Research project

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Homogeneous Gesture

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First part

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Abstract

— What is gesture ?

Gesture is a medium that brings together the spiritual, the social and the cultural in a single entity, the body. When performed, we can collect information. From a social point of view, some gestures facilitate exchange and communication between two persons. From a personal point of view we can identify the origins of a person through his/her gestural heritage from his/her childhood. From a manual point of view, we can see the controlled gesture of the craftsman at work.

Gesture is thus a concrete element of an animated body, the expression of the specificity of a human being. However, during the past few years, there has been a significant change with the advent of digital devices, always smarter and more autonomous. Gestures have been standardized due to proletarianization which started during the industrial period and still continues today with the new technologies. This evolution led to a loss of the craftsman's technical skills and know- how which were replaced by manufacturing methods.

As a graphic design student I decided to work on the standardization of gesture in our current societies. My study focused on the following question. How can machines or technological devices which led to a homogenization of gesture and its proletarianization be the place of a liberation and a reinvention of gesture through graphic means ?

Second part

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History and reinvention of gesture

I worked on the anthropological aspect of gesture in order to study how it appeared for the first time in the history of humanity.
During the prehistoric period, in the early stages of man's humanization when primates became human beings, two stages occurred, first physiologically and then neuronally. Following these evolutions, gesture became a skill of the hand for tool manufacturing as men stood on both feet. It was the ability to grasp, to manipulate, to evolve intellectually. Men could then conceive and give shape to their tools. However, after being a technical skill of the hand, gesture took on an identity aspect with the beginning and the development of agriculture which led to the settlement of scattered tribes. The gathering of various communities around places devoted to agriculture led to a number of common identity gestures which federated a group, then gave birth to the first societies.

After the advent of communities, there were several turning points towards standardization. Gestures really developed during an era marked by technical progress, notably with craftsmen. Their muscular efforts and body techniques revealed a domination over their environment. They also participated in the development of new gestures to use and master their tools, like prostheses that extend or develop their body. We can thus say that craftsmen controlled their environment through the use of all these skills.
During the industrial era centered on the development of machines to manufacture objects, gestures were modified and became scarcer. The mega-machine which symbolized a new era, was a huge machine that led to a loss of cultural identity. The technical gestures of craftsmen were integrated into the mechanisms. In integrating the craftsman's knowledge into a

machine, the craftsman's hands became obsolete or useless limbs. The craftsman became a worker that only made a single repetitive gesture.

In the 80's and 90's during the technological era characterized by the advent of technological devices, such as our smartphones or our connected objects, a form of standardization of gesture occurred. With these new technological tools came new operating modes that contributed to the emergence of new gestures called *gesture driven interface*[1]. These new gestures can be defined as ergonomic gestures. They require little energy and can be seen as all the gestures performed in a specific technological context. They are all represented in a single gesture that of the index finger, a recurring finger movement to activate and use our devices.
This single and standardized gesture called *simplex gesture*[2] is an integral part of a set of gestures whose only purpose is to connect man and machine. Simplex gestures compose a synthetic and intuitive corporal language. They are gestures we have to be familiar with and without which interaction and exchange with our technological devices would be impossible.

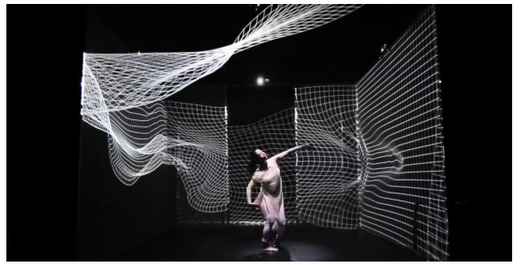
After mentioning the historical aspect of gestures and the steps that led to their homogenization, I focused the systems, the methods put in place to reinvent gestures, to show a new way to apprehend them. The notion of *appariation*[3], which appeared during the technological era, emphasizes the harmony between the two entities, digital tools and gestures. This new combination led to a new form of gestures. Thanks to technological progress, not only devices but also sensors allow us to consider gestures and body differently, as shown by interactive artistic installations.

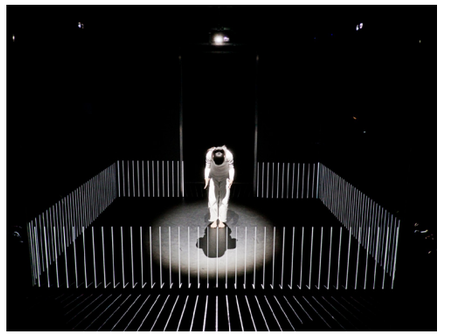
These new artistic works transformed the position of the public from contemplators to inter-actors, participants in the making of an artistic work. With natural gestures that are specific to inter-actors, these innovative systems turn body and gestures into creative tools. Moreover, these new devices allow multisensoriality, giving participants the opportunity to feel emotions. Because our senses are aroused, multisensoriality can help develop a poetic atmosphere. Such is the case of the *Hakanai* (2013) project by Adrien Mondot and Claire Bardainne. This project shows the relation between a dancer and an installation. The aim of their project is to create visual shapes accompanied by sounds

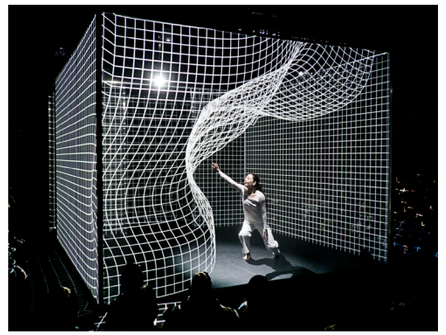
1 — Michel Guérin - émergence et apparence du geste, Publications de l'Université de Provence – december 12, 2014, p.43

2 — Global term which characterizes gestures used in technological devices, which capture the body's movements. Simplex gesture is a body language that speaks directly to the machine. These gestures become coded gestures for both movement and sign.

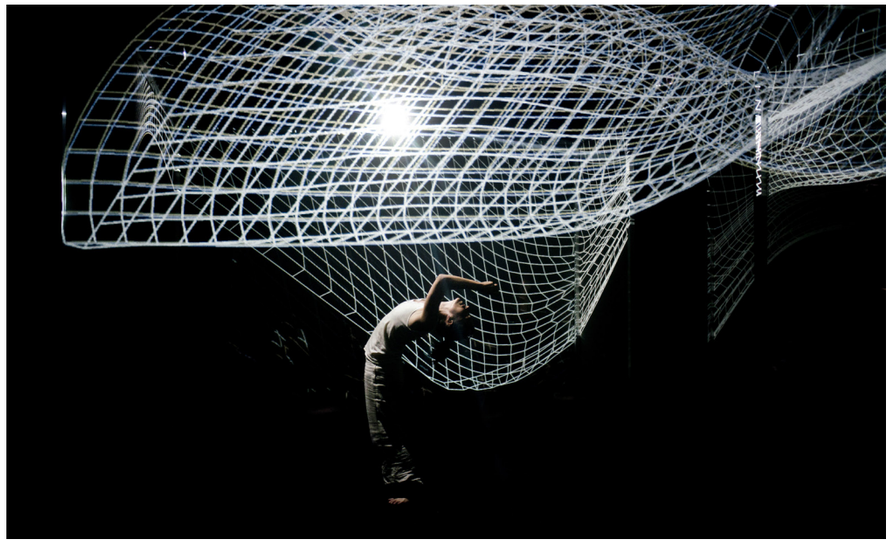
3 — Can be defined as the harmony of two things that match. (CNRTL, 11/02/18)

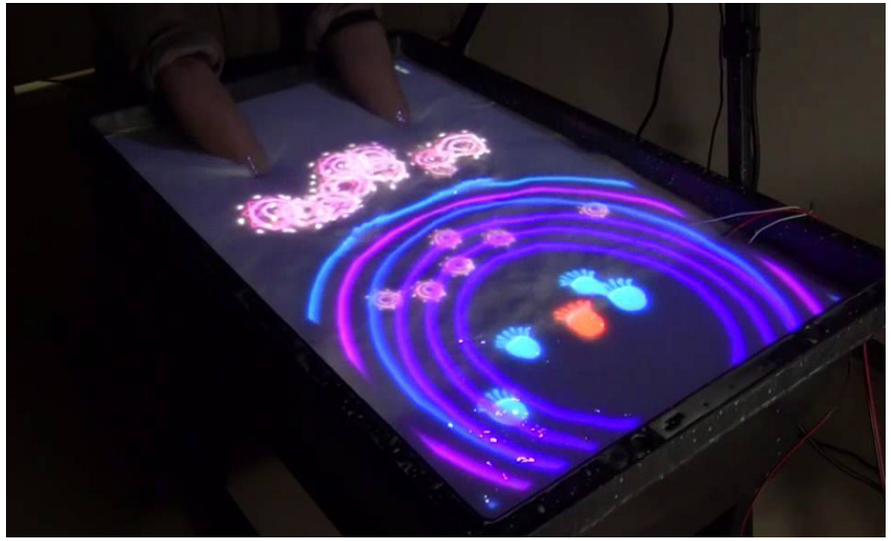


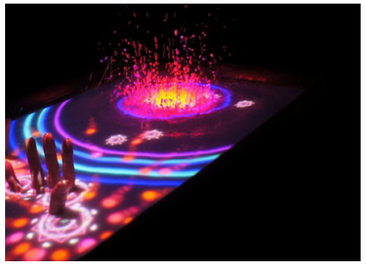




Adrien Mondot & Claire Bardaine - *Hakanai*, 2013







Yasushi Motoba - *Aquatop Display*, 2013

For the artist Yasushi Matoba's project *Aquatop Display* (2013), water creates a new form of interaction with simple and spontaneous gestures. Using water as a screen, the artist provides more sensitivity, more tangibility. Matoba's work contrasts with technological devices and more particularly with touch screens. Water is a material that, due to its smooth aspect, leaves no porosity, no grip on reality and no natural gestures.

These examples show that even in an era that has greatly contributed to its homogenization, gesture is still renewed by interactive installations that allow viewers to perceive gestures differently.

Third part

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My design project

After studying if new technologies could bring some form of homogenization of gestures and could also be used to reinvent them, I planned to work on the different ways to apprehend and perceive gestures.

My design project is about the numerous ways to implement digital tools in order to apprehend body and gesture differently, to offer various ways to capture body and gestures.

At first, I decided to concentrate on making prototypes with sensors[I.1]. I started with a gesture sensor that can be programmed on Arduino which is an open source programming language. This sensor allowed me to program some gestures and to give them a graphic representation through Processing which is another open source programming language and can be connected to Arduino. While working on this first prototype, I quickly noticed its limits and the limited gesture that the sensor was able to capture. However, the results were promising. That is why I wanted to keep on using sensors, more powerful ones but also more complicated to use.
Leap motion is a sensor that uses infra-red rays to capture hands and fingers. Like Arduino sensor, this sensor can be used with Processing in order to have graphic rendering of gestures, to give them an aesthetic aspect. Contrary to Arduino, Leap motion is not limited to any gestures. It is precise enough to capture the position of hands and fingers. Leap Motion shows a real ability to capture gestures and offer a new way to perceive them. However, these gestures are limited to the hands. The sensor is not suitable for the entire body that's why I then used another sensor named Kinect. Designed by Microsoft, it was first used for video

I.1 — *These prototypes can be seen from pages 22 to 24 of this edition.*

games on Microsoft's Xbox console. Kinect has been hacked to be used in interactive installations or devices. Like Leap Motion, this sensor uses infra-red rays to capture each part of the body and transform them into specific graphic shapes according to programming or the use of specific software. When a person faces this sensor, the whole body transformed into a completely new form.

After trying to work with all these sensors, I realized that my work was completely locked into the digital world. To reinvent gestures, to find a new way to perceive them, digital and therefore sensors are not the only solutions. I wanted to add some material, something tangible in order to have a link with the reality like Yasushi Matoba's work and his installation Aquatop Display.
I then decided to work with a laser cutter to be able to represent new ways of apprehending the body while still making interaction possible[I.2]. I was inspired by the statue built by David Černý for Franz Kafka in Prague, where each part of the face can rotate, deforming the face and giving it a completely new shape.

I.2 — *These prototypes can be seen p.25.*

David Černý - *Franz Kafka*, Prague 2014

Xavier Veilhan -
Blind sculpture head (jean nouvel), 2009 on the left
Deborah, 2011 on the bottom

I.3 — *These prototypes can be seen p.25.*

For the second attempt, I drew my inspiration from Xavier Veilhan's artistic work which shows a modified body which can be visible or not depending on the graphic work that is added to it and which reveals a new way of seeing the body. Like Xavier Veilhan, I worked work with different materials such as a 3D printer[I.3]. I first scanned different persons with Kinect. After this important step, I worked on the shapes with Blender software and gave them a hybrid form as if it were a real representation of body but also a graphic and virtual representation of gesture and body.

After exploring the virtual world first and then the tangible world, I wanted to develop prototypes that could mix these two worlds. I made a prototype with an Arduino sensor called the accelerometer. The accelerometer is a sensor that calculates linear accelerations according to 3 orthogonal axes, X, Y and Z. With this sensor we can play with the movements of tools like a hammer or handsaw. With the connected movements of these tools, we can transcribe graphically the gestures associated with manufacturing.

Resources

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— Filmographie

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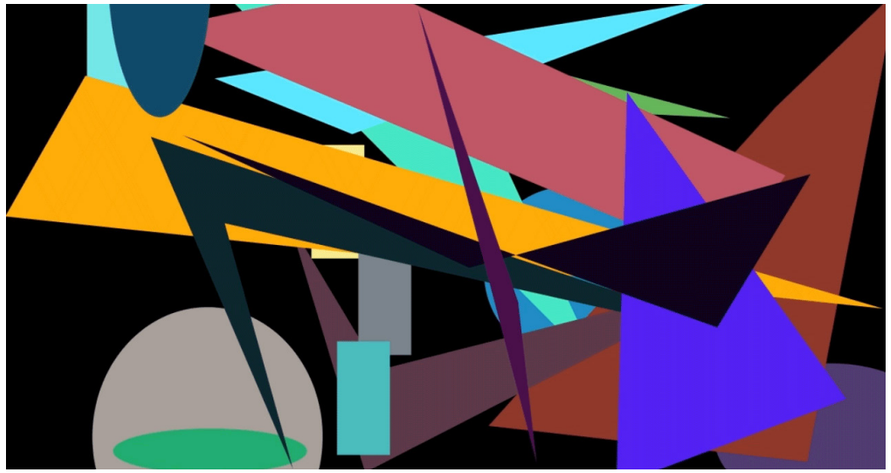
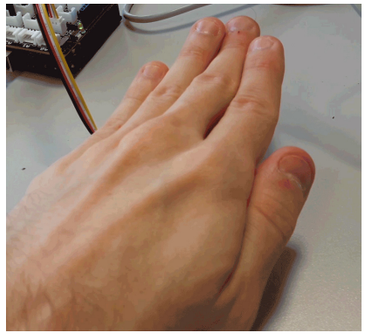
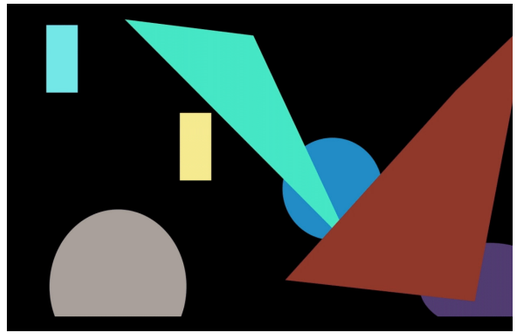
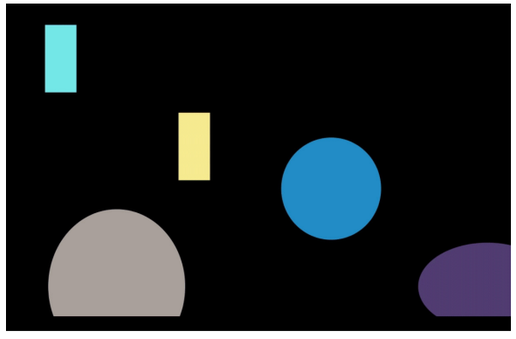
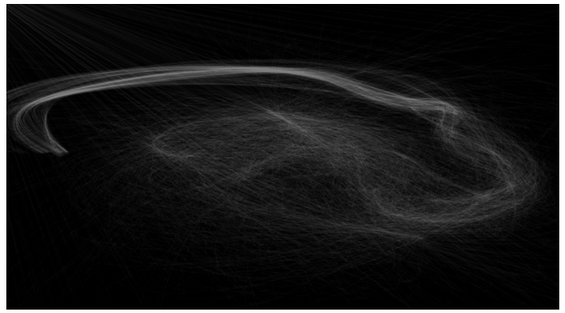




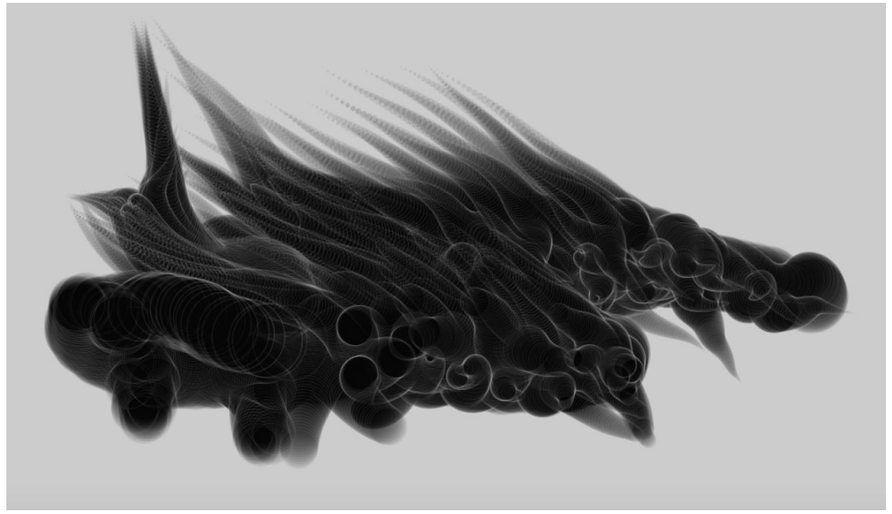


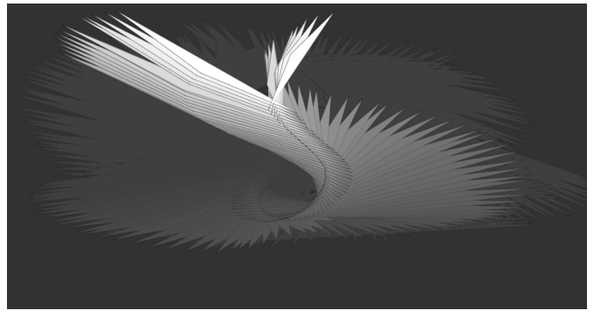


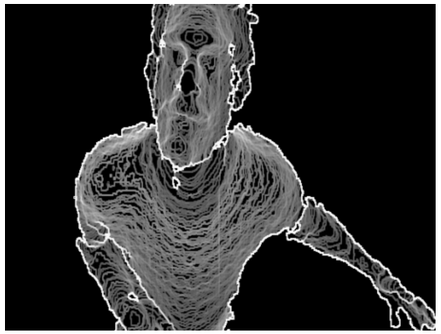
Arduino gesture sensor - *prototype N°1*



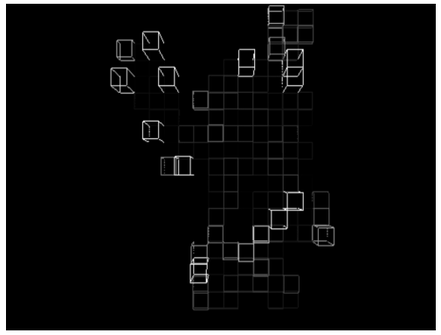
Leap Motion sensor - *prototype N°2*

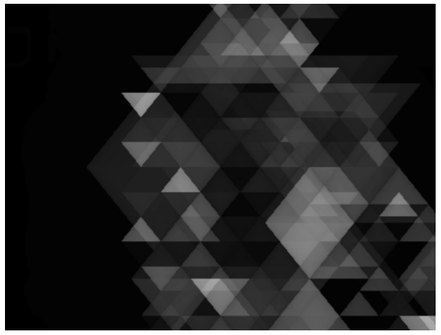


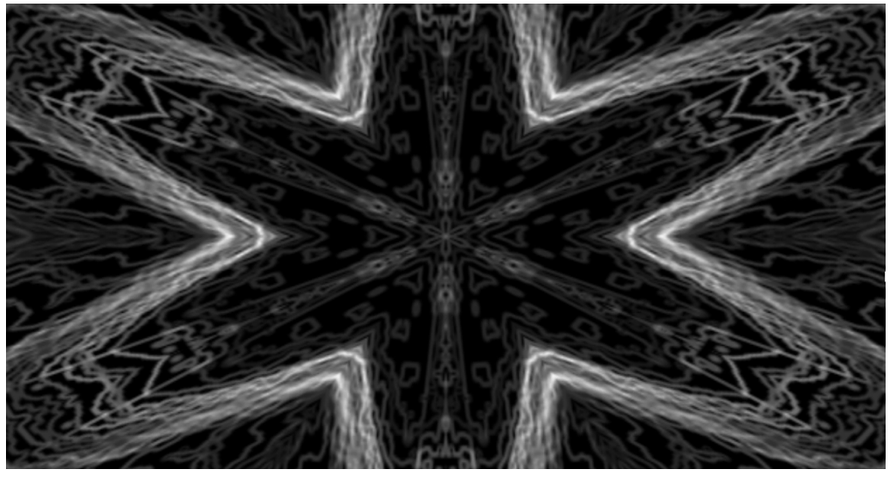




Kinect sensor - *prototype N°3*







Laser cutting and 3D printing- *prototype N°4 and n°5*