Touched

For my computer science colloquium, I watched Dr. Karon MacLean’s research talk on “Applied Perspectives on Haptic Interaction with Regard to Attention, Affect and Pushing Robots Around”. While this title may be unnecessarily long, and in desperate need of an Oxford Comma, it is true in conveying the focus of her talk: the development of further applications for haptic technology. Though I was initially clueless to the meaning of the word “haptic”, this is not abnormal. Haptics centers around the human sensation of touch and artificially-produced tactile feedback, and is an often overlooked component of the technological world. Traditionally, feedback systems are aural or visual in nature, while the role of haptic technology is often reduced to that of a simple vibration. Cell phones have been employing these vibrations to discreetly inform users of their messages for decades, and these options are just now beginning to expand beyond that of a simple buzz. Similarly, video game controllers have been rumbling since the early 90’s, often to let the player know that they have indeed, died. Touch screens were once a mere gimmick, but have finally begun to adapt and allow users a more natural method of interfacing with their various virtual worlds. Dr. MacLean’s research focuses on breaking haptic technology out of this primitive niche that it has been confined to, and exposing the world to many possibilities that surround this undeveloped aspect of technological interface.

Dr. MacLean opened her talk with a story about a very immediate application of haptic technology: using it to more accurately pace and time research talks. MacLean herself had experienced frustration when giving these talks and running out of time, missing the cues of her moderator, or losing her audience’s attention due to such distractions. As this was all taking place at a haptic technology conference, MacLean felt that she and her peers should be able to solve or address the problem with a fresh, tactile perspective. Speakers at her university were requested to wear (obnoxiously) large wrist devices that were capable of producing massive vibrations, and used to pass information to the presenter in a silent and discreet manner. These notifications could be produced “externally”, such as a moderator informing her that her talk was running over time, or “internally”, via predetermined and practiced cues that paced the talk by buzzing at decided intervals. Some of her most interesting findings included the fact that, while users were certainly aware that the informative buzz had taken place, they would still choose to ignore them. Her team realized that recognizing a specific time is only a piece of the problem; users still needed a certain amount of motivation to acknowledge or respond to this new information. The inclination to respect the buzz was inhibited by the nature of the experiment. Though users felt that such a device could be useful in preparing, practicing, timing, or informing the presenter during a talk, many were discouraged by the lack of the ability to customize the device to operate in a manner specific to their personal tastes.

At this point MacLean suggested that configurability would be a key component in the future of haptics. In any field of application, a piece of haptic technology that functions in a singular manner will only appeal to a slim portion of the population. Thus, “touch” sensitive technology aims to become as natural feeling and non-robotic as possible, to easily mold to the needs of the user. This could include modifying the duration and amplitude of the signal, in addition to the location and method of application. Users want to control exactly what exactly these buzzes are meant to imply, and in doing so, become more “fluent” in haptic communication. If this is not done effectively, the haptic technology can easily become annoying, uncomfortable, or distracting. Otherwise haptic communication can be just as efficient as a visual or aural signal, if not more so. With this in mind, well-designed presets that can be easily adjusted are crucial for the social acceptance of haptic technology.

With user-customizability in mind, sports training is a primary area of interest to haptic technology. Often, when working out, people do not have the attention or limbs to spare when it comes to interfacing with their technology. One example of this would be a standard rowing workout on an erg machine. The user will have his or her hands and legs occupied at all times of the workout, unable to do anything but see directly in front of them. While a monitor normally displays a rowing readout, the data that it displays has been shown to be only partially effective in increasing work ethic. Music or other aural stimulation via a coxswain, who helps coach the efforts and synchronization of the rowers, have both shown immense benefits to the psychological battle that takes place during an extensive rowing workout. Effectively harnessed haptic technology could loan an additional dimension to this boost in morale, and push the user just a little bit harder. MacLean and her researchers found that wrist-mounted devices produce the least interference with typical user activities, while leg or thigh mounted devices were the least comfortable to the user. If unobtrusive, a wrist mounted device could be the perfect tool to deliver haptic feedback, informing the rower of which phase of the workout he or she was in, allowing them to allocate the appropriate amount of effort. The key here is to deliver the correct signals in the correct manner; again, this would be entirely dependent on a customizable, user-friendly piece of technology. Haptic technology is also of particular interest in the field of Sports Medicine, specifically in physical therapy. Devices capable of monitoring a user’s exercises could provide gentle feedback, letting the user know that they were exerting the correct amount of effort, or continue pushing to meet a certain threshold. In this sense, haptic technology could help guide a patient’s recovery process, or increase an athlete's motivation during various forms of exercise.

Engaging technology via human touch has only begun to be explored, as consumers have recently started to embrace the smartphone and tablet realm that is dominated by a touch screen. Smartphones retain the ability to produce a gentle vibration with every virtual key press, passing the user the most casual confirmation of their action. While obnoxious vibrations were once the proud conveyor of a text message’s arrival, users can now customize the duration and amplitude of a vibration signal by tapping the pattern onto their touchscreen, that records the length and velocity of each press. This allows for distinct patterns to communicate *more specifically* whether the buzz is an incoming phone call, text message, email, tweet, snapchat, and etc. This is the first of many steps into the realm of wearable tech - “smart” accessories that can function as independent devices, or extensions of an existing cell phone. While an enormous vibrating “bomb detonator” (as MacLean called it) on one’s wrist may seem a bit unpleasant, this represents the crude side of the technology that has slowly becoming more elegant in the form of Apple and Samsung “smartwatches”. Social acceptance of such technology can only occur when it is stylish enough to wear, and accessible enough to use. Apple’s leading steps into user-determined haptic signaling will surely echo in the realm of wearable tech, and become a primary method by which they function.

Of the five human senses, sight and sound have been the prevailing methods with which technology is interfaced. A keyboard and mouse have long served as the portals to our virtual worlds, along with shaking controllers and crude mechanical grunts. Smartphones were the first big step in introducing technology “to our fingertips”, and tablets have done a good job progressing this form of interface, but a number of issues remain. Testing such technology can be difficult, as it cannot be expressed to a great number of people at once, as visual and audio signals can. While Dr. MacLean’s talk was interesting enough, I feel that the world is not quite ready to embrace haptic technology as she is. As we slowly develop the language to more effectively communicate across the gaps between consumer and designer, haptic technology will likely begin to manifest itself in more fields of technology, and perhaps even become as essential as the infinite beeps and bloops of our televisions, radios, G.P.S’s, and cell phones.