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https://github.com/Justinel2/cart360-2019

THIS = THEN = THAT

PROPOSAL

~ BRIEF

Our main objective is to evaluate and possibly influence the synchrony between the two users according to their heart beat, breathing and beta wave activities. Our project, still untitled, would be two identical electronic accessories that are meant to be *worn* by two distinct bodies. These accessories sense the previously enumerated types of data for each user. Each vital signs of a user will be represented to the other one as a multisensory experience, with the objective to cross-influence the synchronicity of their autonomic nervous system activities.

~ NON-TECHNICAL DESCRIPTION

"Virtual worlds, distorted by disembodiment dreams, drain their inhabitants of commitment, responsibility, and, ultimately, purpose."

This = Then = That seems to inspire change, to express metamorphosis. Three following phases that, arguably, defines our Western culture since the late 19th Century are: Modernism = Postmodernism = Metamodernism. While Modernism is notably based around beliefs in science, in progress and in individuality, postmodernism is thought to challenge the standard modern worldviews by nihilism and disbelieve of 'progress'. In today's age of internet and social media, we seem to have approached a time that truly embodies postmodernist ideas, as explored by post-structuralist thinkers like Michel Foucault and Jean Beaudrillard. In contrast, metamodernism sees itself as a *protosynthesis* of these two previous phases.

> "Ontologically, metamodernism oscillates between the modern and the postmodern. It oscillates between a modern enthusiasm and a postmodern irony, between hope and melancholy, between naïveté and knowingness, empathy and apathy, unity and plurality, totality and fragmentation, purity and ambiguity." (Vermeulen & van den Akker, 5)

Metamodernism believes in reconstructing what has being deconstructed in postmodernism to reestablish optimism and hope. It made us wonder: What can we reconstruct?

To this question, we decided to concentrate our project in the reinvigoration of the human physical closeness; A tangible closeness that we feel keeps fading in the internet and social media era.

> "Without directly meeting others physically, our ethics languish. Face-to- face communication, the fleshly bond between people, supports a long term warmth and loyalty, a sense of obligation for which the computer mediated communities have not been tested." (Heim, 77)

With a romanticism worthy of modern times, we want to investigate new kinds of proximity and intimacy. More precisely, we are aiming to create physiological synchrony between users. Many species' survival requires synchronized activity for survival. For humans, synchrony even happens at the autonomic functioning level. This means that humans can have simultaneous changes in the activity of the sympathetic (fight or flight) and parasympathetic (rest and digest) branches of the autonomic nervous system. (Danyluck & Page Gould, 1)

One of the studies that inspired our process is *Coregulation of Respiratory Sinus Arrhythmia in Adult Romantic Partners* by Jonathan L. Helm, David A. Sbarra and Emilio Ferrer. It was published in 2014 and investigates the coregulation (a type of interdependence) in romantic couples. Based on the physiological coregulation proposed by the researchers Butler and Randall (2013), they oriented their study according to two different processes of synchrony: morphostatic and morphogenic. These processes are not limited to behavior and mood but also encompass physiological responses. Morphogenic synchrony suggests that partners corregulate each other's subjective experience and physiological states towards an optimal set point, while morphogenic synchrony interrupts basic regulatory functions and leads them away from this point. They concluded that couples, especially the ones with higher relationship satisfaction, were in sync in heart rate and respiration. The same coregulation has been observed with other strong relationships, like the one between a mother and a child.

We intend to base our installation on some of the processes and data types used in this previous study. We will measure the heart rate, respiration and the beta wave activities in two users. Beta brain waves are known to dominate our normal waking state of consciousness. It is a 'fast' activity when we are attentive, focused and engaged in problem solving. When the waves gets stronger (+ 30Hz), it is identified to be gamma waves. These relate to the passing of information in different areas of the brain. They are usually highly active in the states of universal love and altruism. (Brainworks) The data collected will then be transferred into different sensory outputs:

- The heartbeat of the users will be drawn by an electrocardiogram and will visually output the two live electrocardiography on a screen, where they will overlay. Both of the user can see that screen.

- The respiration of the users will be auditorily recorded by a mic on the chest or back. The two respirations will be outputted live as heat transmission on the chest area of the opposite user. Each user will only hear the respiration of the other.
- The beta waves will be monitored by an electroencephalogram (EEG) and transformed and distorted live as sounds. Both of the user can hear.

The two users will then be wearing their own 'body accessory' composed of the different sensors and the temperature emitters. Ideally, they would be placed in an empty room or space (except for the sound and screen). They would know from the beginning that the objective is to interact with each other and to observe the multisensory experience resulting from their interactions.

We expect the results to vary considerably depending on the level of intimacy the two people have together (during and prior to the experience). In fact, the experience does not fail if the two users can not find physiological synchrony. The objective is to diversify and develop the relationships of the many actors in the installation.

One relationship that is meant to be explored is the one between the user and the installation. The wearable accessory is connected directly to the skin to the bodily function it senses. The screen, the speakers and the heat conductor are also directly affecting the user in its senses. The user can sense its own bodily function in different ways, along with the ones of its experience partner. This seeks to also strengthen the relationship of each user with themselves. It brings another dimension to introspection, of interoception (sense of the internal state of the body).

Another relationship to reconstruct is the one between the two users. The connection and proximity, physically and emotionally, is at the center of our project. We are looking to instigate new kinds of *rapprochement* and, at the same time, to redefine their intimacy. In short, our whole installation will attempt to connect the users with themselves and each other through the empowerment of their human autonomic functions. All of this, in an era where the word 'connection' does not imply physical proximity.

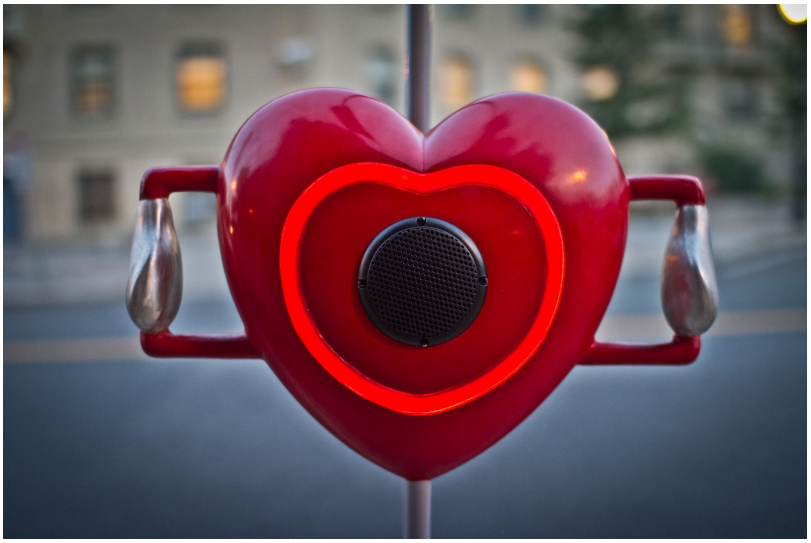
> "Because we have a new power to flit about the universe, we let our com- munities grow ever more fragile, airy and ephemeral. We are more equal because online, stand-in bodies are costless. ... Soon we forget that our stand-in bodies lack our primary identity's vulnerability and fragility. . . . Without face-to-face, personal and private communication, our very 'ethical awareness' based on lived experiences 'shrinks and rudeness enters'." (Nguyen and Alexander in Shields, 117)

~ NON-TECHNICAL EVALUATION OF SENSOR

There are multiple sensors that could be involved in our project. As we explore the topics of interpersonal synchronization, we really want to try to make the experience as relevant as possible. One of the most important sensors will be the ECG sensor (Electrocardiogram sensor) that will be used to detect the heartbeat rate and activity. We would use two of them to compare the heartbeat of two person simultaneously and in real-time. Another important sensor will be the EEG sensor to detect the different kinds of brainwaves. We would also use two of them so we can compare simultaneously the brainwave datas of two persons. Another aspect of the human body activity that we would like to compare is the breathing rate. This one is very important because it is easily controllable, so it could be main tool to achieve interpersonal synchronisation. We are thinking of using a microphone to capture the breathing rate since it could also capture the strength of the breathing and the length. For now we would only use these three kinds of sensors for the hole project since we don't want the installation to be too complex for the user and make it as simple as possible while getting a very relevant result. All of these sensors would transmit their data to an arduino microcontroller, that will analyze and process them. To get the two persons to synchronize their bodies and mind, we will need to give some kind of feedback to them. For the breathing aspect we would use a dispositive that would produce heat on the other person's body. With stronger breathing it could produce more heat. For the electrocardiogram we would display it visually on a screen and for the brain waves we would use sound frequencies to output the brain wave frequencies.

~ SIMILAR PROJECTS

Similar project #1 (Pulse of the city, by George Zisiadis):



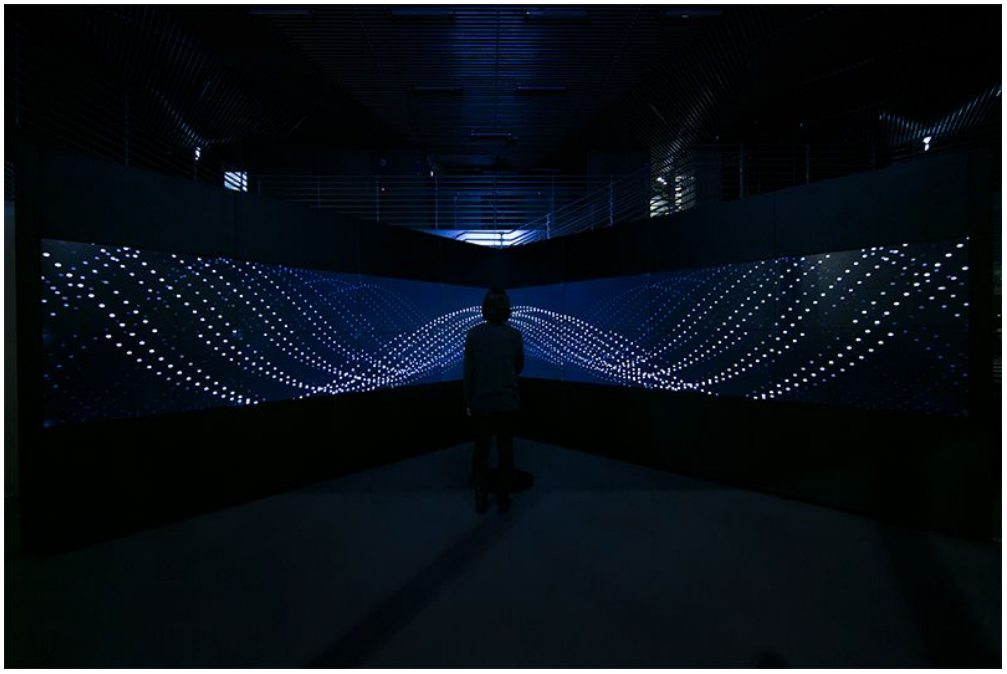
(Picture taken by George Zisiadis, 2013)

This project is a public installation that uses a person's heartbeat to make music. It is meant to be installed on the sidewalks so anyone walking by can try it and hear music inspired by their heartbeat. It looks like a big red heart with a speaker on the middle and handles on both sides. The user put his or her hands on the handles to transmit their heartbeat to the machine that will use this data to create music. In an email, George Zisiadis (the creator) said:

''We designed music that would complement different heart rate levels. The unit detects your pulse and then an algorithm determines the best sounds to play for you. That music plays in synchronization to the beat of your pulse and adapts in real-time. The result is music from your heart!''(Zisiadis for Citylab)

It helps the user to reconnect with his or her body, especially in a chaotic environment like big cities. This project uses an electrocardiogram sensor connected to an amplifier and the amplifier is connected to a Raspberry Pi computer and an Arduino microprocessor at the same time. It isn't specified which microcontroller is doing which task in the process. The installation uses solar power so the whole thing can be auto sufficient in energy. It also transmit the data wirelessly so city officials can learn on how to use these kind of public spaces more efficiently. The project is credited to George Zisiadis as the official artist, but it was actually a team effort between many people from different backgrounds (Music, engineering, design). It recorded over 1000 interactions within the first weekend of it's installation in 5 neighborhood where a lot of pedestrians walk.

Similar project #2 (Unity of motion, WOW)



(http://kando.vision/en/954/)

This project made by a Japanese collective named WOW is an interactive installation that uses the heartbeat to create a powerful visual and sound piece. The experience is separated in three parts: the heart, the nature and the machine. The heart is captured by a heartbeat sensor that will vibrate in real-time and synchronously with the user's heartbeat. That specific unit uses an infrared sensor to gather the heartbeat data from the palm of the user's hand and it is made from a real engine piston. The nature aspect is represented by a first giant wall of screens. It creates a visualisation of life-form movements with boids, an artificial life simulation program. That specific program can create flocking patterns that are commonly seen with birds and small fishes. These generated lifelike organisms will move with the rhythm of the user's heartbeat so both heart and nature can get in synch. The third aspect, the machine, is represented by a "V" shaped wall around the user. When this wall is in standby, it will display some trigonometric functions (sine or cosine waves) that are related to the circular mention of the piston from the heart dispositive. When it detects a pulse, the sine and cosine waves synchronises with the heartbeat and go from a very mechanical circular motion to more natural movements that are similar to the organism from the nature wall. Blending all of these together we get a new form of movement, and try to simulate a new kind of lifelike experience.

Similar project #3 (Eunoia II, Lisa Park)

(http://www.digiart21.org/art/eunoia-ii)

This project by Lisa Park is a tangible materialisation of her human emotions with sound and water. Lisa had done a similar experiment (Eunoia) at a smaller scale, but with pretty much the same concept. With the help of an EEG headset to scan her brain waves, she uses these datas to create sound from a large variety of speakers (48 to be exact). In the first Eunoia, she just used five speakers to express the five most common emotions which are sadness, anger, desire, hatred and happiness. She would then get a tangible feedback of her emotions from the speaker that activates to these specific emotions. These speakers are set on the floor and Lisa added some water on them, this way we can visually see the vibration from these speakers. The water is also great to demonstrate the strength of one speaker or one emotion since it will start to bounce on the speaker if this one starts vibrating louder. One of her goal with this experiment was to try to get in a perfect state of peace that would generate no sound or movement from the water. By reaching this state the water would be completely stale representing her state of mind. On Eunoia II, she used 48 speakers to match with Baruch Spinoza's 48 state of emotions. She also used a better EEG sensor that could also monitor emotional state and facial expressions in addition to analyse her brain waves data. In this more complex installation we can see a better representation of our brain activity the piece feels more accurate to the various state minds instead of separating it into five drastic categories.

~ DIFFERENT IMPACT

Our project uses similar technologies like heartbeat sensors and brain wave scanners while exploring similar topics like self-awareness, well-being and the human mind, but it is oriented on group awareness and interpersonalization synchrony. Instead of getting feedback from our own bodies, the user's are receiving the signals of the other user and try to synchronize with them. It is meant to see how people synchronize with each other and if there are some ways to make that connection easier or faster. It is not meant to be an art piece using the user's internal body data, instead we would offer an experience that is understood and physically felt by both users. We think that a group experience can create an even greater state of awareness than the ones seen in the similar projects. We might not be as synchronised with each other as animals who move in flocking patterns, but we have a great capacity of awareness and empathy. Maybe this simple experiment can help people understand each other or help cohesion. It's also a new way to conceptualize well-being. We know that other people's mind's affect ours and it has become generally accepted that it is the same with our bodies. We mostly think of health and well-being as an individual experience, but there are some reasons to our physical and mental states that are exclusively related to our interpersonal physical and mental relation with each other and the well-being of social groups could be an interesting concept to research at a more biological level.

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