A Day in 2060[1]

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You're walking on the street and meet a japanese woman. She starts to speak her native language, but your augmented reality lenses automatically translate and display what she says. Akemi explains that her GPS doesn't function well and asks if she can connect to yours to find her way. You accept the request, but your augmented reality vision also display: "try something". What happened in the background of your extended self in order to suggest this? In a fraction of a second your sensors and artificial agents did the following. They took a picture of Akemi, from which an image-search was launched, along with face-recognition. Several webpages of her public profiles were found. This information was integrated to create a profile, summarizing her professional, and to a lesser extend, personal interests. Additional visual and olfactory sensors on your wearable clothes did notice unusual pupil dilatation and pheromone concentration. Intellectual and bodily data concluded – on both sides, since Akemi did of course do a similar search – that this encounter was an excellent love match. You could have configured your digital agents to give a you better tip than "try something", but you chose a low advice specificity profile, to leave some of life's spontaneity. So, you indeed try something, and invite her to join you and your friends for swimming with dolphins this afternoon. You share time and GPS coordinates and you are thrilled that she accepts the invitation.

You run back home, cross the street without even looking at cars. A car brakes violently. You are surprised to see a driver in it, and shout: "poor and dangerous biological human, buy yourself a self-driving car, your reflexes are too slow!" Your emotional reaction was monitored and the automatic legal decision making actually gives you a one bitcoin fine, because you should not have had crossed so quickly the street in the first place, and you should not have had insulted the human driver, which had a negative emotional impact on him. Your augmented reality informs you sympathetically: "I understand that you felt upset and need more security. This security indeed implies that people should switch to stronger human-machine symbiosis, but can you please be more careful next time? The transition is still in progress. The driver felt embarrassed and miserable about this situation, which is one of the reason why you had to pay this fine. I don't advice to make an appeal, it will only cost more money and given that the situation was recorded by 10 different nearby sources, there is few ambiguity, so the judgment has a 99.9% confidence. The bloodstream of the driver has also been checked and it was perfectly clean, whereas your adrenaline levels were unusually high." You understand this but still wonder why human-driving cars are still allowed to circulate. Probably a lobby of the old-fashioned Association for Biological Human Rights.

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[1] This short science-fiction story is followed by an analysis to show its plausibility. It is based on reflections about techno-sociological evolution from section 2 of: Vidal, C. 2013. "Distributing Cognition: From Local Brains to the Global Brain." In *The End of the Beginning: Life, Society and Economy on the Brink of the Singularity*, edited by B. Goertzel and T. Goertzel. To appear. http://student.vub.ac.be/clvidal/writings/Vidal-Distributing-Cognition-LB-GB.pdf.

When you arrive home, a self-driving car just brought fresh cartridges, automatically ordered by your 3D food printer. As soon as you plug the nutrient cartridges in, your 3D printer cooks for you, based on inputs from nanobots floating in your bloodstream, which monitor the nutrients you need most. Your 3D printer is furthermore configured to follow your preferences, in this case, to follow a paleo diet because you decided to be in line with evolution. The animal protein supply is a mix of artificially grown, meat, fish, worms, and insect proteins. The food quantity is also higher than usual, because your printer anticipates your sport activity planned in your agenda. Indeed, you gave access to your agenda to your printer. The recipe is a new creation, because you've configured your printer to never print two times the same meal. Life is too short and the world's diversity of cooking too great to eat two times the same meal.

When you arrive at the harbor, safety procedures are quick and simple, just to give your stem-cell box, which could be used by the first-aid-kit on the boat. The boat is small, and no oxygen bottles are taken on board. Instead, the trainer takes a suitcase with syringes. Just before going into the water, the trainer gives a shot to all participants. What is in the shot? Mechanical artificial red cells, providing a 4 hours in vivo Self-Contained Underwater Breathing Apparatus (SCUBA). You and your friends dive in the water, play and communicate with dolphins, thanks to the dolphin speaker interfaced with your augmented-reality diving mask.

Suddenly, the boat radar displays an alert on your mask: "Shark approaching at high speed; no time to swim back to the boat. Fight is the only option". But you use your biological brain and think that there must be another way. You remember that dolphins can sometimes fight a shark. You turn to the dolphins hastily, set your dolphin speaker to beam a help signal, along with the 3D shape of a shark you quickly downloaded. Fortunately the dolphins understand your message, they do thank you, but get scared and swim away! The AI advice was wise. You feel frustrated that AI was once again smarter than you.

Out of sea mist, the shape of a shark is coming. Some last minute information is displayed on how to fight a shark to you and your friends. You start to read them, but too late, the shark has chosen to attack you. You see the shark's jaw dramatically expanding and... nothing. You loose consciousness.

You wake up on the boat, fully recovered. You ask Akemi: "what happened?" She explains that your friends managed to scare the shark by fighting him from multiple sides on its gills, and that he finally released you. You ask: "but how come was I not wounded?" Akemi: "You actually almost died! Your nano health bots detected your right kidney and your liver were critically failing. The messaged was transmitted to the first-aid kit on the boat, and the 3D organ printer started to differentiate your stem cells and printed at fast speed two new organs. I contacted a japanese surgeon expert in organ transfers for an urgent tele-operation. I gave him distant access to the first-aid robotic surgery apparatus, and he could work with the printed organs. I hope you don't mind we chose a human surgeon, we are still not confident enough with the cheaper fully robotic AI surgery." Your health insurance reckon that the incident could not have been avoided, and financially covers the whole operation. The file is already closed.

You ask: "what about the shark?" Akemi continues: "Since it drunk on your blood, it will be infected by artificial viruses. I guess you feel resented, but you know that global eco-regulations forbid to reprogram them at a distance to kill the

shark. However, thanks to this artificial virus infection, the shark is now trackable and should not create any further incident to any diver with an augmented-reality diving mask." As you put back your augmented reality lenses, you look at your information feed, and see that you have been thanked by diving, surfing and fishing associations for successfully tracking an additional shark.

On the way back to the coast, you skim some news and learn that a bomb has exploded at the headquarters of the Association for Biological Human Rights. The police has found out that the bomb was printed directly through the local 3D printer of the association. The cyber-attack left traces distributed around the globe. Police said the identity of the hacker is uncertain, and the debate rages whether it was triggered by a human or a coalition of artificial agents. At the end of the day, you realize that AI agents have done much for you today, and are in awe and grateful to them and your friends. You owe them all your life.

Let us now analyze this story and give some hints of why it is plausible, if we extrapolate some existing technologies. Augmented reality contact lenses will surely come, and prototypes are being tested (Lingley et al. 2011). In the story, humans are augmented with sensors, noticing details too hard to consciously perceive, such as the amount of pupil dilation or pheromone concentration. Three-dimensional food printers (Cohen et al. 2009) and biological organs printers (e.g. Mironov et al. 2003) already exist in embryonic forms. Automatic translation is supposed to work very well, and could be made more effective thanks to contextual data inputs. For example, your location in the street makes it likely that the conversation will be about finding your way, and the profile of the person restricts the likely vocabulary usage. Machine-machine interaction occurs when your GPS signal and maps are shared with Akemi's system, or when your artificial agents collaborate to tell you "try something".

Regarding the car incident, the legal system is extremely fast, reliable and efficient, thanks to distributed sensors recording continuously objective data. The driver's blood checking could be done by real-time blood analysis (Golan et al. 2012). Deontic logic (see e.g. McNamara 2010) allows in principle to make such artificial legal reasoning. Non-violent communication (Rosenberg 2003) is used by machines to communicate empathically and efficiently with humans. Bitcoin is a distributed and decentralized digital currency which is already in use (Nakamoto 2008).

Humans are supposed to be swarming with nano-robots, which perform all kinds of measurements and enhancements, and which are connected to the internet. For pioneering work on nanomedicine, see for example (Freitas Jr 1999; 2003). In particular, mechanical artificial red cells were conceived by Freitas (1998). A dolphin speaker has recently been developed (Mishima et al. 2011). Beaming the shape of a shark could be possible, if dolphin's "sono-pictorial" language of communication is confirmed (Kassewitz 2011). Surgery at distance has already been performed (see e.g. Anvari, McKinley, and Stein 2005). An accelerated differentiation of stem cells to produce desired cells is fictional, but would be very useful, as shown in this story. Artificial viruses are likely to be used in the future given rapid and promising progresses in this area (see e.g. Mastrobattista et al. 2006).

The "Association for Biological Human Rights" is fictional. But it is arguable that a too strong attachment to humans as a strictly biological (contrasted to bio-technological) species might hinder long-term socio-technological progress.

A 3D printed bomb is also a serious threat, and the security of 3D printers should be of high concerns. The option that a coalition of artificial agents could perform such a criminal and symbolic action is a classical theme about human-machine interaction or rivalry. It also raises the following issue: could a swarm of artificial agents have a will and agenda of its own?

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