

HYUNDAI MOTORSTUDIO ART PROJECT

UNITY
of
MOTION

WOW

 HYUNDAI

UNITY of MOTION

Interactive Media Installation,
for Hyundai Motorstudio Seoul (2015)

[WOW credits]

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Sensor sculpture design / fabrication
Sensor programming development
Housing fabrication

[Special Thanks to]

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ANIMA, PRINCIPLES OF MOTION IN NATURE AND MACHINE

It happens that we empathize with characters moving in images, or that our eyes are caught by something fluttering in the wind, suggesting to us that these things “look as if they were alive.” That is because we interpret the very phenomenon of movement as a sign of vital activity, which is reflected also in the fact that “animation,” a technique used for creating the illusion of motion by linking together still images, is derived from the Latin word “anima.” One may say that we perceive the act of making an object move as breathing life into it.

The members of the visual design studio WOW consider all forms of visual expression as being subject to design. While expressive means are as varied as imaging technology, spatial, UI/UX or product design, one thing that they all share is the aspect of “making things move.” Regardless of whether it is two-dimensional imagery or real three-dimensional objects, by applying current digital technology to make things move, the people of WOW aim to breathe life into any object.

When extending our vision down to atomic level, we realize that not only living organisms, but all other things in the world—even such inanimate matter as minerals for example—move. It is of course not possible for us humans to perceive such motion with our bodies alone. However, thanks to developments in the fields of science and technology, we have managed to expand our imagination to realms beyond the boundaries of our physical perception. On the other hand, even the development of science and technology hasn't yet provided a standard answer to the question, “What is life?” The definition of “life” has actually become even more diversified, and people seem to agree in the point that a universal definition is impossible. If this is the case, it must be possible to treat all things—animate or inanimate—equally in respect to “motion.”

It was in the early 20th century that people in the field of visual art began to turn their minds to how they could possibly express such things as movement or passing time. In the Manifesto of Futurism, Filippo Tommaso Marinetti mentioned the automobile as an epitome of the “beauty of speed.” The automobile, which enables a human to experience by driving it a speed that cannot be achieved with the human body alone, was important not only within the history of science and technology, but also in popular and intellectual history. Reflecting the dramatic speed-up of everyday life revolving all around the automobile, aspects of speed and motion began to appear as subjects of artistic expression.

The diversification of ways of depicting movement continues. For example, within the realm of simulation based on the speed of computer calculation, knowledge in fields such as complex systems is being applied in order to create complex movements that look just like those of living beings. This has also triggered a new trend in CG animation. In computer simulation, the actual processes of transition are difficult to calculate even for the programmer. Things generated by way of simulation are in a way half out of their creator's hand. This is why CG animation based on computer simulation involves the process of “observing” the animations created, and adjusting the underlying programs and parameters accordingly. While traditional animations are realized in a similar process of feedback, in which the creator watches scenes and subsequently adjusts the individual frames they are composed of, placing greater emphasis on the aspect of observation has brought along obvious differences in CG animation—in the finished works as well as in the creation process.

As it has further become possible to easily obtain and use all kinds of sensors that detect biological data, such devices have come to be utilized in various works of interactive art. By directly incorporating and reflecting in artworks data associated with human life-sustaining activities such as heartbeat or bioelectric potential, instead of involving the active operations of pressing buttons and keys, such works evoke in the viewer/user the feeling of being part of the respective work, much rather than suggesting communication with the work by way of his/her operations.

This is how the history of visual expression of movement has always run parallel to developments in science and technology. Considering that the idea of depicting motion was initially inspired by the discovery of a unique aesthetic immanent in the machines and industries that emerged in the early 20th century, it certainly is a matter of course.

The installation UNITY of MOTION works with CG animation based on an artificial life program—just one of many different techniques of expressing motion that have been developed up to now. In the work, this program generates a type of motion similar to the flocking behavior of living creatures, activated by way of the visitor's heartbeat. The underlying idea is that all things that move are animate, living things. By presenting a fusion of machine and nature, UNITY of MOTION aims to provide an opportunity for visitors to reconsider via the aspect of motion the boundary that separates animate from inanimate matter.



CONCEPT

UNITY of MOTION produces a completely new life environment by triggering through the human heartbeat two types of motion as seemingly different as machines and flocking living creatures, and merging them together in a virtual space.

The installation is composed of the following three elements.

HEART: Sensor Sculpture

NATURE: Media Wall 1

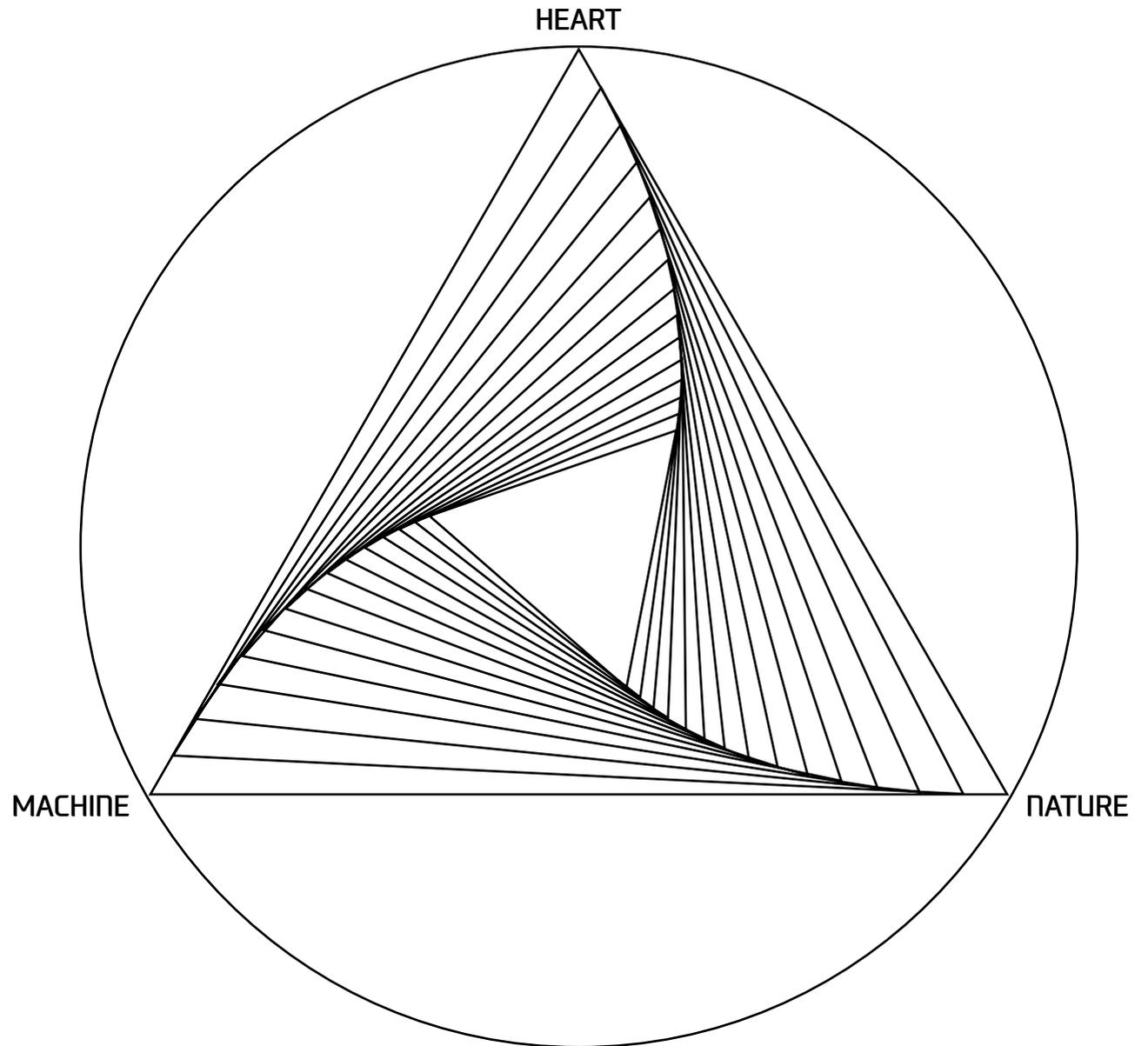
MACHINE: Media Wall 2

HEART is an infrared sensor that detects a person's heartbeat from the palm of his/her hand. It is sculpted with an engine piston, the heart of an automobile, at its top end. The type of piston used here is actually used also in Hyundai cars. This sensor sculpture is what triggers the UNITY of MOTION.

NATURE is a large screen on which the natural flocking behavior of living creatures is visualized by way of computer simulation. When HEART detects a visitor's heartbeat, that information is translated into the flocking movements of birds for example. Those movements are generated by an artificial life simulation program called "Boids," and even though each individual object is programmed to behave according to very simple rules, together they form flocks or schools that behave in rather complex ways.

MACHINE is a "V" shaped arrangement of screens that symbolize mechanical motion. In Stand-by mode, the screens display trigonometric functions (Sin, Cos) closely related to the circular motion that is part also of the operation of an engine piston. Just like NATURE, MACHINE is connected to HEART as well. As soon as HEART detects a visitor's heartbeat, the sine and cosine waves stop their regular periodic motion and come to life, transforming into birds or other creatures that ultimately come together in dizzyingly fast-moving flocks.

In this installation, data of the human heartbeat is transferred as a "source of life" to the NATURE and MACHINE parts via the interface of HEART. Operating based on a perspective that interprets movement itself as life, UNITY of MOTION fuses through movement the aspects of both machine and nature into a new moving body, which ultimately dissolves into nothingness again. This cycle appears differently each time, telling a new story of life and death each time the work is set in motion.





HEART

HEART is a sensor sculpture that symbolizes the engine of an automobile, utilizing a real car engine piston that has been customized to serve as a sensor head. As soon as a visitor touches HEART, infrared rays sense the person's heartbeat. The detected heart rate data is transmitted to the MACHINE and NATURE parts, where it triggers the UNITY of MOTION. Retrieving data of the human heartbeat via the interface of an engine piston, the very heart of a car, HEART literally functions as the heart of this work.

In addition to the sensing function, HEART is equipped with a built-in vibrator. When HEART detects the beat of a human heart, it begins to vibrate in sync with the heartbeat, which can be felt by the person that holds its top end. Once NATURE has received the data of the visitor's heartbeat, that information is visualized in the form of flocking patterns of changing virtual creatures on a screen. While the creatures' behavior is basically beyond the visitor's control, colors and patterns change in sync with the visitor's heartbeat as long as he or she holds HEART. In this respect, a mutual relationship is established between the visitor and the flocking creatures.

An artwork with interactive features is perceived differently by different viewers as soon as it is out of its creator's hand. Since the 1990s, such characteristics have been attracting great interest thanks to the increasing calculation speed of computers, and the development of sensors detecting human behavior and environmental changes. Interactive works only come into effect through the viewer's active participation. Without remaining in a certain state, they continuously change in response to the viewer's operation/motion.

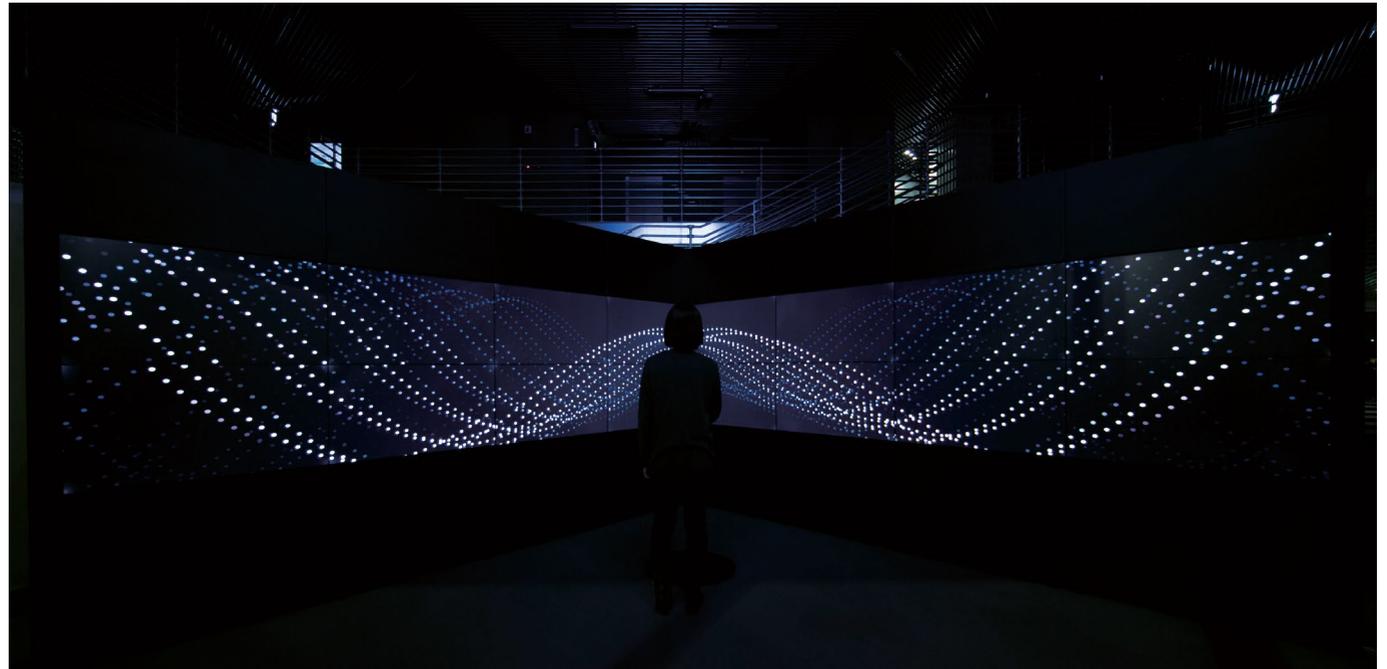
The involvement of visitors is necessary to activate this work as well, whereas a different UNITY of MOTION is established with each start-up. The visitor then witnesses how something is brought to life through the heartbeat that testifies his/her own vital activity, and eventually transforms into different life forms altogether. While we normally perceive the world as "something external" around ourselves in the center, the work makes us realize that our behavior or mere presence may cause transformations in the outside world, and above that, certainly also that we are part of it in the first place.

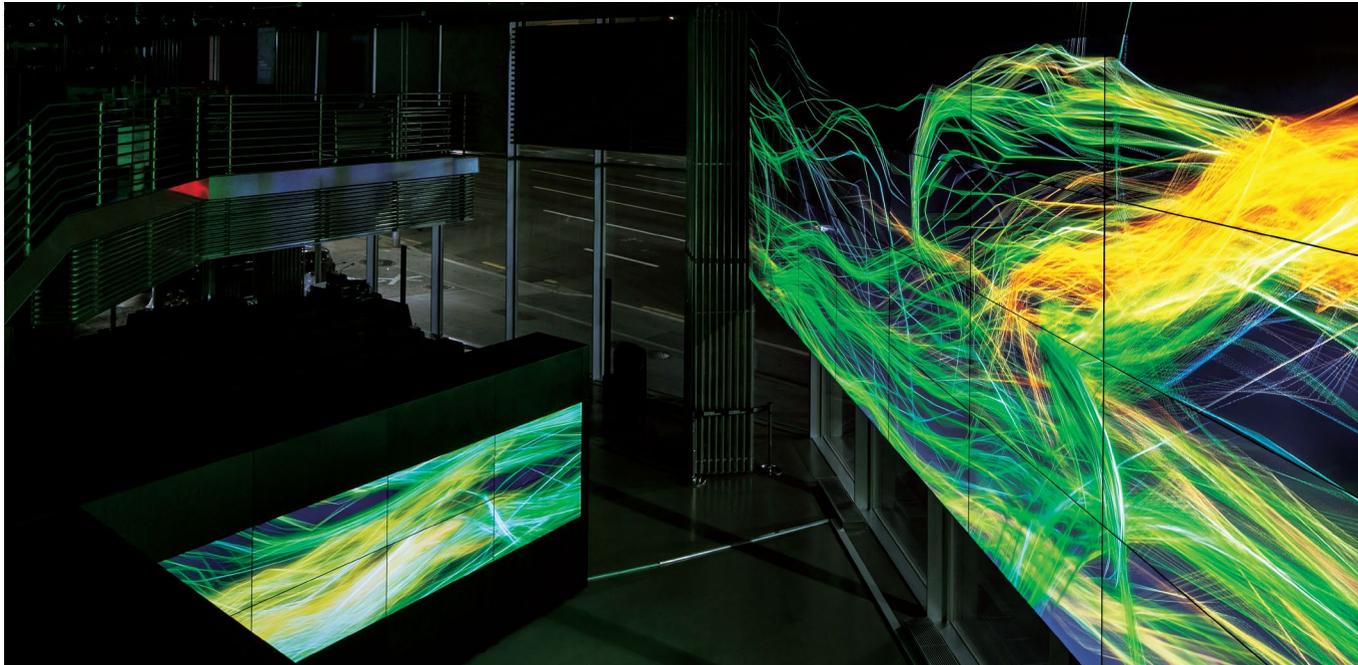
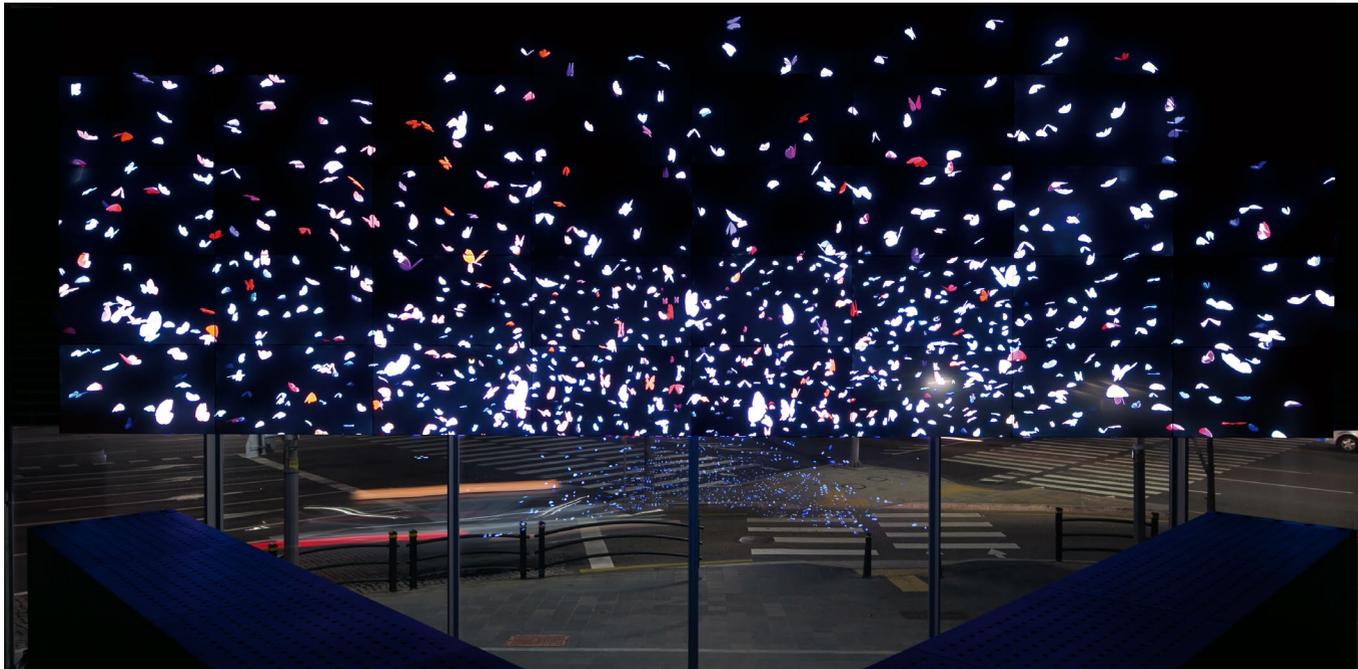
MACHINE

MACHINE is a device that embodies machines, digital technology and networks. In Stand-by mode, the screens of MACHINE display sine and cosine waves in multiple dotted lines. When data of a visitor's heartbeat is transmitted from HEART to MACHINE, the sine and cosine waves begin to oscillate in sync with the respective heartbeat. The dots gradually transform into birds or other creatures that eventually show flocking behavior based on the Boids program, moving on a field that encompasses both NATURE and MACHINE.

Circular motion is a crucial part of the operation of machines such as piston engines. When the trigonometric functions that represent the process of such circular motion contain (limitless) combinations of sine and cosine functions, they can express rather complex periodic functions and signals. The geometrically and analytically convenient qualities of sine and cosine are being utilized in a variety of fields including electrotechnology, vibration analysis, acoustics, optics, signal processing, quantum mechanics and economics. Trigonometric functions are helpful tools for us humans for understanding the world we live in, and creating artifacts based on such knowledge.

The functional beauty of machines as one type of artifacts manifests itself in designs and structures free from unnecessary ornamentation and other superfluous elements. Likewise, the motion generated here is an aggregation of pure and simple movements. Such motion patterns also function as modules that we use when analyzing types of motion in the realm of nature. In MACHINE, the visitor's heartbeat functions as a trigger for transforming machine motion into the flocking behavior of living creatures, and thus become one with NATURE. This process of a machine, an abstraction of nature in itself, being merged together again with nature in a virtual space is at once the achievement of a UNITY of MOTION.





NATURE

NATURE is a device that simulates through animated computer graphics the flocking behavior of animate beings in nature. In Stand-by mode, the NATURE screen shows a globular shaped accumulation of dots in the center. Whenever HEART detects the heartbeat of a visitor, that accumulation changes its shape, and begins to behave just like a real flock of birds or a school of fish.

This flocking behavior is realized with the artificial life program "Boids" (short for "bird-oid objects"), developed by Craig Reynolds in 1986. In the program, the following three rules are applied in order to determine the speed and direction of each individual object's motion in relation to other objects in the same flock/herd/school.

Separation:

steer to avoid crowding local flock mates

Alignment:

steer towards the average heading of local flock mates

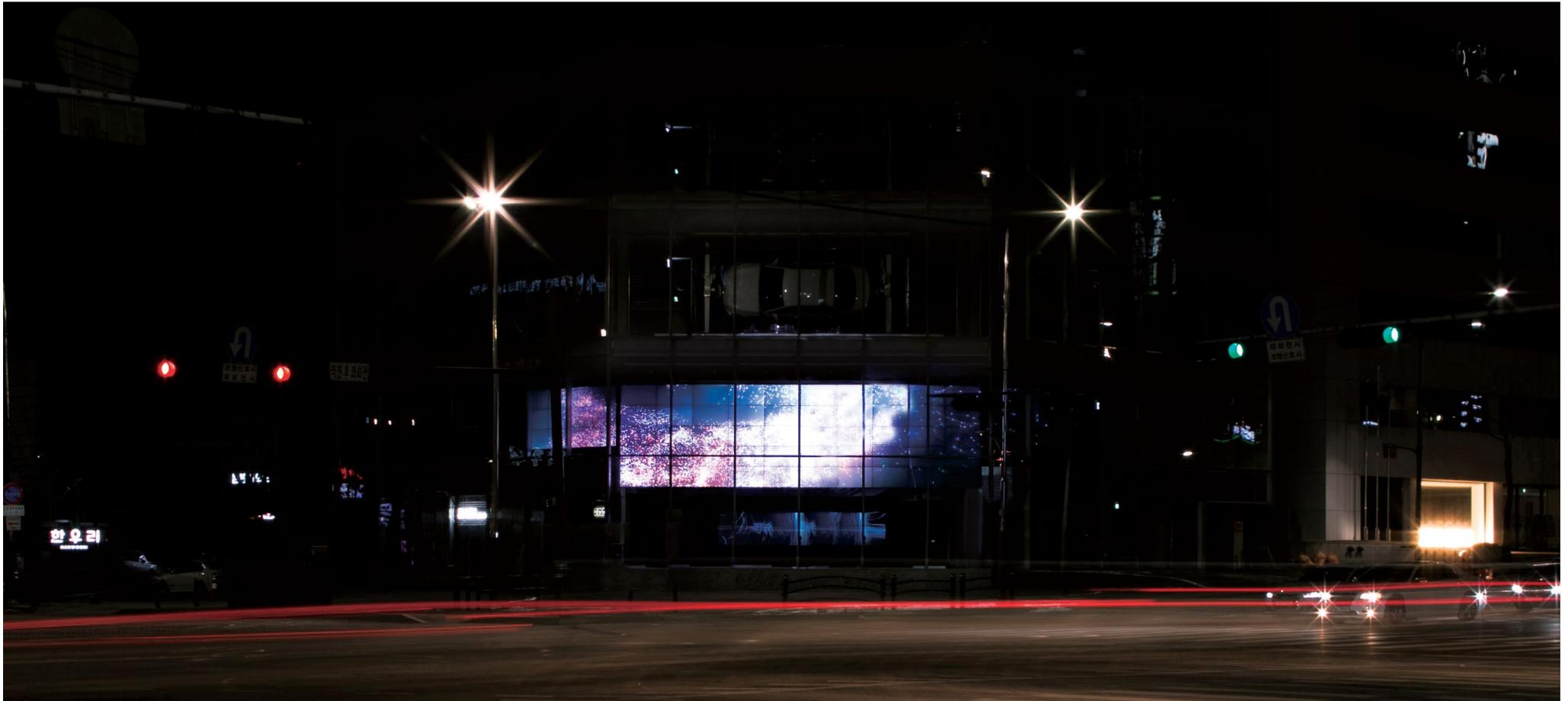
Cohesion:

steer to move toward the average position of local flock mates

Flocks of birds and schools of fish show an extremely complex kind of behavior that at a glance looks sometimes systematic and sometimes like a complete chaos, depending on circumstances. With the above set of simple rules, Boids can imitate such behavior fairly well. While this doesn't explicitly mean that actual flocks of birds or schools of fish are following the same three rules, research into artificial life using software and robots aims to explain schemes of life and ecosystems by simulating such simplified models and observing processes.

As opposed to the traditional practice of biology that tries to extract such schemes based on analyses of real living organisms, artificial life attempts to "recreate" biological phenomena through simulations of abstract models, and thereby gain insight into the underlying schemes. These two approaches to the same phenomena are contrasting yet at once complementary to each other.

Regarding the application of such artificial life programs as swarm intelligence or genetic algorithm in the realm of art, one recognizable trend is the emphasis on "processes" focusing on the indeterminacy and unlimited possibilities of life. When combining auto-generation through computer programs with mechanisms that facilitate the viewer's involvement, both virtual and real space can get involved in an artwork's life environment. One may understand this as the "emergence of art as a living system."



BIOGRAPHY

www.w0w.co.jp

WOW aims to create and design sensational, yet timeless work that is free from fashionable trends. Our original creative process combines art and design together, and explores collaborations that cross the boundaries of categorization. WOW leads the visual design from the elements of interactive designs. Rather than only a visual design outlet, WOW is an emotional platform in which we invest all our skill, knowledge and sense of beauty.

WOW is a visual design studio based in Tokyo, Sendai and London. We are involved in a wide field of design from advertising and commercial works to installation works for exhibition spaces, and also invent new user interface designs for prominent brand names. We are also very passionate about creating original art works, holding exhibitions not only in Japan but also internationally. We are continuously discovering the tremendous possibilities of visual design, and the visual designs that are useful for society bring out the best talents of each artist and designer.

