**What is innovative about wearable technologies?**

*In the future, perhaps we’ll become cyborgian - our clothing will significantly enhance our capabilities without requiring any conscious thought or effort. – Steve Mann*

Wearable technologies can be regarded as anything with computational power residing on a human’s skin, clothes and even clothes themselves. Due to its nature it is recognised by most wearers as intricate ‘gadgetry’ [1], however, it serves a much deeper purpose than the ever popular fitness trackers of these days.

Wearable computing is innovative in a sense that it attempts to achieve man-computer symbiosis, a close and intimate relationship between human and machine [1]. The first such computing experiments were done by a researcher named Steve Mann. He devised a complex hardware machinery that would connect to the internet, have a pair of smart glasses, a wearable camera, and set of sensors measuring and recording his heart rate, galvanic skin response and temperature [2]. Unlike the traditional computer, he says that wearable technologies *see what the wearer sees* instead of pointing the screen at the wearer.

In my opinion, key selling points to wearable tech would be:

1. **Flexible interactions** – any individual can adapt a computer to best suit their capabilities. In example, a person with motor-coordination difficulties could use a highly responsive speech recognition system to interact with computer.
2. **Assist communication** – the possibility to scan restaurant menus and read them aloud for a blind person or translate between languages on the fly. It should also be able to detect environment changes and adjust its behaviour accordingly.
3. **Augmented Reality** – i.e. detect human glance and read out relevant information or offer a discounted product based on user need and location.
4. **Intelligent Reminders** – listen in on conversations and take part in the wearer’s life without breaching privacy concerns.

**How can they contribute to our living healthier lifestyles?**

There are many ways wearable technologies can help us live a physically or mentally healthier lives.

Apart from the very well-known fitness trackers widely used for counting steps there exist wearable ECG devices that can monitor cardiac conditions. They measure an electrocardiogram that you can easily send over to your doctor and go over the results. They also integrate with smartphones for easy statistical access. It’s a crucial device for those with family history of heart strokes or suffering from high blood pressure. It wraps around the chest and continuously monitors your heartrate, its variability, skin temperature, respiratory rate and activity. You can get such a device [here](https://www.getqardio.com/qardiocore-wearable-ecg-ekg-monitor-iphone/).

Another good example is rings, which upon activation would send a squeeze to the other wearer. This would find application in children suffering from mental conditions, such as autism that seem to be improved with signs of affection, such as hugging [3].

A lot of other curious inventions are being made to improve the overall mood, thus mental wellbeing of people. Bunny shaped kissing robots exists to transmit a kiss shared between a couple potentially miles apart. Scent producing glasses are created to improve the mood of people. This could be an alluring perfume or simply the scent of a steak to a poorer student. Such poor student could also benefit from a device that emulates flavours through electrical stimuli. It’s arguable if the student would afford it but the thought is there [3].

**Common wearable tech challenges**

The wearable technology can indicate certain things about its user. For example, wearing an Apple watch might say certain things about the user’s income/style/preferences, which the user may or may not want to share. The wearer might not be able to actually wear said technology if it’s too clunky or looks socially awkward. When Steve Mann was experimenting with wearable hardware he alluded to not being able to wear it much due to it being heavy or not taken well by others [2]. Therefore, wearable tech has to be discreet or designed having in mind it says things about a specific user’s style, demographic.

Power for multiple sensory devices is hard to scavenge. Battery energy density doesn’t shrink as fast as transistor density. It’s very hard to come up with ways to power up devices on a human body without annoying the wearer by having to constantly charge it. There’s many political/environmental issues in using powerful batteries and many other implications using another battery source, such as food, which can create problems in the military world (making the soldier choose to power up tech or eat) [2].

Overheating is yet another problem with scarce solutions even for traditional laptops. If you try to squeeze such a computing power to the size of a matchbox the heat might be unbearable for the human skin and result in severe burns. There’s many possible solutions, such as: creating lower power components or using the wearer for ventilation, dissipating heat onto the body itself, or more careful coding. However, there’s no consistent solution.

**Thoughts on privacy**

Finally, privacy is a big concern addressed by Steve Mann as early as 1996. Many researchers speak of wearables as personal companions almost as an alter ego latching onto you since birth. However, technology is not flawless and during a data breach information about your conversations, emails, preferences, bank, address details, even clothes and shoe size – everything may be stolen and taken advantage by malevolent entities or simply companies seeking profit from your needs. I.e. we may be driven to higher consumerism by very conveniently placed personalised offers making us tempted to spend money. We may also be forced into doing certain actions by blackmail and threats to release very intimate information. We may also not notice what information is available about us to the world due to the interconnection of wearables. If our clothes themselves become transmittable devices that are connected to the Wi-Fi network and can talk to each other, a breach in such network could expose our location, objects with or around us and our activities.

[1] Starner, Thad. "The challenges of wearable computing: Part 1. " IEEE Micro 4 (2001): 44-52.

[2] Mann, Steve. "Smart clothing: The shift to wearable computing. "Communications of the ACM 39.8 (1996): 23-24.

[3] HOONG, T. (2015). Professor working on programming pyjamas to give out hugs. [online] The Star Online. Available at: https://www.thestar.com.my/News/Nation/2015/08/31/Beyond-sight-and-sound-Professor-working-on-programming-pyjamas-to-give-out-hugs/ [Accessed 20 Nov. 2019].