

# Digital Synesthesia: Using Mobile Technology to Interact with Our World

By

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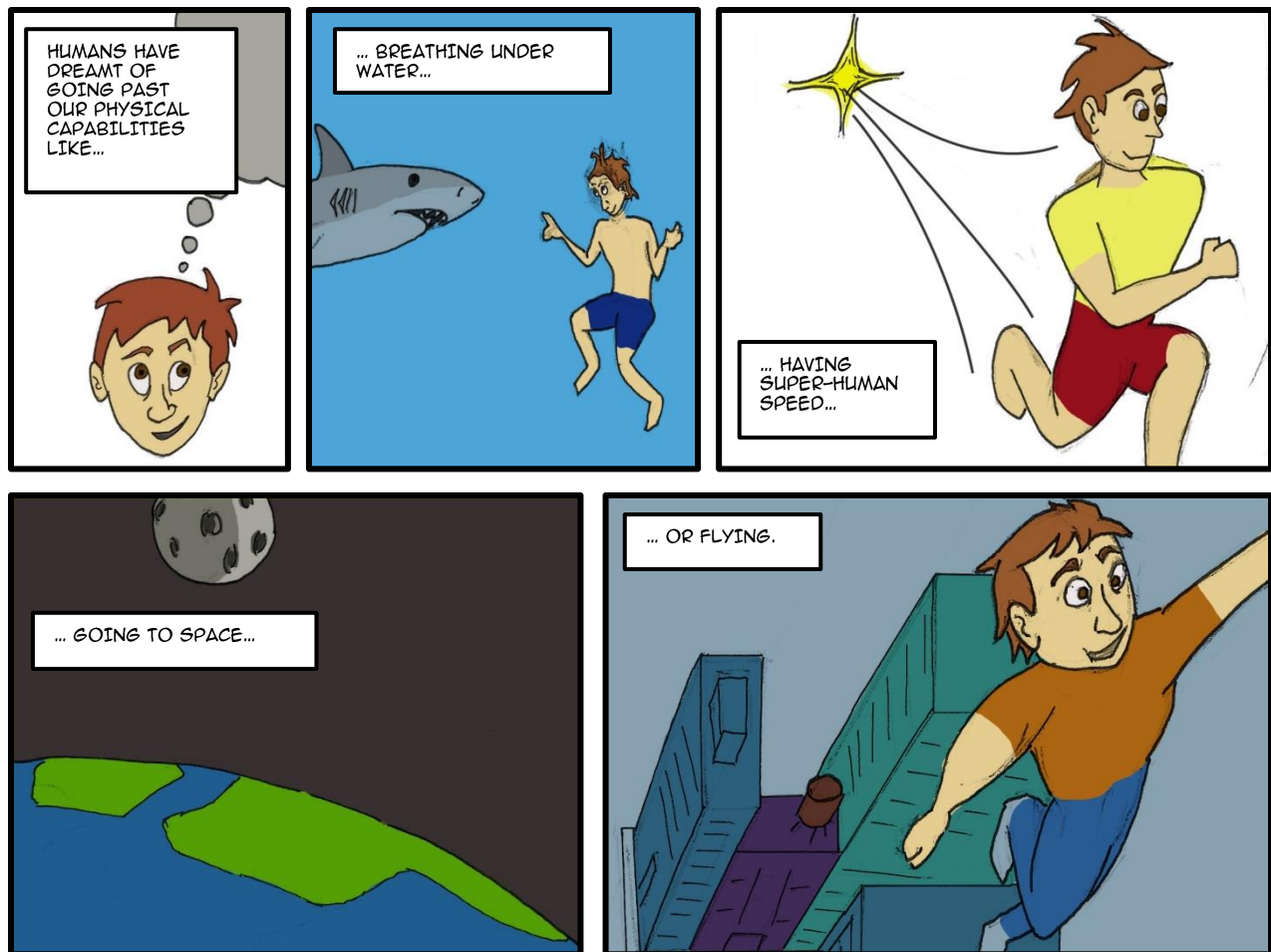


FIGURE 1 - HUMAN DREAMS OF SURPASSING OUR NATURAL ABILITIES

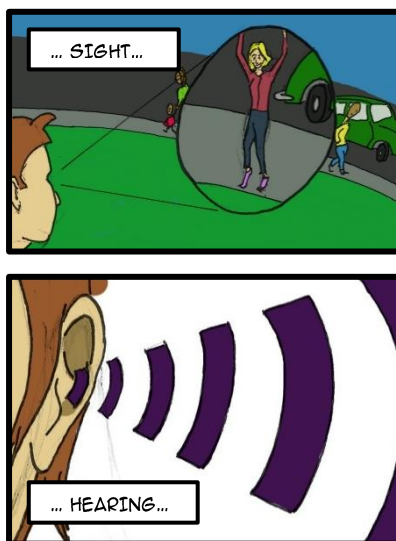


FIGURE 2 - DREAMS OF AUGMENTING OUR SENSES

## EXECUTIVE SUMMARY

Humans have dreamt for many years of going beyond our physical capabilities (Figure 1). We have dreamt of flying, breathing underwater, exploring space or simply moving as fast as possible. All of these dreams have been made possible through the use of technology and our understanding of the physical world around us. We have also dreamt of augmenting our senses (Figure 2). In popular culture, we create characters that are able to see through walls, feel the presence of danger, use echolocation or sense the emotional state of others. Technology has already given us the tools to make most of these dreams a reality. Furthermore, mobile technology has made it possible for humans to use sensors as a ubiquitous just-in-time source of information. This ability to

access digital information from anywhere at any time is the main value of mobile devices. But interaction with mobile devices relies heavily on transmitting information visually, which demands a high level of attention from the user (Figure 3).

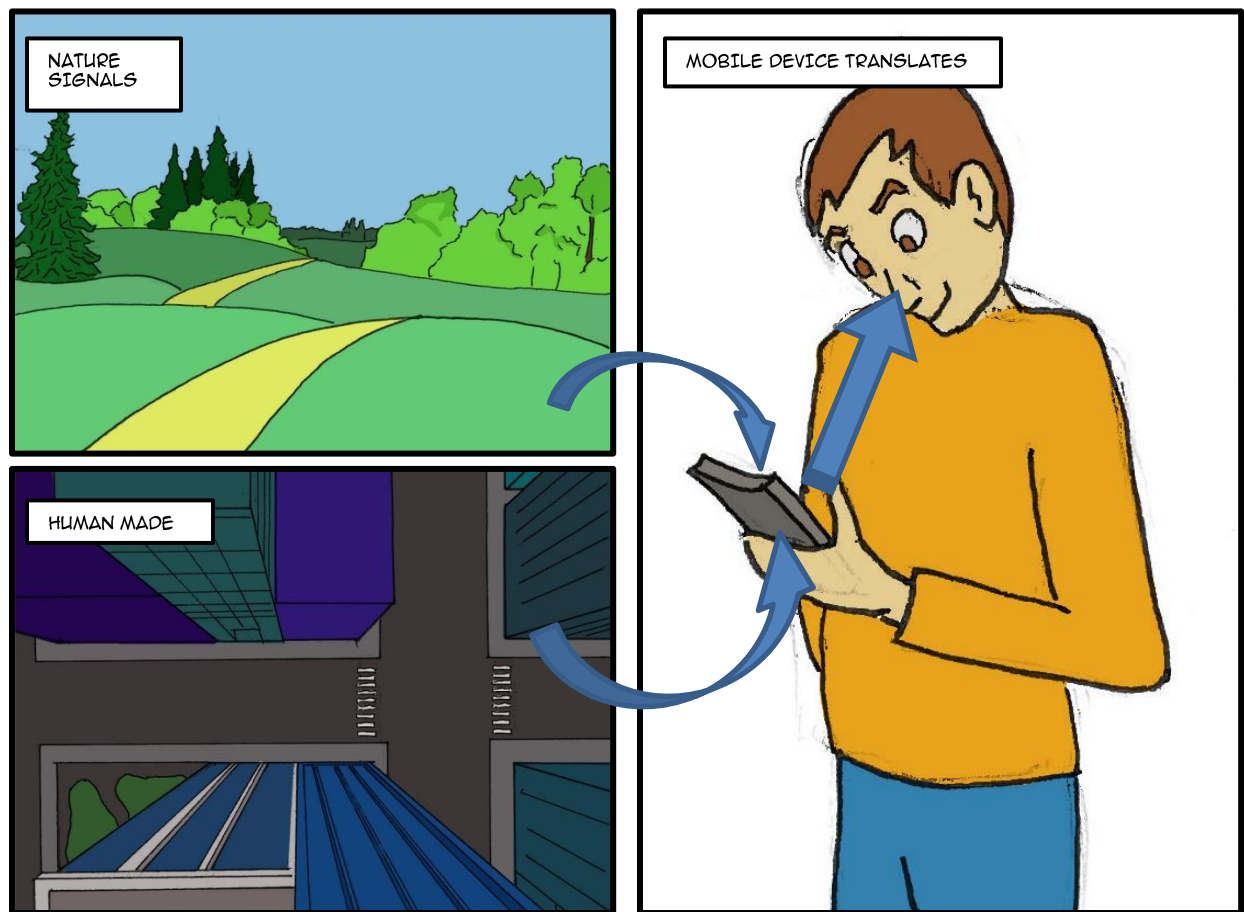


FIGURE 3 - MOBILE TECHNOLOGY IS THE TRANSLATOR OF THE NATURAL AND ARTIFICIAL WORLD

This thesis explores a way of using sensor and mobile technology to create a superhuman sensory experience that feels as natural as possible to the user. I aim to develop a new paradigm of interaction between users and their mobile devices: one in which the device acts mainly as the “translator” of information while the users interact directly with the world they are trying to explore. This “Digital Synesthesia” can be achieved by using a sensory channel other than vision to relay the information detected by external sensors.

Digital Synesthesia refers to the ability to use mobile technology as the conduit between the body and aspects of the world that the human body is not able to sense. It will connect modern sensing technology with the brain’s interpretation of external data. I will show that by using natural sensory channels to represent information beyond human perception, the brain will be able to interpret and assimilate the new stimulation as a new sense. Instead of giving the users an absolute value of the information being detected, the users will feel this translation on their

bodies. This will allow each user to find a personal meaning for the information that they are experiencing and interpret it in a unique way. By spreading out the interaction across more senses, the experience will feel more natural and thus allow the users to more easily divide their attention between concurrent tasks. Thus, Digital Synesthesia creates a richer, more immersive experience.

The related work falls mostly into two categories, those that replace a non-working sense with another, and those that give the user a completely new sense. The results of these projects have proved that there is a great opportunity in using senses other than vision or hearing. They have also demonstrated the plasticity of the brain in interpreting information when received through different senses. This thesis will go further by building on top of these findings and asking how we can use Digital Synesthesia to create a new interface paradigm, one that will allow the users to interact directly with the world and not with the mobile device. Since we understand our environment through our senses, having new sensory experiences will grant users a richer understanding of the world as they explore their new sensory capabilities.

The evaluation of this work will be done by conducting a series of studies in which users will wear devices that generate new sensory feedback loops. In these studies, the subjects will be asked to complete a task with the aid of one or more new digital senses. The studies will range from scenarios in which the subject simply compares the digital sense with a natural sense, to a situation where the subject can feel new information and has to discover what it means. Data will be collected on the time and accuracy of the completed task and a qualitative result will be obtained from discussion with the subjects about the wearable technology and the experience in general.

#### **FUTURE PROJECTION**

Many animals use natural phenomena to their advantage every day, such as sensing ultra-violet light to choose the best flowers or sensing magnetic fields to find direction. When humans are able to interpret these physical phenomena in a way that is more in tune with their bodies and less of a cognitive interpretation of quantity, then our interaction and general experience in and with the world will change dramatically. By understanding and interpreting these natural phenomena, designers of digital synesthetic interfaces will be able to create new sensory loops that offer new experiences to the users. Digital Synesthesia will give everyday users the ability to turn senses on and off depending on the experience they seek.

## ABSTRACT

Digital Synesthesia is the concept of using sensors and mobile technology to create a user experience that mimics the way people use their senses and enables the perception of information that is outside of our sensory spectrum. Modern technology already offers the ability to detect this information, but what has not been achieved is a way for our brains and body to incorporate this new information as a part of our sensory tool-belt. Then we can truly begin to understand our surrounding world in a new and undiscovered way.

The vision of Digital Synesthesia is to help the current idea of Human-Computer Interfacing evolve so that it gives way for a new Human-Environment Interfacing. Digital Synesthesia aims to keep our mobile devices in our pockets while allowing us to experience the world by sensing information outside of our sensory capabilities.

The system will not only collect data through sensors, but also find the best way to pass the information to the body while bypassing visual and auditory channels. This way, the brain will be able to interpret the new information without shifting or dividing attention from the current task.