DIGITAL SYNESTHESIA

WHY?

The evolution of our mobile technologies has come hand in hand with the feeling that we are slowly isolating ourselves in a virtual social bubble where we can only acknowledge what the screen is showing us and only relate to our social networks. Many thinkers have looked at this issue from both positive and negative points of view (Alone Together, Smarter than you think) and most arriving to the conclusion that we are surrendering some of our social costumes in favor of newer virtual ways of relating to one another and to the world.

It is my view that our technology should be better at looking for a way to help us be closer to our physical surroundings and smarter at finding a way of giving us all of the benefits it offers without compromising our interactions with our world and peers. Digital Synesthesia is a way of attempting to do just that. I understand that what we have done with mobile devices is offer just-in-time information streams that enhance our understanding of every moment, place and time. But all this information is being bottlenecked through mainly one sensory channel and in doing so our brain is overwhelmed needing to place most of its attention to this one input and ignoring many others.

DESIGN APPROACH

Digital Synesthesia is divided in three major parts. Sensing, translation and feedback, the understanding and implementation of these three areas is the key to create a stable base for future designers to be able to build upon this project.

Sensing is the technology that will capture information from the world. This area brings interesting cross sections between fields. The designer needs to know about sensors that may be available to capture raw environmental data. Also knowledge of how other organisms may use information that is outside of our human sensory capabilities. Most importantly there is the need to understand that if one sensor may be detecting very specific phenomena, the interpretations and usefulness of that information to us humans might be completely unrelated to how other organisms might use it.

Translation is a more narrow area where the designer can implement knowledge in coding and electronics to interface the sensor to a mobile device in order to capture the data. The mobile device will then translate this information to the appropriate feedback. Translation also needs the design of a user interface. In the far future vision of Digital Synesthesia, this interface will let a user choose what sensor they want active and where, and how, they wish to experience this feedback. This way, depending on the user's activities, they will be able to turn artificial senses on and off.

Feedback is the final step. At this stage, the designer will draw upon their knowledge of user interfaces and ergonomics to create a comfortable sensory experience that will make sense with the user's need and surrounding context. The design of wearable technology will come into play as we find ways to comfortably generate the sensory signals that will respond to the sensors.

IMPLEMENTATIONS

Three implementations have been developed in order to test the user's ability to relate to artificial sensory systems. Each of the implementations was designed to test the user's ability to relate to an artificial sense while reducing the familiarity with the experience. During the first user study the users would be able to try a new artificial sense that would provide a redundancy with an existing natural sense. This way, the users were able to quickly learn to understand the patterns of their new sense. The second user study was designed to take away the redundancy but still give the user some contextual information on the experience. The third user study would remove all redundancies and contextual information and simply ask the users to explore their world and try to understand what the artificial sense was responding to.

FIRST STUDY: PROXIMITY SENSING

For this study, I gave the user a proximity sensor to wear on the palm of their hand and a vibration on the thumb of the same hand. The study was comprised of three stages. First, with a blindfold on, the user was asked to wave their open palm over a table where I had placed a certain amount of objects and try to sense how many objects there were. After every guess, the user was allowed to take the blind fold off and see the real answer. This was important because the users would then try to remember the feeling of the new experience and in essence calibrate themselves to be able to identify and ignore the noise in the signal.

The second stage used the same methodology but the user was asked to identify the shape of a single figure that was place on the table. The figure would be a square, circle or triangle. This time, the users had to rely on a 2D movement of their hand and also they would have to compare their expectation of how a shape would feel to what they were feeling.

The third and final stage asked to identify a 3D shape. So the choices were a cube, a square or a Prism.

SECOND STUDY: TEMPERATURE SENSING

For this study, the user was fitted with a head band that had a temperature (IR) sensor facing outwards and a vibrating transducer towards the inside, against the forehead. Four peltier modules were placed on the table in front of the subject. A program was written that would randomly choose one of the four peltier modules to warm up. The subject would have to try to read the feedback vibration on their forehead to decide which modules was on and press the corresponding button on the device. This way nor the subject or the investigator would know which module was active. The investigator would simply record how many responses out of 20 opportunities were successful.

THIRD STUDY: CELLPHONE SENSORS

This study was designed to be the closest to the future vision of Digital Synesthesia. The users were fitted with a baseball cap that supported the circuit and vibrating transducer. The vibration was felt on the forehead. An app was written that would scan the available sensors of the mobile device and connect the data stream to the transducer using a IOIO board. The subject where asked to spend 15 minutes walking around the lab, anywhere they wanted to go. After the 15 minutes they were asked to give their best guess as to what the feedback on their forehead was responding to.

As a whole, these studies were looking to understand the ability of a user to form a coherent story by adding together minimal artificial information, proprioception cues and contextual knowledge. They have proven that when the subject is confronted with minimal information about a sensory feedback, they are quite capable of forming a good causal relation between the experience and the world and that even when they don't understand the actual sensing device, the mental mapping of the experience is still formed.