# aINTIMATE TECHNOLOGY The battle for our body and behaviour



**Intimate technology** The battle for our body and behaviour

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### Intimate technology

The battle for our body and behaviour

#### Authors

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The boundary between man and machine slowly begins to fade. Which begs the question: how close to the skin can technology become? And also: how far do we allow technology to go?

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### Preface

This essay aims to spark a wave of public and political debate about a series of new products already showered out over you, the volume of which will continue to increase during the coming years. This essay takes a serious look at the trend that technology is rapidly nesting itself in between us, very close to us and even within us, increasingly coming to know us and even receiving human traits. In short, we have become human-machine mixtures, cyborgs.

Some examples may clarify this statement. The computer changed from desktop to laptop to smartphone and soon in the form of a computer glasses. Through data-mining, Google knows sooner than medical experts that a flu pandemic is coming up. And market researchers rely more on emotion recognition technology in order to measure consumers taste rather than relying on statements made by those consumers. We are entering a new phase in the information society, where information technology becomes intimate in nature. The Rathenau Instituut therefore coins it as the intimate-technological revolution.

The most sensitive ethical questions are in terms of influencing behaviour through information technology

These technologies offer many useful opportunities for innovation, especially for the Netherlands with its strong electronics and creative industries, but they may also entail undesirable developments. As it often affects people directly and personally, intimate technology sparks many social and ethical questions. These often touch upon fundamental rights, such as the right to privacy, to physical integrity, the right to have a safe environment, the right to property, and to have freedom of thought and freedom of conscience. Such questions are already topical, or will become on the short term, and therefore deserve the full attention in the current public and political debate. Politics and government are now challenged to develop – well on time – the necessary moral and legal frameworks to steer this development in the right direction. This process could build on the experiences gained in recent years, dealing with ethically sensitive technology, such as biomedical engineering and biotechnology. As information technology increasingly becomes intertwined with the life sciences and behavioural sciences, a mass of biomedical techniques will also find a place outside the application of medical practice. This brings up many ethical questions and the most sensitive are in terms of influencing behaviour through information technology, one also can frame it as persuasive technology, micromanagement or social engineering of behaviour.

Especially badly needed is the commitment by self-assured citizens who want to maintain the right in the future to be opinionated

The political and administrative handling of this intimate technology is still in its infancy – apart from the privacy issue. It is important that these challenges are picked up both on national and European level. In order to direct our own technological evolution, it is indeed necessary that politicians, administrators, lawyers, scientists, futurists, philosophers and ethicists think about the meaning and consequences of this trend. Especially badly needed is the commitment by self-assured citizens who want to maintain the right in the future to be opinionated. This essay therefore aims to stimulate opinionated citizens to think about the future of nothing less than our humanity.

Jan Staman Director, Rathenau Instituut

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# 1. The intimate technology moment

We now experience the historic tipping point in which the distance between technology and ourselves rapidly decreases.

We let it *into us*; we let it position *between us*. And as a result, the technology increasingly has knowledge *about us* and can even operate *just like us*, that is, mimicking facets of our individual behaviour. In short, man and machine are able to fuse to an extensive degree, so that it hardly becomes a metaphor in saying that we are becoming more intimate with technology.

Technology will increasingly define us more individualized, more personally, more intimately. This book seeks to address fundamental questions such as: How does intimate technology affect our humanity? Will intimate technology bring us closer to ourselves and allow for closer meetings with each other, or not? To gain some insight on these vital questions, the Rathenau Institute requested a broad range of experts at the interface of technology, ethics and society, to write about this subject in a personal blog post. It was up to them to see what technology they wanted to discuss. Taken together, their texts present a broad and diverse intimate picture of what intimate technology entails and what questions and positions it evokes. If you read Dutch, you may read the personal essays back on the web log Intimate Technology at http://intiemetechnologie.wordpress.com.

The essay you are now reading is inspired by those blog entries and other research by the Rathenau Institute.<sup>1</sup> It describes the nature of intimate technology, questions how we experience the intimate technological revolution right now, and presents various issues it raises and how we can deal with them.



Scan the QR code to go to the Intimate Technology weblog (only Dutch).

# Technology in us, between us, about us and just like us

Technology is nestling itself within us and between us, has knowledge about us and can act just like us, as I just stated.

In us: think of brain implants, artificial balancing organs and biocultured heart valves. Technology therefore becomes part of our body and therefore of our identity. Technology enters between us, on a large scale; we enter social media to show ourselves to the outside world, to contacts and communicate with others. Technology collects knowledge about us; smart cameras are able to measure our heart rate by looking at our skin and, pointed at a woman's face it can tell whether she is fertile - a thing she may not even realize herself. Dutch supermarket giant Albert Heijn stores our buying behaviour in databases, Dutch railways our travel behaviour, and public authorities store behaviour of our children and their parents through the Electronic Child Dossiers. In the public space, cameras ensure that we are well behaved. And finally, some technology behaves 'just like us'; they get human traits, exhibit intelligent behaviour or touches us with its outward appearances. Chat bots are becoming more lifelike, computer games more realistic and all kinds of apps are happy to encourage you when you are running or dieting.

#### New technological wave

Technology does all those things by becoming miniature in size, by better computing, and by increasingly focusing on individuals. In short, they become smaller, smarter and more personalized. In our daily life, the cell phone may be used as the outstanding example. The same amount of computing power as was needed to put people on the moon in 1969, is now residing into our pockets, purses and bras – we have all become high-tech heroes. So in the meantime quite something happened.

To start off with, a revolution has taken place in the field of materials. In the nineteen seventies we could examine and manufacture materials on micro level, but now it can be produced a thousand times smaller, so now we can design objects as small as a millionth of a millimetre i.e. nanometre – hence the term nanotechnology. This technique has also helped to found the information revolution, allowing to digitally store large amounts of information about our bodies and behaviour and subsequently to model and mimic body and behaviour. Conversely, without powerful computers there would be no machines available to produce nano materials and products. Nano and information technologies are thus interconnected in an upward spiral.

In addition, both fields also stimulate life sciences, not just biology, including genetics, and medicine, but also the cognitive neuroscience. Modern equipment ranging from DNA chips to MRI scans, increasingly offers opportunities to explore body and brain and to intervene. Insights from life sciences in turn inspire equipment builders: think of neural networks, DNA computers and self-repairing materials. In short, currently four technological revolutions are propelling each other, being the nano, bio, information and cognitive technologies. This dynamic quartet is collectively known as the NBIC convergence, pushing up a major technological wave like a whirlwind. And a large part of this wave consists of technologies, which are intimate in nature.

#### Turning point in history

Some thinkers see this as a turning point in our relationship with technology, even in our human history. A typical quote: "For all previous millennia, our technologies have been aimed outward, to control our environment. (...) Now, however, we have started a wholesale process of aiming our technologies inward. Now our technologies have started to merge with our minds, our memories, our metabolisms, our personalities, our progeny and perhaps our souls."<sup>2</sup> The first step in

this direction can be found in the period just after World War II, when scientists have set out to map human nature, to control and mimic it. Disciplines such as genetics, neurology, pharmacology, information technology and artificial intelligence all participated. Then still in its infancy, but now they do mark the world in a major way. The NBIC convergence is the direct continuation of that relatively young tradition, founded on current technical ingenuity and the growing interdependence between the physical sciences – nano and information technology – and life sciences – both biotechnology and cognitive technology. The goal is still the same as in the late nineteen forties, to understand the human being and its social world, and to control and mimic it. The goal has just come a lot closer.

### Increasingly, living systems are seen as makeable

#### Human being becomes machine, the machine becomes human

The intertwining of physical and life sciences is reflected in two technological mega trends: 'biology is more and more becoming technology' and 'technology is increasingly becoming more biology'.<sup>3</sup> The first implies that living systems are increasingly seen as makeable. Genetically modified bulls, cloned sheep, cultured heart valves and artificially reconstructed bacteria illustrate this trend. It is not only about biological interventions, as IT-based interventions are also emerging, as in techniques to influence brain processes. A well-known example is the use of deep brain stimulation to reduce severe tremor by Parkinson's disease patients.

The reverse trend being that of 'technology becoming biology', is reflected in artefacts that increasingly appear more lifelike or seem imbued with human behaviour. In France, there are cash dispensers that recognize Dutch bank cards and show texts in Dutch. Other devices are able to recognize human emotions, which they then take into consideration in their own behaviour. And Roxxxy, the first female sex robot, is a bit shaped like, well, let's say a female but more specifically a porn actress. When studying our own human condition, the two engineering mega trends can be transformed into three tendencies. First, human beings are more and more seen as machines, which therefore can be taken apart for maintenance and repair – and which could also be upgraded or otherwise improved. Second, machines become more and more humanoid – or at least engineers have the ambition to build in human traits, so they become social, emotional and perhaps even moral and loving creatures (here we talk of the machines, not the engineers). And third, interactions between people change, precisely because machines are increasingly penetrating into our privacy and social life. In the remainder of this essay, we use this threefold classification to gain insight into the question: how close to the skin can technology become? What do we find pleasant, we do find rather intimidating and where is that demarcation line?

We also want to seriously address the question whether intimacy and technology can be compatible. Blog Author Jan Vorstenbosch considers 'intimate technology' a contradiction in terms: intimacy represents a human sense of confidentiality and feeling being connected, and that concept can only collide with technology, a term that refers to lifeless devices put together with screws and bolts.

But is that really the case? I think the boundaries between these concepts are sliding, and that movement raises extraordinary questions. Are we going to consider ourselves as a machine, and thus largely as makeable? And can we see machines as humanoid, even as romantic partners? Since we can no longer dismiss these questions with a sincere 'no', or 'utter nonsense', we have reached a point where we will have to search for new answers.

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# Intermezzo 1:

Technology inside of us

The development of technology 'inside of us' is developing quickly, especially in the medical field. Smarter pills and nano research capsules traveling through our bodies are among the prime examples. The University of Twente in the Netherlands for instance works on a special electronic pill; the highly sensitive nanowires it contains can detect DNA fragments in the intestines that may indicate the development of cancer. In addition, the electronic pill can send the result of the measurement to the patient's smartphone.

At the University of Texas, Alexander Mamonov is working with colleagues on a cheaper, guicker and less painful alternative to traditional endoscopy as a method for cancer research, replacing the classic colon capsule endoscopy. Patients swallow a capsule containing a tiny camera and a light source, a transmitter and a battery. On its journey through the bowels the capsule sends film images to a wireless receiver. Analysing these images is still a labour intensive human task, but the researchers hope to develop an algorithm that will take over the job. For the oesophagus such a system is already available.

Using nanotechnology, yet others pills are constructed so that they will not randomly spray their active medication throughout the body, but only release it near or in the diseased tissue, such as a tumour. Such a targeted delivery makes the treatment not only more efficient, but also minimises the side effects.

Electronics that improve the functioning of our hearts and our brains by sending electrical impulses have been around for a while, the pacemaker since 1958, and deep brain stimulation since the 1990's. In our nanotechnology times more electronic functions become soon possible. In Switzerland a subcutaneous chip was recently developed, designed to measure and yield various blood values and relay it to a mobile phone. However, body hacker Anthony Antonellis uses such a subcutaneous chip for another purpose, namely to store a digital data carrier within his body. At present it is hardly large enough to contain a simple picture, at 1 KB. But Antonellis' main aim was to show that it could be done.

Other body hackers walk around with the similar kind of RFID chip nowadays used in pets. The most famous bearer is Amal Graafstra, who uses such an implanted chip as a door key to enter his house. Another body hacker, Rich Lee, had ear buds implanted, so he always carries those ear buds inside, within his ears. And the colour-blind artist Neil Harbisson carries within and on his head an eyeborg, able to detect colours and through software translates its vision into audible sound information.

Not only body hackers are using in-body technology; other variants are designed for people with damaged body functions, such as impaired hearing, sight or movement. In the Netherlands, deaf babies now almost

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as standard procedure get a cochlear implant, which allows them to develop significant hearing. Also, some adults can benefit later on from an implant, albeit to a lesser extent. For the human eye a retinal photovoltaic chip exists now, which has been implanted around the world in several dozens of blind persons. The technique only functions if the optic nerve is not too severely damaged, and only restores sight to a very limited extent. For a dysfunctional vestibular (body balance) system a technical remedy is also available. The first implantation of that fix, done by Dr. Herman Kingma, took place in Maastricht, Holland.

To put it in biblical style, the deaf will hear, the blind will see again. And truly, later on, the lame will walk again. At least that is what several European researchers expect who are working on the Mindwalker, an exoskeleton that will be controlled with brain impulses.

All these examples show that intimate technology is helping more people to do more than their disability hitherto allowed them to do – in those cases we use the terms healing or repair, or it will even go beyond what a human body normally allows us to do, as in improving, upgrading. However in principle, technology can also deprive us of opportunities, that is, technology can be employed to downgrade a person, for example, to make people infertile. This of course has also been possible for much longer with voluntary or compulsory sterilization, but it can now be applied with a subcutaneous chip that renders a woman infertile for a longer period, e.g. for one year. Enforced temporary sterilization is a very controversial idea, but Paul Vlaardingerbroek, professor of family law and juvenile court law, has urged to apply it. He argues that if child welfare takes its task seriously, it will have to think about using this technique on people with a drug addiction or a mental disorder.



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#### INTERVIEW: COCHLEAR IMPLANT

### 'I CAN UNDERSTAND YOU, BUT I REMAIN DEAF.'

Ottolien Tilanus, age 18, is deaf. When she was a toddler she received a *Cochlear Implant* (CI), a device that enables her to hear speech and other sounds, albeit to a limited extent. Before starting the conversation, she asks me to always look straight at her when I talk to her, so she can read my lips - this is now officially called speech reading in the Netherlands. For the same reason, she changed the seating arrangement so that my face was properly lit. The result was impressive. She flawlessly understood all guestions and she responded with a strikingly high voice, but in fluent Dutch. Only subtle signs indicated that Dutch is not her first language; here and there she has a slightly different pronunciation (coach becomes koos, the p in the word operation fails to really explode in her speech) and some minor grammar glitches occur. But enough about the way she talks. What did she actually say?

"Both of my parents are hearing, but my twin sister has one functioning ear and ever since my infancy I have been stone deaf on both left and right hand sides. I cried a lot at night. Small children always find it scary that they cannot see in the dark, but on top of that could I not hear my parents.

My mother remarked at one point that she was actively talking and singing with my sister, but with me she mostly hugged me, silently. She wondered why she did that, and then had my hearing examined. When I turned out to be deaf, all of this immediately became clear. My father worked as an ear, nose and throat specialist, but he really had not noticed it at all. After the diagnosis, he went to conferences on Cochlear Implants in order to be well informed, and when I was two years old, I received an implant by my father's colleague. At that time I was the youngest Dutch person with a CI. Nowadays it is quite normal for babies of six months old to get CI on both sides. For the sooner that this operation happens, the better it is. I received speech therapy in order to learn to speak Dutch properly, but it took until I was eleven years old before I became really good. Initially, I had learned sign language much faster and easier, which in turn helped me to learn spoken Dutch. So Dutch is not my first language; Dutch Sign Language is. My parents and sister also learned gesturing, and with my father I still often do that. I also use deaf American Sign Language (ASL) for contact with foreigners. English I can read, write and understand, but I find speaking it difficult. It is a bit like having to write with my left hand.

I like listening to music. I can plug my iPod directly into the external part of my CI. Not only do I hear the rhythm, but also the tones and lyrics. Although I seem to hear fewer nuances than hearing people, I enjoy it very much. And I can turn my iPod up very loud, because my environment remains unaware. That is an advantage. Just like I can switch off my CI when I go to sleep, and thus I am never bothered by any noise.

What I do not like to do at all is to speak on the telephone. The phone

distorts the sound and then the CI doubles this noise again. That makes it difficult to understand. I thus prefer just using text messages. Group discussions in spoken Dutch also become difficult for me. Right now I'm talking to you, so my CI is now switched to 'focus', and therefore I only pick up sounds that are close by. But in a group talk that option is impossible, and then I also hear all kinds of background noise.

For a large part, my social life is in the deaf world. I have a deaf boyfriend, attend a school for the deaf, visit sign language cafes, go to a church for the deaf and occasionally also dance at *Sencity* parties for the deaf and for the hearing that appeal to all of the senses, with music, images, massage and more. You should consider visiting it, as it is great fun for everyone.

There are strange ideas about CI. Hearing parents often think their child fitted with a CI does not need the deaf world anymore. That is untrue, for although it is a useful tool allowing you to communicate with many more people, you will not turn into a hearing person. I'm happy with it, but I remain a deaf person. Yet in the world of deaf people there are some who do not find me quite deaf enough, as I hear something and because I can speak Dutch.

Some deaf people are also afraid that CI will destroy the deaf culture. However, I need both worlds and both languages. Without sign language I would have an identity problem, but now there is a community in which I feel at home, in which they speak my first language and where I can simply participate in group discussions. There are also deaf who received a CI and it did not help, so they cannot hear anything. All of these are reasons why it is important that the sign language and deaf culture remain entirely intact. Have you heard of that conference in Milan, Italy in 1880? There a deaf boy was presented who could talk properly and could also read lips well. The experts then decided to abolish sign language. During a full century that decision has been very damaging to the deaf community, though we still managed to keep the sign language in use, more or less secretly. It would be bad if the sign language would be jeopardized again as a result of CI. Then we would repeat the same mistake."

# 3. Human being as machine

I am alive, I am alive, I am alive And I'm loving every second, minute, hour Bigger, better, stronger, power. **Will.I.Am (2013) #thatPower** 

According to some robot experts, we should quickly get used to the idea that we humans are simply machines and as such "subject to the same technological manipulation that we routinely apply to machinery".<sup>4</sup> This idea opens the way to permanently restoring and technologically improving our human body.

The man as machine is not a new idea. As far back as the seventeenth century René Descartes introduced a mechanistic worldview, in which essentially nature is a big wheelwork without purpose or deeper meaning. That opened a miraculous quest, resulting in all sorts of techniques to tinker with our body. Thus Descartes' contemporary William Harvey discovered that the heart is a pump. It is somewhat sobering indeed to realize that after understanding the pumping function of the heart it took more than three and a half centuries – until 1982 – before heart surgeons could place an artificial heart into a human being. And even then the patient only survived the operation for a mere one hundred and twelve days. Meanwhile artificial heart recipients may hope for a life extension of several years.

"By now, we consider our brain as a machine, as our central controller unit"

#### Erasing anxiety and depression

Spurred by recent discoveries and applications we nowadays increasingly embrace the machine metaphor. Thus, we also consider by now our brain as a machine, as the central controller unit of our behaviour and emotions. And the way it performs, can be influenced by us from the outside.

How for example does one prevent bad memories from making you feel anxious time and again? We do so by taking the right pill. Merel Kindt, professor of experimental clinical psychology in Amsterdam, has at least shown in laboratory that anti-hypertensive medication, timely administered, has this beneficial effect. She hopes that this will help war veterans and other people suffering from severe trauma, she writes in her blog post. That would alleviate their suffering and prevent them from becoming incapacitated for work.

A much more invasive method is deep brain stimulation, already mentioned above and also known by the nickname 'brain pacemaker'. A neuron stimulator, usually placed beneath the clavicle, sends electrical pulses to an electrode that has been surgically inserted in the brains, in a specific place depending on the disorder. Tens of thousands of Parkinson's patients have already benefited from it.

Studies are carried out to see whether people with obsessive-compulsive disorder or major depression would perhaps benefit. The Australian patient Catherine Cleary tells on YouTube about her experience with deep brain stimulation as a means to get rid of her depression. Her expectations were not high, but when the device was turned on after a month-long process of research and implantation, her life changed completely; it was as if the sky cleared up. It hit home when the doctor turned the device off again. "Suddenly I felt terrible. I fell back into the black, back into the abyss." Cleary has lust for life again, together with her husband, children and grandchildren and friends.<sup>5</sup>

#### Happiness switch?

Some thinkers become uneasy at the idea of possibly influencing someone's state of mind externally via electronic devices. Their doomsday scenario is the remote controlled robo-rat. Via electrodes, parts of the rat brain connecting with his whiskers are wirelessly controlled, to send him going left and right. To achieve that the animal obeys positively, electrodes are also connected with the pleasure centre.<sup>6</sup> See youtu.be/G-jTkqHSWlg. What is left of a human being, these critics wonder if you can change his emotions and moods with a push of a button? They consider deep brain stimulation (DBS) as a technique that promises to makes us less dependent of fate, but instead makes us just more hooked on technology.

Although such considerations might be valuable in the future, at present such a reliable happiness button is not available yet. This becomes clear from the case of a Parkinson patient who after a successful DBS treatment got into in a state of euphoria. He started a relationship with a married woman and bought several houses and cars with money he did not in fact own, with all the personal, financial and legal consequences. With the DBS switched on, he did not realize his manic behaviour. Switched off, it dawned on him and he repented. Ultimately, he chose to use DBS though only within the protective environment of a nursing home.<sup>7</sup> A quick technofix for our brains is therefore not quite available yet.

Maria d' Augustino's personal story is also illustrative.<sup>8</sup> On two occasions she participated in investigations to establish whether magnetic radiation – known as repetitive transcranial magnetic stimulation (rTMS) – can reduce depression. D' Augustino is torn between hope and fear. Five years after treatment, she is happy with her life. Thus rTMS has contributed to this, but also life experience, medication and years of psychotherapy.

#### **Cyborg Citizens**

Whereas some people perhaps become prematurely nervous about such developments, others cannot wait until these have been realized. According to them, everyone has the full right to control one's own

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body and mind with technology and thus leave human limitations behind. Because they want to go beyond the human being, they are called transhumanists. Their best-known spokesman is Raymond Kurzweil.

The NBIC convergence pushes technology step by step in that direction. Thus Herman Kingma, professor at Maastricht in a section of ENT medicine, has developed an artificial vestibular (balance organ) system. Maastricht citizen Jettie Hollanders has become the first person in the world with such a device implanted inside her head.

Kingma works in the official field of science, but out there in the world, other people are active in garages, in attics and in sheds and plenty of experimentation goes on. These do-ers among transhumanists are in the so called *biohacking* and *grinding* movement. They literally try to hack their own body. They use themselves as guinea pigs using technology to make their bodies do things that it would not perform naturally. They experiment easily with transcranial direct current stimulation (tDCS).<sup>9</sup> And since some consumers want to improve their brainpower, some businessmen play on the new business opportunities. In the case of tDCS a company called Foc.us has put a headset on the market, which should enable gamers to incite their prefrontal cortex.<sup>10</sup>

#### With his 'eyeborg', colour blind artist Neil Harbisson may even see infrared and ultraviolet

Biohackers also are trying to acquire new senses. By applying small but powerful magnets to their fingertips, they can feel proximity to microwave ovens, underground subway lines and people wearing a similar magnet. One of the most famous biohackers is the colour blind artist Neil Harbisson. On and in his head he wears a device, the *eyeborg* that perceives colours and transforms it via software into sound. Instead of being colour blind, Harbisson is now extremely colour sensitive; through his eyeborg he can even perceive infrared and ultraviolet light. Here software and brain are practically fused together. Harbisson therefore sees himself as a cyborg, a mix of man and machine. In 2010 he founded the Cyborg Foundation to encourage people to become cyborgs and to stand up for their rights.

Such experiments are not reserved for artists and biohackers. For many decades a culture of doping has dominated the cycling sport world. Professional poker players will swallow Modafinil to stay awake and alert. Ritalin is also no longer just taken by people with ADHD. At Erasmus University three percent of the students use it as a concentration enhancer, and five percent as a party drug. The journalist Malou van Hintum<sup>11</sup> finds its use as concentration enhancer 'totally okay' because people not really improve their brains, but only optimize what is inside. Nevertheless, the majority of Dutch are reluctant to become a cyborg.<sup>12</sup> They are afraid of coercion and fear an improvement race: Will employers make concentration pills mandatory in future and can one stay behind as colleagues accept such pills for themselves?

# Intermezzo 2:

Technology between us

Once upon a time, communicating was just talking and listening to each other in the immediate vicinity. The latter obviously was an annoying limitation, because we are regularly further apart than our human voices can reach. So progressively more technologies were invented to communicate at a distance, as in whistling languages, yodelling, using smoke signals, flag codes, writing, telegraphy and telephony... But only with the Internet and mobile telephones, combined in the smartphone, we are constantly in touch with whoever we want, wherever we want. And the smartphone will surely get a better connectivity with our body shape, such as in computer glasses.

Although we use the smartphone relatively little just to telephone, and the tablet computer even less so, yet both devices especially are made for contact with each other, for actually meeting others (as in Foursquare, Grindr), sharing events (as in Facebook, Whatsapp, Twitter, and combining texts and images in Instagram) or to talk long distance (as in Skype). All of these apps except Grindr are already in the top ten of most used functions. Of course, with many of those apps we do more than just communicating: with them we present ourselves to the outside world, they contribute to our personal branding. This is certainly true for LinkedIn, a top-ten app, but certainly also for Facebook and Twitter. And then there are the popular social media like games like Wordfeud and Farmville, which primarily revolve around pastime and fun. In these games, but also in some social media, it often happens that people know

each other only through that context, without physical encounter. Here, a communication tool has thus completely replaced the original human contact.

This latter becomes even stronger where technology takes over the role of communication partner. For example the TimeOut! app should help prevent warring partners get at each other's throat in conflictual relationships. The Re-Mission app reminds sick children to take their medicines on time. There are also apps that can serve as medicine or therapy, and the FDA is currently examining the official acceptance of two such products, one for children with ADHD, the other for people suffering from schizophrenia.

And then there are the digital tools that may one day come to influence face-to-face communication. Let us flash forward to the time in which we will install emotion recognition technology on our computer glasses, and will know precisely what our conversation partner feels. And as those glasses also run facial recognition software, we can figure out the names of passers-by around us, and see what is known about them online, all that is massive, and still more is to come. If we indeed want to use it, and if we are allowed to use these features, then contact with acquaintances or strangers will change significantly. And that will be even more intense if we also are getting continuous digital communication

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coaching at our disposal. That service does not exist yet, but its development is far from imaginary.

While these types of intimate technology will make us ever more transparent in physical life for the people around us, we can also try and hide our true nature online. Not only by giving incorrect information - which is perhaps found out soon by being compared to information externally provided – but more subtle, more attractive by using our avatar. This can be done by adding the sound of a heartbeat to our digital selves, but also by using a technique called morphing, so that our avatar subtly looks a little more like that of the person we communicate with.

Finally there may be intimate technologies between us, for which apps are not sufficient, because of the strong physical component they have. Thus the FamilyArizing system allows parents of babies in an incubator to virtually cuddle their child when it is agitated. The baby lies on a mattress containing sensors, and it is relaying the restless baby movement to an electronic device that is carried around the neck by parents. If the parent then puts an adult hand on that device, the mattress folds into a cocoon and it warms up, which makes the baby feels cuddled. It will not be as good as skinto-skin contact, but the cuddling will be there at the right time.

Apart from physical interaction between parents and child, we also find quite a lot of touch between lovers. Holding hands, for example, and that lovers' experience is simulated by a pulsating heart-shaped device called Taion Heart. For actually kissing each other at a distance there is Kissenger, shaped like a silicone mouth, that transfers the partner's lip movements in real time. The makers add that this may also be useful for kissing robots and for digital characters. And for sex: for this remote dildos and fake tele-vaginas are designed. They are called LovePalz and they telecast, again in real time, the movements of the other partner. LAT relationships have never been so lifelike...

Finally, less erotic, but no less intimate was the technology used by Kevin Warwick, professor of cybernetics, and his wife in an experiment. Both had an RFID chip inside their body, which was connected to their nervous system. They managed to electronically relay nerve signals from one chip to the other. This may be regarded as an early form of telepathy through technology.



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#### INTERVIEW: FACE EMOTION METER

### 'IT IS BETTER TO MEASURE WHAT CONSUMERS FEEL DIRECTLY'

Advertising Psychologist Ricardo van der Valk is director of a business unit at IPM, a firm active in market and policy research. In marketing research he uses FaceValue, an application that interprets facial expressions.

"Our buying behaviour is driven by habit, emotion and intuition, not by arguments and reason. For marketers and advertisers is therefore useful to find out what consumers really feel. Indeed, you can ask them, but there is so much that they are unaware of – there is a big gap between say & feel as it is called – so that it is better to measure it directly. By now, many instruments already are available, from association tests to functional MRIs. And now there is FaceValue.

Actually FaceValue is no more than an automated application of knowledge from the nineteen sixties. Psychologist Paul Ekman wanted to prove what Charles Darwin presumed, namely that facial expressions are universal, and not culture-bound. With his Facial Action Coding System, in using 43 points of reference on the face, Ekman was able to accurately record these muscle movements. He filmed people from different cultures and then checked frame by frame what they did with their facial muscles. So he could prove that the six basic emotions – being happiness, surprise, anger, fear, disgust and sadness – indeed were globally expressed in the same way, even by those born blind! Furthermore thirty other emotions consist of a mixture of two of these six mentioned.

What Ekman laboriously did by hand, frame by frame, FaceValue now does digitally and rapidly. Of course we as humans also continuously analyse other people's faces, otherwise our different facial expressions would be pointless and would have disappeared in evolution. But usually we cannot label what we see, it remains unconscious. FaceValue can.

Here at IPM we put test subjects in front of a computer screen with a good webcam and show them something, often a commercial clip. FaceValue analyses the emotions of the person, on a scale from zero to one. Emotion results below 0.3 we do not count. those are too weak. In the course of such a clip, you see that people initially feel neutral, and then - just to mention an example - a few seconds of happiness, a brief moment of anger or fear, and finally again they lose interest. Those primary feelings can also occur mixed up – so you get one of those thirty secondary emotions. Most film clips cause little emotion of any kind. Most of the other clips cause relatively weak emotions, at 0.5 or 0.6. The best videos show a wide range of intense emotions, both positive and negative ones.

I firmly believe that FaceValue yields almost all of the information we need for our purpose. In addition, there is always a colleague of mine looking through a one-way window, to study the subject's body language and listen to their verbal responses. Having a talk afterwards is not necessary for me because that often yields socially desirable and therefore less reliable information. But not everyone wants to embrace this method yet, for this approach, in which you assume that many decisions come about unconsciously, deviates from how people think they shape their own lives.

I will give just an example. A movie clip was made for *Stivoro*, the Dutch antismoking foundation. The intention was that by seeing this clip, smokers would feel positively approached. In the final discussion they indeed said they appreciated the movie clip. But FaceValue actually showed that they felt anger, sadness and disgust. The movie was felt to be too convincing because it had no argument left at all for not to quit smoking. Smokers felt pushed into the corner, and that is a negative feeling.

However, many marketers are still struggling with techniques such as the FaceValue. They are trapped in traditional methods. They are afraid that if they come up with something new, the response will be – what have we have done wrong up to now? And when I say in lectures that we, as people, make choices based on intuition, not on the basis of arguments, there is always someone who becomes angry. I then touch upon something sensitive, something private. In the United States, this face reading technique is already used in job applications. Personally, I think that is going beyond an ethical boundary. I think it is really too private. Moreover, in such a conversation, people perhaps are ill at ease, so you do not know whether their behaviour is representative for their normal functioning.

In a discussion I once heard Gert-Jan<br/>Lokhorst, professor of ethics at the<br/>Delft University of Technology, say that<br/>a scientist or a marketing company<br/>should not look into people's brain at<br/>all. He is afraid that in the end we mayFaceValue is<br/>oped by IPM<br/>FaceReader.

force people to buy products or services, just as it is now possible to move human limbs through external brain stimulus. However, in that same discussion the Rotterdam professor of marketing research Ale Smidts soberly noted that we cannot measure human behaviour that accurately, let alone influence it.

FaceValue is a further version, developed by IPM, of the application FaceReader.

# 4. Machines in human interactions

In intimacy, we are clasped into one and other, and the invisible bonds are liberating shackles. This clasping is imperious: it demands exclusivity. To share is to betray. But we want to love and touch not only one single person. What to do? Pascal Mercier<sup>13</sup>

Technology also plays an increasing role in the intimacy of human interaction. Meetings without technical support, talking face to face, is just one of the many ways in which we socialize with each other. And if that happens, technology may still force itself upon us, jamming our talks. My niece complains about her girlfriend, who during school breaks is texting with a girlfriend in another city instead of talking to her.<sup>14</sup>

### The Internet era starts to unsettle the ancient simple definition of 'intimate'

In his blog post publicist Hans Schnitzler<sup>15</sup> argues that the Internet and social media have caused fundamental confusion about the value and place of intimate life. The field of intimacy is pretty much everything relating to the body and moreover it is about matters that we only share with people who are traditionally close to us: our beloved, our immediate family members and true friends. The Internet age now

dislodges that simple definition of what is 'intimate'. In the Dutch provincial village of Haren, *Project X* showed on September 21, 2011 how it can get totally out of hand: a girl of sixteen accidentally invited 'everyone' for her own party. Thousands of people came to the event and large riots broke out in the normally quiet village.

If we try to predict "explosive quadrate information dissemination", it goes well beyond our imagination, publicist Aleid Truijens claims.<sup>16</sup> And strange enough that is caused by our unlimited creativity. The porn industry can use facial recognition technology to select images of porn actresses, which closely match a photo uploaded by the user. These types of applications can confuse us. Do we consider it normal if someone offers a photograph of his neighbour lady to that porn site or does this exceed a limit of decency?

Below you find for more examples of how technology confuses us concerning our intimate relationships with others and how we cross borders and how by trial and error set new social boundaries.

#### The best is always elsewhere

Almost unnoticed, social media and the Internet may have a disruptive influence on our attention span, our social intuition and our thinking. The journalist Jenna Wortham<sup>17</sup> wrote that she wanted to spend a quiet evening at home on the couch, but soon became restless by countless messages from friends who were dining in a trendy restaurant or enjoyed a special concert. She describes her anxiety as 'fear of missing out', things happen at places where you are not around, the best is always going on elsewhere. Others speak of a 'subtle form of intimidation'<sup>18</sup> or note with regret that even their own garden is no longer really quiet.<sup>19</sup>

Thinkers who focus on psychological aspects of the Internet and social media are worried about its effects on our social skills. It is difficult to estimate intentions of the person on the other side. "The more we are surrounded by technology, new media and anonymous communication, the more important it is that we learn to use, develop and trust our intuition" psychotherapist Jessy Cornet writes in her blog post. However, we only develop those skills with intimate interactions with other people, and not everyone is assured that that will succeed in interactions where communication technology stands in between.<sup>20</sup>

Some even fear that our ability to deeply think is at stake. They claim we are becoming shallow, because Internet surfing pours out small pieces of information on us, whereas the good old book would instead encourage thinking in broader contexts.<sup>21</sup>

Is there really even a change the way we gain experiences? In the past experience was an "almost intimate affair between an individual and a shard of reality: it was a defined clash and a trip into the depths", to quote the popular Italian author Alessandro Barrico.<sup>22</sup> Whereas previously you had to stand still and focus to really experience it, nowadays one experiences things while being in motion. Therefore, people are looking for areas that generate and suggest movement, like the Internet. According to Barrico the new generation gains experience as equivalent to "simultaneously inhabiting as many zones as possible, with relatively little attention" – thus multitasking. He acknowledges that a hectic search for incentives and the energy it generates could also have positive value. But how can we simultaneously maintain the good of the old world?<sup>23</sup>

#### Real Facebook-friends

Why do we actually share and spread increasing amounts of information that until recently was considered intimate? In the book *Real friends* (in Dutch: *Echte vrienden*) philosopher Stine Jensen<sup>24</sup> answers it this way: intimate capital, being "everything that relates to valuable personal information" nowadays is the key way to acquire power and influence and to increase our social status. This applies in social media, but also outside that field, people can use their intimate capital – as the Dutch politician Diederik Samson did when in a campaign video he presented his disabled daughter in order to advocate good health care.

In our individualized society the use of social media is tempting, but the question is difficult to estimate whether the use of intimate capital in this manner is really profitable or whether it will turn out to be bad investment. On Christmas Day 2011, the 42-year-old English woman Simone Back wrote to her thousand Facebook friends that she had swallowed an overdose of sleeping pills, but no one took action to prevent her death. That shows how little real value was represented in her Facebook capital, as Hans Schnitzler writes in his blog post. Perhaps even the realization that her Facebook friendships were just an illusion may have brought her to her suicide act, he suggests.

The incident also illustrates a keen observation by Internet psychologist Sherry Turkle: "When technology engineers intimacy, relationships can be reduced to mere connections. And then, easy connections become redefined as intimacy. Put otherwise, cyberintimacies slide into cybersolitude."<sup>25</sup>

Could perhaps the meaning of friendship be subject to inflation? Does the word no longer stand for emotional and practical involvement, but for something that is "set with a single mouse click, by adding someone to your followers?"<sup>26</sup> Or do just different kinds of friendships emerge, does the true friend remain, and is the Facebook friend added".<sup>27</sup> That appears to be quite true, and was aptly expressed during the *Naked Song Festival* in Eindhoven in 2013, when singer Howard Williams said to his audience: "You may be my friend on Facebook, but only on Facebook."

Pop singer: "You may be my friend on Facebook, but only on Facebook."

#### Debordering frontiers and new borders

Thus social media are enabling new forms of relationships, both lengthy and volatile ones. *Zeitgeist* always plays a role. Take the search for a suitable candidate for a love relationship. Not long ago, you were considered somewhat pathetic if you were looking for one through a newspaper ad, or on the Internet. Nowadays it is considered normal: almost a quarter of young adults of 16 to 35 years goes for online dating and one in ten relationships have started that way.<sup>28</sup> It offers an accessible, safe way to build a relationship step by step now that due to career pressures and lack of time, it has become hard to meet new people. As a modern matchmaker, technology can even automatically introduce those people who would fit well together. Everybody happy? No, some thinkers fear that in that way "even the most intimate part of our life – being love – (...) is being preprogrammed by computers."<sup>29</sup>

# Almost a quarter of the Dutch between 16 to 35 years is active in online dating

Geo-social networks such as Foursquare and Grindr are also being used to lower social thresholds. One user said: "Through Foursquare I have met people face to face who regularly commute on the same train as I do, people one would have normally never met, but through this instrument it is easy to have a chat."<sup>30</sup> It seems that geo-social networks will lower the threshold so that 'anonymous strangers' become 'familiar strangers' and 'familiar strangers' are allowed to enter a network of 'city friends'.<sup>31</sup>

Grindr is a gay dating service allowing users to see where the nearest one hundred other users are located, so that if desired, they can quickly make an appointment. One user told me that casual sex is an important part of the Grindr experience, but this service also has brought him interesting conversations, pleasant friends in nightlife and great holidays. But when he caught himself only beginning to judge people on Grindr on their sexual attractiveness, he criticized himself and he decided to moderate the use of this app. That was also made easier because he had already met the love of his life – via Grindr.

#### War at a distance: bloodthirsty and intimate

Yet another relationship between technology and intimacy comes to light in the debate on drones, the unmanned aircraft capable of bombing. Remotely operated thousands of miles away, their pilots decide over life and death based on live computer images. Such a warrior with an office job lives in two worlds: during the work hours he kills enemies, but for dinner, he joins his family. The risk is that the hostilities seem less real. Quote from an operator: "It's like a video game. It can get a little bloodthirsty. But it is fucking cool."<sup>32</sup> The threshold to start killing may possibly be lowered in this way; by numbing the operators' feelings possibly even to the extent that they start to dehumanise the enemy and consider them as mere things. That seems strange, because these operators have a much more intimate contact with their enemy than F-16 pilots, who drop their bombs from a great height over the intended location. By contrast, computer pilots sometimes monitor their victims for many days before they kill that person. They gain insight into the target's private life and their loved ones. They also see the consequences of their assassination. "It is really more intimate for us, because we see everything" according to the former drone operator Brandon Bryant<sup>33</sup>, who participated for some five years in missions involving the deaths of more than 1,600 people in total. Gradually the people he killed turned into things for him: "I felt no more respect for life. I felt that I had become a psychopath." In any case Bryant suffered from post- traumatic stress syndrome.

Drone operator: "I felt no more respect for life. I had become a psychopath."

On the other side of the front drones also have consequences. In Pakistan, near the Afghan border, drones cause many civilian casualties.<sup>34</sup> Citizens get stressed-out because they are never sure whether these buzzing drones just perform reconnaissance flights above them or are plotting an attack. They feel intimidated. The result is that their resentment against drones and against America increases, creating a breeding ground for new terrorists.<sup>35</sup>

#### **Enhanced behaviour**

How can two people convey feelings and experience intimacy through technology? That is a key question in the field of human-technology interaction. Across the board, use is made of effects that also strengthen our sense of intimacy outside the technological domain. For instance by using sound; the fact that people pay attention to sound in order to determine how close others are located, is technologically usable. When hearing the heartbeat of an avatar we experience a strong intimacy with that avatar.<sup>36</sup> Bio-hackers could perhaps simply strengthen the sound of their hearts in order to instil a stronger sense of belonging in other people. Communication via the Internet also offers numerous possibilities. Psychology tells us that people who physically resemble ourselves, will be more persuasive. Software is able to digitally mix two faces in an optional ratio. This so-called *morphing* makes a person more convincing in the eyes of the other, and as long as it is not too overdone, the effect remains subconscious.

Google Glass is expected to appear on the market in 2014. These computer glasses offer so-called augmented reality, an extra layer of reality. For example, the Lambda Labs Company is working on a Google Glass app that can live link a seen person to his or her Facebook or LinkedIn profile. What does that imply for the way we interact with strangers? Like the cell phone – switched off during a classical concert, during a theatre play and in the silent study section of a train – computer glasses require new social manners and software. A philosopher has already proposed, for example, that the face detection function may only be switched on after two people have directly looked at each other in the eyes for more than five seconds.<sup>37</sup> This implies a kind of informed mutual consent.

# Intermezzo 3:

Technology about us

Technology collects more and more information about us, so that you and other persons will increasingly know more about us.

It has for instance become very easy to track the whereabouts of people, which is useful for ourselves in order to find the way around, but also a convenient way for others to keep an eye on us. GPS for example, is already available in our phones and navigation systems. When using the right app on a big festival ground, it becomes easy to trace your friends, and parents can monitor whether their child has arrived in one piece in their school. RFID chips can also perform this function. In the United States there are schools where students' ID cards contains such a chip, and children should always carry them, so that the school can check - like the Marauder in Harry Potter where everyone is located. In Japan, there are even schools where pupils are digitally monitored on their way home. The parents automatically receive a text message if their child enters or leaves their school

For many years metal detectors have made visible what is hidden inside luggage or school bags, but by now there are also special gloves that can perform a similar task. Thus, for instance, while in crowds the police can check to see who carries a knife or a gun.

Companies can monitor their employees with cameras, data entry registration, wiretapping and e-mail taps, in order to see how they perform or to check whether they are complying with company rules and procedures. Even events happening inside our bodies can be measured or deduced with cameras or sensors. Heart rate, respiration, body temperature, sleepwake rhythm, calorie consumption, blood oxygen, and blood pressure changes - the list is long and growing. And with sensor-like tattoos, which are just printed sensors on the skin, body temperature, exercise intensity and skin moisture can be monitored over time. This kind of data are extremely useful for coaching applications, and it will independently encourage users to show desired behaviour - including exercising, energy efficient driving, sitting straight up - and omitting undesirable behaviour.

One step further is the Body Area Network (BAN) in which the data of several sensors is collected in a central unit and then relayed from there. Patient recovery, the development of a chronic illness, or early warning for disease signals within a healthy person can thus be observed. And why should we wait until the first signs of disease will occur? Analysis of the complete individual genome is now fast and affordable – and it easily reveals diseases for which that person would be most susceptible.

With techniques such as functional MRI one can see what is happening in our brains, even three dimensionally. Our thoughts, preferences and emotions can be distilled from that, although not quite so accurately at this moment, as well as neural or psychi-

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atric disorders such as autism, dementia and depression. So we are not even safe from prying eyes in the intimacy of our own skull. If we are our brains, as some researchers claim, we are becoming very measurable and quantifiable.

At the same time that entire intelligence gathering about individuals has now become ever easier, massive data storage has become much cheaper and therefore has increased. All that information gathered collectively is called 'Big Data', and it forms a digital gold mine indeed, and is being actively exploited. By adding data interpretation and conclusions, a valuable new layer of information is created, which is useful for all administrative, scientific and commercial purposes; measuring the population composition, health and educational issues, monitoring traffic patterns, the course of epidemics and health behaviour, focusing on customer needs and stock market dynamics. Especially when information is gathered and analysed in real-time, it becomes very useful in order to quickly and properly take informed decisions and to give advice to clients for example in traffic situations and on the stock trade floor.

All of the collected data have another potential user, the measured person himself or herself. Life-loggers are the prime example. These are generally healthy people who are literally registering everything – and to make it overly clear, perhaps even each fart

they have produced. Their interest is focused on their calorie intake, sleepwake rhythm, heart rate, blood oxygen level, mental mood and their physical and mental performance. They measure things with portable sensors and measurement devices in their clothes or on their body, but it is also possible for them to constantly automatically photograph the environment. Their goal is often to improve one aspect of their own performance, such as sleep or mental performance. This makes life logging a bit like a human improvement plan, though there seems to be a cardinal difference; these life loggers try to exploit their individual capacities optimally, but do not necessarily use tools - except for data information - to stretch beyond their natural boundaries and their human faculties.

Life Logging is only one aspect of the so-called *Quantified Self* movement. Another aspect is applications in the field of civil science. For example, with initiatives such as PatientsLikeMe and CureTogether, in which this type of individual data from large numbers of patients are analysed, it has led to new medical insights, for example, showing the side effect of medication or preventing migraines.



### INTERVIEW: SURVEILLANCE CAMERAS 'DEVIANT BEHAVIOUR IS WHAT WE ARE LOOKING FOR'

Nearly 450 police surveillance cameras are installed in the Rotterdam police region, from the cities of *Hellevoetsluis* to *Capelle aan den IJssel*. The world that is appearing in front of CCTV lenses is being continuously recorded and then stored for one week. In addition, a team of camera operators is watching images live, not really all of these images, but an ever-changing selection.

Continuously ten operators observe one *spot monitor* directly in front of them, plus a wall consisting of camera images on ten monitors located on the wall opposite them. If and when necessary, they can rotate most of these cameras and zoom in, so that they can follow persons on the street and accurately view and capture details.

Camera operator officer H. Ghasem has been working on that job for seven years. "For this job one needs to have a sixth sense", he says. "We are obviously trained, but eventually you also should have a feeling for whether someone is planning something evil. Deviant behaviour is what we are looking for. Please note, all events are not an offense. For example, someone may wear a long coat in a 30 degrees heat. That person gets however noticed. If someone's behaviour gives enough reason for suspicion, I forward the image to the watch commander or the emergency room. They can then also watch and decide to send in police officers. That could be a regular unit, such as a neighbourhood police team or a bike team. During public events, it may also be a horse unit, a dog handler or riot control troops. It totally depends on the situation.

In the beginning, people sometimes called this job 'being paid to watch TV'. Instead, it is actually pretty heavy. To stay focused, we need to take a fifteen-minute break every full hour doing no work at all then, and then we continue to watch the images of yet another set of cameras. One sits for long periods in the same position. And you do many things at once: you watch the spot monitor, or the wall of monitors, you communicate by phone, and then sometimes you consult with a colleague or your supervisor. Continuously you have to decide whether something is worth your attention That can refer to small events, such as men urinating in public spaces, or incorrectly parked cars, even damaged street furniture. But we also regularly see violent events: beatings, rapes, people walking around carrying a firearm or knife... What you really want is to take the culprit and pull him down. But all you can do here is capture images, reporting and ensuring that your colleagues can do their proper work. I do love my job, and I travel to the office whistling every day. But I also at times go home with a headache.

We are here for public security, and most Rotterdam citizens experience it also like that. This requires responsible and professional behaviour from my colleagues and me. We must respect the privacy of citizens, and that is what we do. In part, that is even digitally guaranteed, as the computer automatically shields the windows of homes. And for example we may only zoom in on people in the street when there is cause for suspicion. We should not zoom in on, lets say, the curves of a female. Sometimes a colleague has been warned against that pitfall; at that time he said it was a coincidence, not intentional. Or just imagine that I would see a stranger walking with my daughter, then I am not allowed to follow the two with cameras. That is not what these camera systems are designed for. Or what some people sometimes fantasize, that we should try and read PIN numbers at an automated teller machine. Many cameras are indeed pointed at cash dispensers, to combat skimming. But for good reasons we have sworn an official oath. Moreover, we have a supervisor and everything we do is being recorded. Not in the first place to check us, but to avoid misunderstandings.

Thanks to our work, very regularly suspects are arrested and cases are solved. I remember a robber who quietly and unobtrusively walked down the street with his booty, and was stunned when he was arrested. We were fully able to follow him using our CCTV cameras. Of course we also make occasional mistakes. Like that time I saw a guy get a bag out of his

jacket and handing a kind of balls to his friends. My colleagues on the street apprehended him and after checking they discovered that these balls were just innocent edible nuts.

In other cases, we may also just find out that nothing is going on. If a message arrives about let's say a brawl in the heart of Rotterdam, we can very quickly check whether that information is correct. Previously it would require a police car with full lights and sirens going all the way down, with all the danger that that implies. In this way, we also provide more security. And we save cost."

# 5. The machine as a human being

Machines are not only sandwiched in between one person and the other person, many of us have been philosophically and emotionally prepared by now to "seriously consider them as potential friends, confidants and even romantic partners" according to Turkle.<sup>38</sup>

She therefore has coined the 'robotic moment' in our human history. She claims that we stand on the verge of considering the social company and the opinion of technological artefacts as a normal part of our lives. Where would we be without the advice of Rain Radar pinpointing exact rainfall, or TomTom satnav GPS? They are digital confidants. This also applies to the app Tone Check, which helps the user to keep check on oneself. In using emoticons it keeps us from using foul language on the Internet.

Millions of gamers totally prefer to immerse themselves in a technological fantasy world. In the computer game *FIFA* 14 my son plays with star soccer player Messi in Barcelona el Clásico against Real Madrid, commented by the famous Dutch television sportscaster Evert ten Napel. Over the years, avatars have become more realistic, and not just in soccer games: when in the latest generation *first shooter games* a person dies, you see those really croaking, leading to feelings of empathy with that player.

What makes the virtual world so attractive? According to game designer Jane McGonigal<sup>39</sup> it is the fact that people crave for

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satisfying work, experiences of success, social connectedness and meaning. After all, the machine provides a continuous world in which those human needs are fulfilled, whereas the real world only occasionally does so. In the real world, we could indeed do with some support from technology. Did the California politician Mary Bono Mack take her grandson on her lap when crying at night and did she sing a lullaby to him? No, "I did anything any good grandmother would do, and I went to the App Store and downloaded Baby Soother."<sup>40</sup>

#### Technology as human mirror

Some philosophers think the chances are that in the near future we will consider technological artefacts as 'significant others'. According to one of them, technology will eventually play the same role as intimate persons and as such become important in forming and expressing our identity. Precisely because we are such intensive users of our handhelds, they are in turn able to put together our profile. That forms "...a mirror of ourselves; they give us insight into who we are – or at least technology's vision of us."<sup>41</sup> However that digital mirror is often a distorting mirror, another person notes. When she was creating her Twitter account she got all kinds of suggestions for vague acquaintances that could follow her and vice versa. Twitter creates an unreliable and annoying picture of the user. "The image that is seen is entirely false."<sup>42</sup>

Not that technology is always goofing. For measuring emotions, advertising psychologist Ricardo van der Valk<sup>43</sup> now relies mainly on emotion recognition technology. According to him, one can use the FaceReader – a device that can measure basic emotions and subtle blends of emotions on a face from microsecond to microsecond – "...finding out what consumers really feel. Yes, you can ask them, but there is so much that they are unaware of that you measure it better directly." A discussion afterwards is no longer necessary, he says, because "...then often socially desirable and therefore less reliable information emerges." Van der Valk thinks that Limits should be imposed in the use of this kind of technology. To use it in job applications, such as already done in the United States, is crossing the border. "Far too private". Yet it is conceivable that in the near future we massively walk around with a Face Reader app on our smart mobile or Google Glasses - or will we never go beyond that ethical boundary? If so, what would that imply for our social interactions?

#### Electronic lifestyle coaches

Another confidant that could be perhaps partially replaced with technology is the coach. This is due to the emergence of the electronic lifestyle coach, a device that gives people more insight into their physical and mental state. An early example was the Rationalizer, being a bracelet measuring the wearer's emotional state, developed by Philips Design and ABN Amro for people who trade at home on the Internet. Research had shown that home investors are often too much guided by greed and fear, thus hindering their rational choosing process. The Rationalizer intended to inform the home investor about his emotional state and advise when it would be wise to take a break and just reflect on the actions that he or she has taken. The emotional state of the investor was communicated through lights in the bracelet on an emo-scale; the more rapidly flashing red lights are seen, the more mentally excited the investor was. The Rationalizer has not become a commercial success and has by now quietly disappeared from view.

A very different kind of electronic coach is tested by the Centre for Domestic Violence in Eindhoven, Holland. It is the *TimeOut!* App, which should assist people with relationship problems in order to prevent their bickering getting out of hand. Each of the two partners can manually start the TimeOut!, and if the noise level gets too high, it will also switch itself on automatically. During the timeout the partners must keep sufficient physical distance from each other. The app detects that distance and regularly asks to show feedback how you feel, using computer moodies-icons. If the anger does not drop or if the partners remain in too close proximity, the app will contact a human counsellor.

The next generation of lifestyle coaches wants to go one step further. In laboratories around the world, scientists are working on technological systems that use sensors, data mining and persuasive technology in order to make automated personal feedback possible. Thus within ten to fifteen years the major European research *Guardian Angels for a smarter life* wants to develop systems to continuously monitor – without human intervention – the mental and physical condition of athletes, infants, the elderly and medical patients. Smart algorithms will evaluate and possibly even predict the user's performance. Based on such intimate insights the behaviour of the person can then be

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influenced either in open or hidden ways. The technology then even provides the most effective way of coaching, taking into account one's personal profile.<sup>44</sup> Which made a Philips researcher<sup>45</sup> grumble: "We are increasingly breaking through our own intimacy borders (...) We will never be the same." The art of writing once robbed us of much of our memory capacity, the pocket calculator dumbed our computing capabilities and satellite navigation melted our sense of direction. Will electronic coaches yet again affect other abilities? And if so, how bad is that – if we can perform better: more information capture, better math, reaching our destination safer and faster and be nicer in human interaction?

The U.S. military wants the drones replaced by machines, who will autonomously decide to kill

#### Killer and lover machines

Meanwhile, in their dreams engineers been going a lot further; they want to build autonomous and social robots. The U.S. military wants to replace the remote-controlled drones by autonomous armed robots, machines that will decide to kill themselves. The United States expect that in 2047 the first robots will fly and act autonomously. Some<sup>46</sup> have stated that the military robot will surpass the human military in decisions taking, even moral decisions, and will make fewer mistakes. Others, however, say that a human being must always take on life-and-death decisions because a machine can never be held accountable for those actions. The debate on killer robots or killing machines is heated. A number of human rights organizations, including Pax Christi, have launched the campaign 'Stop killer robots'<sup>47</sup> and in April 2013 the UN Human Rights Council discussed the Heyst report, which calls to temporarily stop the development of autonomous armed robots in order to create an international dialogue on its pros and cons.

Obviously robots are inherently not bloodthirsty, but can also be deployed to protect life. The autonomous car – a wheeled robot – is now a realistic future perspective. The Google car has travelled thousands of test kilometres and every self-respecting car manufacturer is working on this development. The *automobile* finally becomes what its name, self-propelled, promises; it moves increasingly by itself. Step by step it takes over more driving tasks from the driver. For example, a Mercedes S-series can parallel park independently in the city and when driving up to 50 km/h it can stop automatically for unexpected obstacles, such as a person crossing the road. On the highway it can drive in a train formation and automatically continue on the same road section at a speeds up to 200 km/h. Dutch technology institute TNO<sup>48</sup> expects that in about 25 years from now, autonomous cars will be driving around, whereas Google thinks that this will already be the case in 2020. Although the autonomous car has been so far, just like nuclear fusion, an eternal promise for the mediumfuture, this time the signs seem very strong. In collaboration with Google Traffic the state of California has adapted its traffic laws to make test-drives possible with autonomous cars. Already in 2015 the law rules should be completed in order to enable the market introduction of the autonomous car. One hopes that this kind of technology will save many lives and prevent injuries.

Finally, robots will also play a role in the social and physical interaction with people. In the nineteen-nineties we have already met the Tamagotchi, the Furby and the robot dog Aibo - the first two are indeed back on the toy market. At present, the dinosaur Pleo is popular and worldwide research takes place into the effect of the seal robot Paro on the welfare of elderly people with dementia. Even more physical and at least in one sense much more intimate, is Roxxxy, the woman-shaped sex robot - previously mentioned - that appeared on the market a few years ago. The thing - or the female - is 1.70 meters long, weighs 25 pounds and offers a choice of five personalities; the adventurous Wild Wendy, the shy Frigid Farah, the motherly Mature Martha, SM Susan and inexperienced Yoko. Roxxxy moves, has a heartbeat, responds to touch and can talk about the things that her consumers like.<sup>49</sup> According chess player David Levy, this development continues and by 2050 even marriages between humans and robots will be normal. But is it really conceivable that we outsource love and care to machines and that in the future we will have our most intimate relationships with robots?

# Intermezzo 4:

Technology just like us

In many ways, technology gets more and more human characteristics. This process already fully happens in the virtual world, and gradually it also percolates down into the physical world. We also see that the human being itself, one human organ at the time, is copied by technology. In short, technology is gradually turning 'just like us'. Now that fine-grain resolution is not anymore measured in *pixels*, but in three-dimensional voxels, slick designed computer games like Halo 4 and Grand Theft Auto 5 are setting the visual standard. Some gamers say the games cannot get realistic enough, whereas others worry as they feel compassion for their victims, however fictitious and digital they may be. Not all game developers find that worry objectionable, as the relationship between gamer and game just becomes more intense and intimate, and that is probably also enhancing the fun. In addition, the emergence of serious games shows that - among other things - this feeling of compassion is useful for educational purposes. Think of the game *Darfur is dying* that is asking for attention to the distressing situation in Sudan.

Games are not only gradually made slicker, like eye candy, but the characters, both enemies and allies, now embody a lot more tactical intelligence. It makes them more unpredictable and therefore the game turns into a more exciting one. The fact that artificial intelligence increasingly gets a climbing IQ score can also be seen in chess computers. In 1997, the computer Deep Blue defeated former world champion Garry Kasparov, who by the way played a weak game during that match. Nowadays chess grandmasters only sporadically win from their digital training buddies, for that is what chess computers have nowadays

become. It is expected that the chess player made of brain and blood will stand no chance anymore in a few years time.

Artificial intelligence is also used in *chatbots* and avatars are for example put to work in customer contact departments. Ikea is one of the firms putting them to full use. Whereas their robot Anna still cannot hide her robot identity, it is surprising how adequately she responds to a conversation with small talk. And because she is able to learn, she is becoming more 'real'.

Watson, IBM's supercomputer has even more to offer, now understanding an incredible range of research questions, which can be simply formulated in ordinary spoken language, and it is able to process and respond by rapidly consulting online reference works. Its developers feel that this Watson is 'breaking down the barriers between people and devices'. In any case, it caused a furore in 2011 in the United States by winning the TV show quiz Jeopardy. Obviously, IBM has not developed Watson in order to join in TV games programmes. Rather, Watsons adult future lies in medical diagnostics and in the financial world.

The European project *Blue Brain* takes a different approach in order to create a supercomputer. Bit by bit, researchers are trying to imitate human brains in order to develop a virtual brain. In time that will help neuroscien-

Intimate technolog

tists, they expect, to better understand human brains and neurological disorders.

Artificial intelligence also penetrates ever deeper into the physical reality. The automobile for instance is becoming more and more like a rolling robot full of driver assistance systems. The first autonomous system installed in ordinary commercial vehicles, by now made compulsory in the EU, was the anti-lock braking system (ABS), which during moments of heavy braking keeps the car steerable by preventing the wheels from locking. Its successor, Electronic Stability Control (ESC), can also early intervene when the car is slipping, by controlling the fuel flow – yet another step towards vehicle autonomy.

ABS, ESC and other systems form the prelude to entirely autonomous, selfmanaging commercial vehicles. Internet Company Google has autonomously driven a test car for thousands of miles on Californian public roads. On its roof a laser has been installed that creates a detailed 3D map of the area. A computer combines that with data from Street View, GPS and on-board radar. Finally, a camera monitors traffic lights and other road users.

Also coming up: humanoid robots. Their prospects are again pretty good as our environment is tuned to hominids, namely ourselves. Moreover, we prefer to deal with beings like us. Moving about, including running, climbing stairs and carrying trays without spilling drinks, is getting ever better in humanoids, and sensory exchange parts are also available for robots. Yet a critical challenge is to develop a morality for this group of new actors.

Parts of the real flesh and blood human beings have also been recreated in various labs. In the United States, for example, a human ear has been grown, consisting of living animal tissue that was allowed to grow over a mould in the shape of an ear. In Austria, based on stem cells, a cerebral organoid or mini-brain was made, which in terms of complexity is quite comparable to that of a developing embryo. And in Oxford living tissue was recently produced by a 3D printer, perhaps becoming the precursor of synthetic human cells.

What is next? The genome of Neanderthals has no secrets anymore for us, so the challenge is to remix our own genome with that of our extinct distant cousin. An advertisement: "Wanted – surrogate mother for Neanderthal baby" is still premature, but no longer entirely unrealistic.



### INTERVIEW: SEAL ROBOT IN A CARE INSTITUTION 'PARO SPARKS LONG CONVERSATIONS'

For a number of years now, the Westfries hospital in the city of Hoorn owns and uses Paro, a robot shaped like a fluffy white seal with black eyes and a black nose. At first the robotic animal was kept in the paediatrics department. However, as there were relatively few patients there, Paro moved to the geriatrics department in May 2011.

Activities counsellor Marianne van Vechgel loves using it, she says. "I do really not thrust him towards the inhabitants. I offer Paro with some reticense: "Look what they are able to produce these days". I do also not pretend that Paro lives. Nevertheless only once have I seen someone who thought he was a real animal.

If the patient is interested, I position Paro closer by. Patients usually pet him, and often they start talking to me, about a pet that they once owned, for example. Thanks to Paro we have nice conversations, between the patients and me. That is fine, because they are often people who are otherwise unable or unwilling to do much at all. And because they only have a shortterm stay with us – this is not a nursing home – I do not know them that personally. When I plugged Paro in for an electrical recharge, in the living room of the geriatrics section, the people became curious: "What is that?" "A very modern toy", I said, and just put him on the table. That loosened the tongues! About the toys they had played with themselves in their youth, about computers children play with nowadays, and also about the fact that children play too little. Whole stories."

On YouTube you can see in various clips how demented senior citizens cuddle with Paro. That seems endearing, but it also has something embarrassing. How does Marianne van Vechgel see this?

"I can imagine Paro causing a little embarrassment in family members and outsiders. If they see their mother or father with Paro, it seems as if they play with a furry doll. But I perceive it differently. When our patients deal with Paro – I'd rather not speak of 'hugging' or 'playing' – they are stimulated to feel something different than the fear, pain and sorrow that hospitalization often entails. They relax; they feel better, happier, and safer. I would definitely give my mother such a seal if she were in that situation. I really consider Paro an asset to our department. Nevertheless, I think it important that Paro is used the right way. Not too childishly, but respectfully. For our patients are not severely demented. And besides, even if they were, they remain adults, and even demented people have lucid moments. I also think it important to be there yourself and to make contact with the patient. In care a robot cannot replace a human, I think."

# 6. Political battleground

In paragraphs 3 to 5, three major trends have been described and illustrated, which are currently occurring at the interface between technologies on the one hand and the human body and brain on the other. In short, human beings increasingly resemble a machine, and the machine takes an even more emphatic place in human interaction, and the machine becomes more hominid. These three trends together form the intimate-technological revolution, which now unfolds before our eyes.

How do we respond to this revolution? Sometimes we accept its outcomes hesitantly, but more often we eagerly embrace the technologies that contribute in shaping our bodies, minds and social environment. They have therefore – I repeat – nestled *in us* and *between us*, and they gather knowledge *about us* and, now that they even begin to get human traits and behave *somewhat like us*. A medication that dissipates war trauma, an electrode planted in the brain that dissipates prolonged depression and creates joy. Communication systems allowing sisters to play a game of Scrabble thousands of miles apart and share everyday chatter. Robot aircraft remotely spy on the enemy and perform military attacks. Machines exist that measure emotions and warn us against hasty, over-emotional investment decisions. Some even think that in the distant future we will be able to embrace romantic partner machines – literally so. In short, more and more take machines seriously, we increasingly experience ourselves as more and more makeable and embrace technology in our intimate environment. Thus, an extensive fusion between man and machine is taking shape. We have become cyborgs, man-machine mixtures.

### We ourselves are the information society's main raw material

But wait - do we actually know what type of cyborgs we want to become? Or perhaps even better formulated: what kind or human being we wish to be in five, or in twenty or in a hundred years from now? The weight of this question becomes clear when we compare the current information revolution with the industrial revolution. With industrial techniques we controlled our natural environment, which supplied the raw materials – from oil to iron ore – for the industrial revolution. The intimate technologies of the information revolution intervene in our bodies and social environment. We ourselves have thus become the scientific frontier and have become the main raw material of the information society. Therefore researchers of technological top university MIT have coined the term reality mining and Facebook founder Mark Zuckerberg, in the movie *The social network* describes his ambition as "digging the total social experience of college and putting it online". The mining by social media that began in 2004 with American students now affects over one billion people around the world. Thus our bodies, minds and social environment no longer can escape the laws of science and the market.

#### This time around let us start to think in time

The industrial techniques have brought us much prosperity, but not without a fight. For technology only leads to progress if it is accompanied by shared moral principles, and those must be often be fought over long and hard. No welfare has emerged – for example – without the fierce battle between capital and labour in order to counter the exploitation of industrial workers. The Industrial Revolution also unleashed a global struggle for the environment. Awareness of ecological sustainability has painfully slowly surfaced as a guiding moral principle in dealing with nature by man. And just like industrial techniques have dramatically changed our natural environment, intimate techniques will radically change the conditions of our humanity.

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What it means to be human therefore has become one of the central moral issues and political controversies of this century.<sup>50</sup>

It is literally of vital importance to start early with collective thinking about what kind of future we want and what elements we do not want to lose. If we fail, history will repeat itself and new leading moral principles will too long be delayed. For the emergence of such principles is a matter of intense political controversy, preceded by a period of awareness. Consider the environmental issue, which after the start of the Industrial Revolution took more than a century and a half to be taken seriously. Will we indeed be able to search in time for shared moral principles to steer the information revolution in a dignified way, with political direction?

If we do not do so, we lay our future in the hands of the driving forces behind technologies. The authors of the blog Intimate Technology distinguish three specific key forces. Firstly scientists, will they withstand temptation to develop autonomous technology that will dominate mankind? Probably not.<sup>51</sup> Secondly, the economic market. What will happen – as we now seem to do – if we mainly leave the development of intimate technology to the prevailing greed and short-term profit by commercial trade?<sup>52</sup> Thirdly, the military and its related institutions. In 2011 Tjeerd Andringa suggested in his blog post that we all unconsciously share intimacies with the U.S. military industrial complex, and plugged the provocative conclusion: intimate technology = totalitarian technology. Now whistleblower Edward Snowden has revealed how the U.S. National Security Agency systematically intercepts telephone and Internet data with its computer program PRISM, this suddenly sounds much less radical. The NSA paid millions to companies like Google, Microsoft and Yahoo to obtain a gateway to information. By using it as a platform for spying the Internet in every possible way, the U.S. government and electronic industry have broken, according encryption specialist Bruce Schneier<sup>53</sup> the social contract of cyberspace. That contract simply means that data of citizens be controlled neatly, legally and ethically - avoiding a Big Brother society. In short, according to these blog authors we as citizens and politicians do not stand ourselves at the helm, but instead it is the world of science, market and those who should guard our safety; they have become the powerful parties that colonize our intimate environment.

# Science, and market forces and the military threaten to colonize our intimate environment

How can we indeed become the stage director of this intimate-technological revolution? At least not without fanning more public awareness. The emergence of the Internet and mobile telephone systems has particularly opened many eyes to the transformative power of technology. The information revolution rages like a hurricane through our lives, sweeping many technical and social boundaries away. We have already encountered the sweet and bitter fruits of this revolution: With social media, we can mobilize large groups, always and everywhere we are linked with our friends, we find a partner for a chat or for sex via location-based services, we can remote-kill with a single click – or at least the drone operators among us can; devices measure our emotional state and protect us from reckless behaviour. We are tempted by personalized ads, we meet avatars who speak and look like real people and in the near future we will wear Google Glasses, the computers that complement our visual reality with extra features.

Such new opportunities require that we rethink ethical boundaries and social manners and reformulate – and sometimes will even need entirely new concepts. Consider the term Facebook friend, which seeks to maintain the original warm meaning of the word friend but also to pigeonhole the phenomenon of Facebook friend so we realize that it really is just a digital acquaintance. New technical possibilities so often lead to border conflicts, on the one hand to preserve the old mores and the other to demarcate a new frontier. Such skirmishes happen in many places and strata in society. The youth group of the Dutch conservative Christian political party, SGP youth, are combating what they consider indecent in the company Second Love, which encourages people to cheat on their spouses by placing advertisements. The director of that dating site does not believe in marital faith, but rather in 'a breath of fresh air'. In high school my son students fight the 'digitization of the school break'. Agreeing to temporarily stack their cell phones, they want to protect something they apparently also perceive as a prime need: just talking with each other.

This essay aims to strengthen such critical awareness and open up a discussion for a wider audience and in politics. That awareness is badly needed because, in this hyper-networked world, we are 'all babies' in the words of Siva Vaidhyanathan, author of *The Googlization of Everything*. He indicates that we still have much to learn about the questions that the rise of intimate technology brings on. The challenge is to learn how to deal with the advancing technologisation and digitization of our bodies, minds and social environment. Just like the creators of the steam engine could not have estimated the Industrial Revolution that they would unleash, we cannot foresee what the information revolution will bring. We are already convinced of the fact that its impact will be huge: no sensible person has recently stated that the 'Internet blows over again' or 'cell phones are a senseless fashion'. But the many social issues that intimate technology entails are not yet clearly visible on our collective retina.

### Let's become human cyborgs, who deploy machines in a humane way

By intervening in our bodies, in social interactions and behaviours, intimate technology creates a new political battleground, on which will be fought a large number of social and moral issues. In the next paragraphs I will start to outline what I label as the 'biopolitical' agendas. This I will present on the basis of the three trends that have been central to this essay: 1. Human being as machine. 2. The machine as a human being, and 3. The human-machine interaction. The underlying message – the position I am taking on the battlefield, if you will – is actually three times the same: let us apply intimate technology in such a way that we indeed become human cyborgs; that machines will especially become facilitators for humanized human interactions; and that at all times we will put machines with human traits to work in a way that we experience as humane.

#### Human-like cyborgs

A number of techniques have been presented here which remedy or alleviate physical or mental disorders. Those give rise to relatively little debate. It is particularly the techniques that stretch the limits of our abilities that will lead to moral debate: matters that allow us mentally and physically to do more than what mankind has hitherto been able to. Transhumanists advocate the freedom of the individual to become a cyborg. Opponents, sometimes labelled cishumanists, are instead advocating borders. Otherwise they fear damaging our 'human essence' – a thing, which according to transhumanists does not exist.

Thus a central moral and political issue is the extent to which people should be free to self-realize via improvement through technology. This includes the justification issue: to what extent will people have equal access to such resources? Self-realization without external influence obviously does not exist. The media for example played an important role in the social acceptance of cosmetic surgery. Also the use of doping in cycling sport was not merely an individual choice, but was framed in a sports culture.

#### The way, in which technologies will be used, will remain to be seen in a sometimes conflicting social practice

What even goes beyond influence is social or economic coercion. Its prevention should be an important part of the discussion, since the risks are not imaginary. Let's take as an example a device or application to measure work-related stress. That could become a tool for employees to prevent them from crossing a border. It may even become a power tool for employees to prove having been overloaded with tasks by their boss. But it can also become a bench vise used by an employer to squeeze the maximum of labour from the employees within a given tolerable level of stress. How this technology is used cannot just be predicted, but shall become visible within social practice that is sometimes filled with conflict.

The growing number of techniques to measure and optimize physical performance, for instance with pedometers, and mental performance, with cameras monitoring alertness – this suits our achievement-driven society. A sense of discontent is never far away, because we experience ourselves, and each other, as beings who always fall short of something. A key question is whether we, as cyborg, are indeed retaining our human value or not. The question which use of tech-

nology is morally defensible strongly depends on the situation. Monitoring sweat, heart rate and temperature can be a good idea in psychiatric patients who at times have violent emotional outburst and must be temporarily isolated in order to protect themselves and others. The measurements to see the stress build-up enabling to predict outbursts, sometimes even to avoid it an hour and a half in advance, averting much misery. This technology gives the patient more insight into their own situation and provides the care staff with tools for preventative action. But do we also want to use this type of technology in children with tantrums and for husbands who are beating their wives?

These virtually unlimited measurement capabilities can be used to classify and normalize our behaviour. There is a risk that the free citizen is forced into an external standardization or optimization process. That turns the free citizen into bondage.

#### Human interactions through machines

As intimate technology becomes embedded in our communication, this may have consequences for our privacy and our freedom of choice. Moreover, addiction to this variant of communication could occur and all intercourse between people could change – including the times when technology is absent.

A spoken sentence will normally hang in the head of the participants, but ever since the invention of writing, announcements may be re-read days or centuries later – also by third parties. Basically, once technology becomes a tool in the interaction between people, the privacy issue looms in life. What do we want others – such as parents, government, insurance companies, police, employers, to know and do not know about us, and how we keep a grip on it? Intimate technology makes personal information increasingly available, so more and more parts of our privacy become compromised. In the digital domain our name, our appearance and our address are easy to find, but also often our location at the moment, our purchases and our thoughts and feelings. Indirectly, there is much to deduce from that information about our social relations, political and sexual preferences, and our health.<sup>54</sup> The source is sometimes surprising: our way of typing or our music choice can indicate depression, our gait may

announce dementia, and by what one likes on Facebook can inadvertently reveal ones own sexual preference.

### Our self-realization hinges on maintaining privacy

In recent years we have massively yielded information about our social life to companies such as Google, in exchange for their 'free' services. We are now at the point to give away all kinds of data about our bodies and wellbeing on a large scale. Consider the smart running shoes from Nike, equipped with sensors that measure athletic performance. Hundreds of thousands of joggers share their performance over the Internet and in return they receive Nike's personal training advice. These athletes continue to have access to the data of their own performance, but they are no longer the owner: they have given them away for free to the new large data-owner Nike. There is no such thing as a free lunch, or more aptly put, if we did not have to pay for something, we ourselves are the product. Therefore we should attach much more value to our personal data and the ownership thereof.

Under mottos like 'I have nothing to hide' or saying 'that app is just useful' one has sometimes become laconic in recent years about decreasing privacy, but in fact our whole self-realization stands or falls with the presence of privacy that should not be open to everybody. The more our life is linked to the Internet, the more will cyber crime, such as identity theft, have increased impact in the daily lives of citizens. How do we ensure that the protection of our personal data remains intact and that we remain free to organize our own lives at our own discretion? It is advisable to act with restraint in deploying monitoring. That applies not only to the government – the proverbial Big Brother – but also for ourselves.

Can a child develop in a healthy way if it knows it is continuously spied upon with technology?

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Some Japanese parents buy their peace of mind by installing a technical system that continuously traces the location of their child in the neighbourhood. But by doing so they deprive their children of the freedom that helps them to develop into independent adults, with all the ups and downs that go with it. It is even doubtful whether a child is able to develop in a healthy moral and psychological way, as it continuously knows it is spied upon.<sup>55</sup>

Another crucial form of freedom is freedom of choice, and we only really own that if we keep control of the information that we gather in order to arrive to our choices. Increasingly smart devices adjust the supply of information to our individual profiles. The information we get to see is really pre-programmed.<sup>56</sup> Information providers thus increasingly determine how we see the world and what options we have. We need to get more insight into the way profiling works and how our information supply is established, because right now we are at a 5-0 loss, as the computer knows a lot of us, but we know almost nothing of its algorithms and the business models behind that system. This imbalance must be restored.

Human interaction via machines has a third aspect worthy considering: the addictiveness of ICT. A philosopher<sup>57</sup> recently described it this way: "Look around you while you ride the train through the Dutch wildlife park Oostvaardersplassen. What do people look at? Yes indeed. Not at nature. Not at each other. But at Facebook." The Internet seems often larger than life and therefore more attractive than ordinary reality. For companies that provide important revenue sources, our attention = our time = their money. Thus in the experience economy - critics also speak of boredom avoidance industry a fierce battle for our attention is fought. How do we ensure that intimate technologies take our limited ability to pay attention into consideration? How we do keep our mind from being polluted and overloaded with partly nonsensical information? How do we ensure that our life does not become a continuous commercial experience? And perhaps the most fundamental question: how do we limit the colonization of our experiences, our imagination, our existence in the world?

We can set our own personal boundaries by simply switching off certain devices. But since we are all addicted to technology, switching off is hard to do. To really master such a switch, therefore, requires a deep insight that is aptly described by the poet Joseph Brodsky<sup>58</sup>: "What's good about boredom (...) is that it 's not a deception". In other words, that it is not an illusion, the surrender to your own thoughts is real and pure. Guarding those unpolluted, empty moments has become a momentous task in this world, both for the individual and for society as a whole. Therefore, it is "...high time to get boredom not only on the philosophical agenda, but also on the political and bioethical agenda."<sup>59</sup>

Intimate technology also – this is the fourth aspect – has a huge impact on how we interact with human beings. Technology also breaks down borders in this field. We clearly go beyond the pale when 'reification' of people occurs, as in the cases of the stressed-out drone pilot and the Grindr user who no longer appreciated himself. It's getting harder when we consider social developments that occur almost unnoticed. Sherry Turkle argues that the frequent use of ICT by young people will lessen their social skills. She fears that our expectations of other people will gradually decrease and the needs for true friendship physical personal encounters are reduced. In such a scenario, in the long run face-to-face communication becomes too intimate an adventure. That doomsday scenario was outlined in the 1909 short story by E. M. Forster, *The machine stops*. Let us with all our might try to avoid such dehumanization.

Meanwhile new intimate technologies are already looming, and they too can drastically affect our fellow contacts. This applies for example to the abovementioned morphing, with which we can expand our social impact in the virtual world. Manipulation lies around the corner and also in this case, a fair amount of transparency and giving *informed consent* on the influencing technique used is important.

#### Humane use of human-like machines

Machines are getting more and more human traits, not only in their appearance, but also in word and deed. There are devices coming up that will start to coach us socially and emotionally almost unnoticed.

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Google Glass is one of them: the computer glasses that can literally complement our view of the world in real time with extra information and images. In this *augmented reality* providers can give us tips on the route we have to walk, add personal advertisements and will coach us electronically.

This has consequences for our autonomy. What information do we get offered, to what degree are we consciously or unconsciously driven by the technology and to what extent can we still choose independently? Let us determine on time within which limits we want to use such intimate technologies.

Similar questions are prompted by the FaceReader that measures emotions. Can we use them justifiably during job interviews or is that going too far? For people with autism this technique seems to be a help in social intercourse. But is it also recommendable for other, perhaps neurotypical people? And if we are going to use it, what do we rely more upon – what our partner says – or the score on the emotion meter? How do we maintain and realize our social skills and our own willpower levels in a world where the computer helps us to manage our emotional balance and our good intentions? Or will we soon be finally become pleasant and kind to each other? If we want to preserve our freedom to observe and experience each other and the world itself, unmediated we must dare to face these questions on time.

Devices are getting better and better at mimicking human speech, faces, actions and behaviours. That actually gives them, or the people behind those devices, plenty of ways to fool us. Again a fair amount of transparency is a requirement, as well as learning about it; our children and maybe we ourselves must learn to distinguish real from unreal. It could even happen that aspects of love and death are outsourced to machines. But are we really waiting for machines that may neatly decide to kill an enemy under the rules of the war game, or that will baby-sit our little ones and elderly ones? Not to mention version 20 of Roxxxy, that smart sexy piece of plastic. All of those things would be wonderful feats of human ingenuity, but also the perfect formula for a future of loneliness. Let us therefore sit down and consider before we start. Do we want outsource that heavy social and emotional care task to technology? If we do that on a large scale, we lose part of our humanity. Just like intimate relationships with others shape us, also the care for others helps us grow. Are you really waiting for a robot or machine being the 'relevant other', as your friend or partner? Guaranteed it will never cause a domestic quarrel again, but still...

### Even those activities, outperformed by a robot are sometimes better done by a human being

My conclusion is that sometimes there simply is no place for machines. There exists for example a robot that can play great trumpet tunes. It would however really be a letdown if on the Dutch Memorial day, May 4, the tattoo signal on Dam square and elsewhere would be left to a robot. So even those activities outperformed by a robot are sometimes better done by a human being – perhaps a tiny bit less perfect.<sup>60</sup>

Intimate technology



# 7. Epilogue: the happiness of the wild cyborg

Pleasure, emotion, sexuality, happiness – you will kill them by pursuing them. Actually, you almost should plead for a kind of *let it be*, *let it be*. **Stefan Hertmans**<sup>61</sup>

The intimate-technological revolution promises the makeability of humans: our bodies, minds and social environment. This provides many wonderful opportunities for personal and social development. Think of serious games for overcoming fear of airplane flying, treating schizophrenia or reducing our energy consumption. But the technologization of our selves and the political and economic struggle around it, as we have seen, also engender numerous thorny political issues. There will be a social compulsion to reach self-perfection. There is an explosion of privacy issues, putting the integrity of body and soul at stake. A commercial battle for our attention is going on. And how we stand in the world, what information we get offered, how we meet others and experience the world – all is increasingly pre-programmed; our behaviour is manipulated, our social skills threaten to crumble and by using some technologies we may experience other people more as things than as human beings. The contract with ourselves is actually three times the same. Let us apply intimate technology in such a way that we become human cyborgs. That machines propelled interactions remain human in nature. And in deploying machines with people's traits we do so in a human way.

The scope of this contract has not yet sufficiently landed in our awareness.<sup>62</sup> Policy and politics now recognize that technologies that directly affect the body are socially and ethically sensitive - see section 3, Man and machine. In recent decades we have learned to carefully deal with medical and biotechnological developments. As a result, the introduction of such novelties is regulated in various ways and is surrounded with social reflection. We find it normal that medication and subcutaneous labs on a chip are extensively tested and we conduct ethical debate on cloning. Paragraphs 4, Machines in human interactions and 5, The machine as a human being show that many more intimate technologies are available and arriving, and although not directly intervening in our body they will have a strong impact on our physical, mental and social life and thus cause a lot of politically and ethically sensitive issues. The fact that the introduction of such intimate technologies needs to be done with care, has still insufficiently been understood in policy and politics. For example, the introduction of the Google Glasses is left to the market forces, whereas it raises many political and administrative questions. This is because authorities do not consider the computer glasses as an intimate technology that may deeply affect our daily lives, but as yet another electronic gadget.63

#### We do not want to live without computers, but neither do we want a computerized life

This essay has listed a large number of current and future gadgets in order to show that all of these dots form a pattern: a wave of intimate technology. In order to indicate the scope of this mega trend I made a comparison with the Industrial Revolution, which impacted on the management and control of our natural environment. The intimate technological revolution, driven by the convergence of nanotechnology, biotechnology, information technology and cognitive technology focuses on managing and controlling our intimate environment, our bodies, behaviours and social interactions.

In order to become a stage director of our own technological revolution it is necessary that politicians, administrators, lawyers, scientists, futurists, philosophers and ethicists will be thinking through that entire

trend – and not only those but especially all "opinionated citizens who want to maintain in the future the right of being stubborn" writes Jan Staman.<sup>64</sup> Being opinionated, with autonomy, freedom, playfulness, wildness, these are indeed important human characteristics to maintain. We do not want to live without computers, but we do not want a computerized, full pre-programmed life. Then we would really become robots and we do not want that.

The discussion about nature in an industrialized world can therefore perhaps inspire the discussion about the future of our own nature, our humanity. In nature debate the ideal of having a pristine great outdoors wilderness or wildness still plays a central role. This concept refers to an element or a quality many people do not wish to lose. The desire for wildness also leads to a certain reluctance towards controlling nature. Some European planners want to return large tracts of farmland back to nature, using the term *rewilding*. It is about deliberately not-intervening in nature, but respecting the ability of natural processes to organize themselves. In thinking about the future of mankind, the theme is often about what we want to improve in ourselves and in others. The question then comes up, what kind of cyborg do we want to be? Do we seek refuge in the complete mixing of man and machine, a process the transhumanists advocate? If we overshoot this, a counter-movement is already lurking, a theme beautifully elaborated in the Swedish television series Real Humans. The pressure group 'Stop The Cyborgs', which calls for a conscious use of wearable computers, like Google Glass, is a current example of such a counter-movement.

Instead I advocate a middle ground between cyborgisation and what the philosopher Derix labels as *rewilding humans*.<sup>65</sup> Rewilding simply implies 'stacking phones on the table' in the pub and the first owner to pick up his phone, has to give a round or drinks. Rewilding implies not reading and responding to work-related emails on holiday, not wanting to know everything, choosing a paper book; diving into cold water without a wetsuit, feeling the wind. The intimate-technological revolution requires certain human wisdom. Wisdom will involve at least the following:

- 1 Carefully handling the privacy of ourselves and others, because privacy is not dead, as many Internet gurus would have us believe. That also implies consciously dealing with the ownership of our personal data, because they are of great economic value both personal and public. It is precisely to keep alive the concept of privacy, in order to reduce the risk of identity theft, and to ensure that our physical and mental integrity are vouchsafed.
- 2 To monitor the way in which information reaches us.
- 3 Being alert to the right of every person to freely make choices and to develop them selves. A cult of self-development is not desirable, but the right to be simultaneously very special and very common is important.
- 4 Not outsourcing to machines those essential human actions, such acts as killings, marriages, love, care for children and the sick.
- 5 Keeping our social and emotional skills alive.
- 6 Protecting the right not to know and not to be measured, analyzed or to be coached.
- 7 Cherishing the thing that is perhaps our most precious possession: our attention.

Technical ability, finally, is also an important part of human ingenuity. But it is not to be hoped that faith in technology will prevail. Trust in people and accepting human forces, but also acceptance of failure, should form the guideline of our actions. Above I mentioned that a smart camera could see if women are fertile at that moment. Such a machine does not exist yet, but males do have that power: they smell it<sup>66</sup> or see it on the face<sup>67</sup> or in the way the hips sway.<sup>68</sup> I apologize for that blatant lie, but I was happy to let you frown your eyebrows in order for you to realize for a moment what special powers you have consciously or unconsciously. In this particular case just if you are male, but other similar abilities are generally human or specifically reserved for women. 76 Epilogue: the happiness of the wild cyborg

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We go into a bright future as we learn skills to navigate between cyborgisation and selfrewilding.

And the wild cyborg lived happily ever after.

Realize what special powers you have consciously or unconsciously

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Complete strangers walking around with computer glasses, who recognize your face and your emotions. Companies using big databases, who know what we desire and influence our buying behaviour. Foreign secret services keeping an eye on us, who intercept our private email. Robots keeping demented people company. And war games that are so life-like, you feel sorry for the avatar whom – according to the rules of the game – you have to eliminate.

Innocently we embrace one seductive technology after another. But are we merely consumers, and do all of us receive this beauty almost for free? Or are we instead the raw material of the information revolution, where others reap its benefits?

High time to reflect on how close technology may come to us and where intimate harassment begins. This book examines the struggle for our intimacy. It advocates the right to be self-assured. It pleads for the right to not always be digitally monitored and coached. To keep looking each other directly in the eye, rather than solely talking from screen to screen. And it calls for safeguarding our privacy, attention and freedom of choice, values that will never age, but are now at jeopardy.

Certainly, mankind and technology are about to grow together. And yes, man becomes a cyborg. But let us become happy, hence wild cyborgs.





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