DIGITAL SYNESTHESIA: USING MOBILE TECHNOLOGY TO INTERACT WITH OUR WORLD

BY

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EXECUTIVE SUMMARY

The current state of mobile interfaces is nearing a bottle-neck from two distinct points of view. On one side, the bulk of the human-device interface is resting on touch and sight with some audio and haptic cues (these cues only in the form of vibration). In addition, the industry's obsession with ever smaller devices is reaching its peak where screen size will not be big enough for comfortable multi-touch interaction. So we see a resurgence of bigger screens and bigger devices. On the other side, we have not seen a breakthrough in mobile experience for some time, with most advances in technology being slightly incremental. I believe this is not only due to the physical constraints but also because our current expected experience when using our mobile devices is not ambitious enough to demand a breakthrough in the interaction paradigm.

This thesis intends to address both the interface and the experience sides of this trend. First by understanding that what I want to be able to do with my mobile technology is to be in closer contact with the world around me instead of isolating myself in my closed virtual world. For this I will create a radically new experience based on the augmentation of our natural sensory system, either by supporting one of our existing senses and looking for ways to make it more powerful or by creating a whole new sense using electronic sensors to detect information that our bodies are not capable of sensing naturally. This will create a new paradigm of usability that we currently don't have by allowing us to interact with the world *through* our devices in new ways.

The other side of the problem addressed by this thesis will be finding a way for the mobile device to communicate this new information to our bodies in ways that don't necessarily use sight or touch. New ways of interacting with our devices can be by using our tactile sense in a much broader way, generating vibrations signals in different parts of our bodies, generating hot and cold areas in our skin, creating sound through bone-conduction or pulsing tiny amounts of electricity directly to our body.

Some work has been done in this area but never compiled under a general user experience philosophy. Some projects have looked at sensors and computation to map color to sound for color-blind people or to generate electrical signals from visual data that a blind user can detect through the tongue. But these projects have not looked at the possibility of opening up these ideas to the general public in such a way that it may enhance day to day living in more generic contexts. What I plan to do is demonstrate how valuable it will be to open up our interaction paradigm to the world and to our bodies in such a way that those same principles can be applied to many different and more specific contexts and usage scenarios.

The evaluation of this work will be done by conducting a series of activities where users will wear devices that will generate additional sensory feedback loops. These activities will be analyzed by comparing results with and without the devices and by testing users that may be familiar and un-familiar with the general task. A qualitative result will be obtained from discussion with the subjects about the wearable technology in general and a quantitative result will be obtained from the data collected during the tasks.

With this dissertation I look to understand and help map a new direction for the future of Human-Mobile Device interaction.

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ABSTRACT

The computation power that our mobile devices have gained in later years has surpassed that of the powerful computers of a few years ago . As this capacity keeps growing, the demand for better and more fulfilling mobile experiences has remained stagnant. A major reason for this is that the interaction capabilities of our devices are limited to the physical constraints of the device itself.

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