With Gerald Q. Maguire towards immortality

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He works in a glazed room that is a sort of epicentre, some parts used by his students that are sitting around the room and some parts used by the global investigation into 'wearables'. These are things that one has about the person such as jewellery, the soles of shoes and belts that actually are mobile telephones, power sources and internet-capable computers. So the ultimate portable computer: implants that communicate, film, record, search, remember and much more. These small miracles can for example be sensors, computers or memory chips that are manufactured from liquid, proteins or atoms.

His office is a digital variant of the a magpies nest: computers, wireless networks, IP-telephones, mini-computers with video output, oscilloscopes and a plethora of instruments I never really grasped the meaning of. Everything in a reassuring muddle of cables, investigation reports, racks of harddisks and books.

"What is technology? All technical developments begin with people having dreams and visions of what should be possible. Then the engineers, inventors and other technicians look at what is really possible and what can be done to develop technology towards the visions and dreams. They work on the border between the practical possibilities and the visions."

"So the developments certainly drive us to change, but it is always people that actually change ourselves."

<u>The crowning achievement?</u>
While he speaks Gerald Maguire fingers a small card, the size of a cigarette packet but much thinner, just a few milimetres deep. It shows itself to be a mini-computer that besides memory and a processor, has sound input and output and video out and will, in its next version have a stereo sound output capability and XVGA picture quality.

"It needs just 300 milliwatts to work. One can connect it to a small micro-displayer that sits on the inside of a pair of glasses and have a portable, personal screen. It can be powered by a small 'power station' that generates sufficient energy for the device. Soon it will be even smaller and be able to do even more" explains Maguire with delight.

The miniature computers are however just a small detail on the path towards the larger vision he's working with : to bring out peoples real qualities and so transform the whole person.

One vision that can be thought of as presumptious, morally dubious and dangerously utopian, is one that he believes is self-evident: "we should ask ourselves the question "are we really the final stage of human development? Evolutions grand finale? Nature's last goal? I don't think so. We are a link in a longer chain, towards something else."

<u>Computers in heads</u>
Maguire thinks that implants are a part of human development, besides which it's nothing new. Around 10,000 people with aural impairments have already had so-called cochlea implants in order to hear better. In the USA three million people carry implants voluntarily: breast implants, artificial hearts, pacemakers, penis extensions, cheekbone implants, lip enhancements and other important changes. We are becoming accustomed to having our bodies invaded.

"I believe that the fantastic growth in the field of mobile communication has prepared the way for technological implants. We take it for granted that we should be able to communicate no matter where we are. We are already at the point where more people have higher demands, more than just talk and SMS. They want it wherever they are and they want it to be much quicker."

He takes an example that almost everyone today will recognise: clicking the mouse button to cause something to happen on the screen. On average it takes a fifteenth of a second to actually click the mouse button after taking the decision to do so. Today's computers are already much quicker at delivering the results of your click. "Modern computers with their antiquated interface - a "Windows" environment with a mouse are doomed to disappear." Maguire continues "but if I think that I shall click the mouse and can make the computer obey my thoughts, everything would go ten to a hundred times quicker. Which has a fantastic significance for the way we communicate and work."

He concludes that the only plausible solution is to have the computer inside us, that we carry it with us, that it is an integrated part of us.

"I was the first to say that we don't care about how the brain works. On the contrary, our brains can learn how the our implant's interface looks and functions. We can either learn what something means when an implant is stimulating the brain, or let the implant look after itself and only use it when we need it, like with a memory chip."

In a memory implant we would be able to put in everything we needed for a certain situation, name, prices, facts, customers, history and so on. Due to the fact that the memory is separate from the brain, Maguire believes that it would be simple to erase the memory if for example, one changed job.

Implants could help the disabled

Gerald Maguire has sketched out four stages in the evolution of the implants, the final point of the development will make us immortal. The four steps will take fifty years to attain and would be built on a mix of ethics and economic realities.

The first up to receive help from the implants are the disabled. Maguire sees it as a moral responsibility that they should reap the first benefits of the research. This could also be the source of enormous savings if for example, deaf and blind people could hear and see and through that get a meaningful life. For those with muscle wasting diseases or brain damage, the implants can revolutionise existence.

When these smart implants come on to the market, it could be in the form of sensors that can sense our emotional state, movements, muscle tension, blood pressure and much more. It would also be able to give tips on how to avoid burnout or heart attack. It will take 15 years to get results with these implants.

First soldiers, then us!

Next in line are the armed forces and their soldiers and pilots. To train a pilot in the USAirforce costs around SEK 8 million, the planes they fly cost almost SEK 1 billion. There is therefore a lot of money to be saved in the development of implants that will give the pilots skills and allow them to fly the planes better and safer. Defence budgets are huge, not only in the USA.

"The dilemma" Maguire points out, "is that what happens when the pilot changes jobs. Should his body computer then be disconnected, and who should control that? If the pilot should instead become a businessman with the body computer intact and the person would be perpetually connected to a never ending flow of knowledge and information regardless of where that person might be. Imagine sitting in a business negotiation with a person, who through his implant has access to exchange rates, stock values, price fluctuations, orders and logistical information!

Maguire and his colleagues reckon these advances will take 20 years to develop.

The next group who willhave access to powerful body computers will be information workers such as currency dealers, stockbrokers and other similar occupations.

Towards immortality

This requires that in the next 30 years researchers must have developed whole new types of computers and created a new definition of the concept of network. Through the packing of ever increasing amounts of information into ever decreasing cells, one can achieve a magnificent bandwidth.

So with a camera in a contact lense or the frame of a pair of glasses, one can register and record everything you experience. We should then be able to continually record and edit our lives.

”We can allow our biological brain to direct the recording function. Or more simply after an experience say ”I want to save that” or ”I want to erase that” and when we are happy, we can upload our lives on to the Internet.
Maguire and his colleagues believe that all this will be possible in approximately 50 years.

The future’s remarkable computers
Today’s computers are linear and wouldn’t be able to record our lives, that requires a whole new sort of computer. Today the research is progressing along four main tracks:

- Protein based computers that work with light sensitive bacteria that in turn can transfer the information to optical storage. Theoretically such an optical ”harddisk” the size of a sugar cube, would be able to store a 1000 billion bits (compared to 100 million bits that todays two-dimensional media is capable of.)

- Nano-computers built from molecules in the form of rods and bulbs that correspond to one’s and zero’s. Cautious calculations point at a billion calculations per second. Todays supercomputers are capable of around 4 million calculations per second.

- Optical computers rest on the assumption that light can be refracted without resistance and create the equivalent of today’s transistors. Optical computers would be small, compact units with unprecedented capacity.

- Quantum computers that use atoms are perhaps the most exciting possibility. Atoms are in themselves a form of mini- counting machine that can take one of two positions, up or down. Up could correspond to a one and down to a zero, one’s and zero’s firmly present in nature! There is however one drawback, when an atom is not being observed it can be both up and down simultaneously. That is what’s called the atoms superposition. It is only when one ’looks’ at them, that they decide which position to be in. Researchers with Charles Bennet at IBM call this qubit. If one gathers together a collection of qubits, they will not line up like today’s digital computers. Instead they will do all possible calculations immediately and look for all possible solutions. When one first ’looks’ at these qubits, they are forced to answer. When there is an infinite number of solutions and an infinite number of questions one would never know in which world any particular answer belonged. But it would do it quicker than the speed of light.

That may sound confusing but the scientists will agree:
”It takes a lot of courage to even try to understand quantum computers” acknowledges Charles Bennet.

What is life?
Professor Maguire and his colleagues around the world have another more human problem. They haven’t succeeded in starting a discussion about these possibilities. If we create the possibility to achieve immortality on the internet through artificial reality, so we raise many questions about morality, democracy, integrity and security.
”I have tried to address the moral side of these developments” explains Maguire ”at different seminars for engineers and scientists, philosophers and humanists, but I have never had a response. It doesn’t pay to think it’s especially interesting considering identity, integrity, democracy and other important questions.”

Implants have already raised a series of important questions; who should get them, should parents be able to decide to put them in their childrens’ heads, how should the laws be formulated, who updates the software, who disconnects them…? There are many questions.

The numbers of question increase if we are able to upload our lives to the Internet. Is the definition of life a functioning digestive system and the ability to reproduce? Or can the concept of life include someone who is physically dead but their replica continues to live, smell, talk and see – on the Net?

Will I still be me on the Net? What happens to my identity when there is a replica that looks the same, reacts the same way and likes the same things? In short, what defines us as individuals?

While we contemplate these existential questions, Professor Maguire and his colleagues continue their work to revolutionise our communication and place in the world.