10] the Futurist's notions of absolute and relative movement form part of "subject movement". As far as they are concerned we might have: a) Regular movements (objects move in a predetermined direction); b) Predictable movements (less precise but still predictable: e.g., an inertial motion); c) Irregular movements (repeating in an irregular "almost predictable" fashion); d) Erratic movements (completely chaotic and "fractalized"). As we see "camera movement" identifies with the technique of "Painting with Light" in its purest sense; it corresponds in fact to the creative way in which motion is inserted into artworks from point-of-view of the artist without being already present in the subject. This new Art born with the advent of Digital Photography leads therefore to "dynamic abstract imagery" very similar to the abstract work of the Futurists and, in a sense, represents a modern way to

implement Bragaglia's "Algebra of Movement". From [1],[7],[10] we borrow a few notes about the capabilities that Digital Photography adds to the whole machinery of "Photodynamism", allowing the modern photographer to use the whole set of ideas about movement in a way that the Futurists could only dream about. 1) LCD Monitor; 2) Low Cost; 3) Stabilizing Control; 4) EXIF Data; 5) Expressive Control. Digital Photography and "Painting with Light" allows the quest for true images of continuous motion to get a fresh and new impetus. As we announced elsewhere "*Climbing on the shoulders of Futurists (as Newton did with Greek science and Einstein did again with Newton's and Galilei's visions) artists in the Third Millennium will be able to give a future to Futurism by means of Digital Art*"; [7]. As clearly stated in [10] "*the real world is in motion all of the time. So, a photograph that can capture and convey a sense of this movement can be powerful. People and objects in motion can create a dramatic streaking effect not unlike a painter's brush that is swept across. With bright colors, the effect can be quite painterly*".



Figure 3: *Painting with Light and Futurism: (left) Dee-Dee Bridgewater in Concert, photo by M.G. Lorenzi ©; (right) The Violinist, photo by R. Doble ©*

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