STEVE MANN

Personal Safety Devices Enable "Suicurity"

"Security" is a Latin word which means "without care," from the Latin prefix "Se" (meaning "without") and "curity" meaning "care." What does this really mean? Persons "in custody," such as children and the elderly, typically live under parental security, or under the security of a caregiver, so that they can live in a "secure" environment where their "cares" are taken care of by others.

Security often has associated with it a custodial relationship. Examples include children in the custody of their parents or teachers, prisoners in the custody of a warden, or patrons in the custody of an amusement park ride attendant. For example, a roller coaster ride restraint mechanism is said to be "secure" when the restraint is escape-proof, so that a "dare devil" rider cannot open it and climb out until the operator has released the riders from custody, once the ride comes to a safe and complete stop.

The concept of "security" in general is evolving toward this kind of custodial relationship between those who provide the security, and those who are "secured." Governments and large organizations are taking over more and more of our "care," so that we can be "carefree." Devices around us are being fitted with cameras and computer vision systems watching over us, to reduce our "cares." New Light Emitting Diode (LED) lights have built in cameras that watch us, and dim the lights or turn them on or off for us automatically (e.g., "Pixelview" by Lighting Science Group, "Netsense" by Sensity Systems, "Lumimotion" by Philips, and "Intellistreets" by Illumination Concepts). The cameras in the Philips Lumimotion lights do nothing more than sense occupancy, but the cameras in the Sensity LED lights also recognize faces, license plate numbers, and "even identify suspicious activity, sending alerts to the appropriate staff" [1].

Recently, computer vision systems have been installed in most of the toilets and handwash faucets at our University of Toronto campus, to flush the toilets and turn the taps on and off for us, so we don't have to. Our cares are taken care of by a small camera and computer vision system in each of the toilets. The pixel count is small – on the order of 128 or 1024 pixels – not enough to identify faces or "suspicious activity," but sufficient to reliably flush the toilet or control the tap so we don't have to. The older one-pixel "cameras" were not very reliable. The 128-pixel toilet and faucet cameras work better, and the latest 1024-pixel valves are more reliable still: "Instead of simply detecting the presence of an object, controller ... based on the signals received from the camera identifies the object type, the presentment, and adjusts valve ... accordingly" [2].

As these systems are networked (e.g., "Sloan Monitored Systems" by Sloan Valve), washrooms are remotely managed and monitored.

In the past, recording or transmitting of images from washrooms has been illegal. However, recently, cameras have appeared in locker rooms [3] and

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Fig. 1. Security by Example: Our government and industry leaders hide their cameras in dark spherical domes so we can't see which way they're looking. If we were to follow this example that they have set for us, we'd all walk around with dark globes over our faces so nobody could see whether or not we're staring at them.

washrooms [4], with full support of Privacy Commissioners and Police.

More recently, problems arose during the Sochi Olympics in Russia, in which hastily constructed hotels featured tap water that was not running clean. Guests trying to have a shower in their private hotel rooms were finding dirty brown water coming from their showers, and thus left it running for a long time (as is necessary when plumbing is recently renovated), hoping that the water would eventually run clean.

Russia's Deputy Prime minister was quoted as saying "I have seen video from inside cubicles" [5] and "We have surveillance video from the hotels that shows people turn on the shower, direct the nozzle at the wall and then leave the room for the whole day" [6]. At issue here are matters of privacy and trust, where leaving water running to flush out the dirt in the pipes is seen by the custodians as an act of vandalism that warrants the installation of security cameras in shower stalls.

Are we free to live a life not "in custody"?

Whereas "security" and surveillance do have valid use-cases, especially regarding those in custody (children, the elderly, and prisoners), a free adult should be able to live "outside custody" if and when desired. As a free adult, I might choose to ride (and be restrained in) a roller coaster, under the watchful gaze of security staff. But I should also be able to choose activities that are non-custodial.

The general idea that there is a tradeoff between privacy and security is itself flawed. Resigning ourselves to a life that is completely "in custody" is living by the exact meaning of the word "security," i.e., it is careless ("without care").

As responsible adults, we should care about our personal health and safety, and take charge of it. One way we can do this, is by incorporating health and safety onto and into ourselves, rather than our environment. By this, I mean wearable computing and personal technologies that function like part of us rather than part of our environment.

The Personal Safety Device (PSD) is a wearable computer, sensor, and camera system that monitors and records our health and wellness and physiological signals, such as our heart's ElectroCardioGram (ECG), and our brain's ElectroEncephaloGram (EEG). This wearable computer system thus comprises our most up-to-date medical record – attached right to our own body [7].

Such a system, when worn by a person who cares about their own health and safety, might be an opposite to security. The opposite of security (carelessness) is not insecurity (uncarelessness), but, rather, the opposite to security is "curity" (i.e., caring).

Let me take the liberty of calling the PSD a "suicurity" system, from the Latin "sui curity" meaning "self-care," i.e., taking a personal interest in matters of health and safety.

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CA: I think we are more connected than ever and I think that technology has a role. Sometimes we look at some parts in our digital connection that is broken but in reality we have never been as connected as today. We have never been as smart as today because today you can Google something. In a second you can find an answer that leads to the next question, so you can build stuff together even when you're in different parts of the world. So I believe it's the best time ever for humanity. I would never travel back in time, I'll always travel forward. We are becoming smarter and I'm very positive about the future of humanity and I believe technology connects us, extends us and augments us, and that's what I'm fascinated about.

AH: So what will the technology look like if it has gone from wearable technology to an embedded technology? What sorts of embedded technologies would we be looking to better understand?

CA: There are going to be chips that we are going to implant that have GPS, information about our identity, information for health. It is amazing because you can have constant information on anything that is happening in your body so you could have alerts that are triggered for yourself or your medical caregivers and you can know when anything gets out of shape and you know prevent things way before they happen. It's a whole new world but I think it's a little ahead of us but nanotechnology things like that, probably microchips and things like that. Like Google just announced a little contact lens that will test your glucose levels constantly and it has just a tiny, tiny chip and that's going to help a lot of people not to have to worry about their numbers and be aware of every moment to prevent accidents and things – the sky's the limit.

AH: *The sky's the limit*...what a fantastic title for this interview. I look forward to hearing a great deal more about your thoughts in that trajectory of technology as it comes closer and closer and in fact eventually as you say being embedded within us. So thank you very much for joining me today.

CA: Thank you Alexander.

OPINION

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We are already seeing people do this, i.e., the large number of wearable health monitoring systems. Let us, in fact, give equal "weight" to our study and practice of:

- Veillance: surveillance and sousveillance (inverse surveillance);
- Curity: security and suicurity; and the
- Vironment: environment and exvironment (reciprocal environment, i.e., ourselves as much as that which surrounds or encircles us).

The extent to which security guards forbid "suicurity" systems such as the wearable computer, is the extent to which we are living "in custody," that is, the extent to which we're expected to "trust security" while being mis-trusted by it.

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