LETTER TO THE EDITOR

Indirect nanotechnology for good and ill

Sir,

As has been pointed out earlier,[1] nanotechnology can be divided into direct and indirect parts, the indirect part comprising most prominently the miniaturized electronic circuitry that is already driving our laptop computers and mobile telephones. In that sense, one can indeed already say that "nanotechnology is everywhere", a phrase often encountered in newspapers and newsletters. The seemingly inexorable trend towards more and more processing power in less and less space is, however, resulting in the emergence of some truly bizarre developments.

These thoughts was sparked by reading a recent issue of "CORDIS focus", published as part of the European Union's 6th Framework Programme for Research (EU-FP6),[2] providing information about current projects.

The first one to have caught my attention is called "ePerSpace",[3] and is headed "Building a personalised network of digital devices". In summary, "Plans to develop protocols and devices that linked together all the audio and video gadgets that clutter homes, handbags and briefcases will unleash an incredible array of new, personalised and location-based services." The article proper then begins: "Imagine your alarm wakes you up an hour early because it knows you're flying abroad, and there's a traffic jam on the way to the airport… the alarm clock gives you the latest headlines about your destination. Your electronic doorkeeper automatically alarms the house as it senses your mobile phone leaving the house, your car provides traffic updates as you travel, suggesting a detour to avoid congestion. Once at the airport, you buy duty-free with your mobile phone. When you reach your destination you can buy movies and videos online, which will be sent directly to your home media centre."

A few superficial comments immediately jump to mind. It seems even the future cyberworld is not immune from traffic jams, but if ePerSpace is clever enough to suggest a detour to avoid the congestion, why was it necessary to wake up an hour earlier? If recent global news trends are a guide to the future, one imagines that "the latest headlines about your destination" will be mostly about bomb attacks, air pollution and riots. Still, perhaps it was worth leaving home since the need for an electronic doorkeeper suggests an unpleasantly criminalised neighbourhood. Presumably the duty-free cigarettes and alcohol—indeed not specified explicitly, but they are after all the main items of merchandise available in such shops—are no longer the health hazards government warnings printed on the packaging make

them out to be. Finally, it seems that the only purpose of the journey was to buy movies and videos, which could easily have been ordered online from one's own home in the first place. This fatuous project is, incidentally, co-ordinated by France Telecom.

Higher up on the scale of absurdity is the SemanticHIFI project,[4] co-ordinated by the Paris-based music technology institute Ircam. Headed "Active listening gives meaning to digital music", it is summarized in the following words: "Imagine a home hi-fi system where music was automatically categorised according to preferences, where you could read the lyrics as you listen, summon up a favourite tune by humming it, and play along with your favourites. It may sound farfetched, but all these functions and more have already been achieved." Apparently this project "represents a quantum leap in home music technology, in which access to musical content, and the ability to manipulate it, have hardly advanced since the days of the gramophone. Psychologists report that when we can manipulate a thing, we understand it better. In that case, society's understanding of music should increase exponentially when SemanticHIFI, a new system for manipulating musical content, takes off." The project coordinator, Hugues Vinet, is quoted as saying that "… adding descriptions to musical content allows for more interaction with music, so users can do more than just passively listen."

This project is clearly redolent with implication. There is a hint that digital music *per se* (in opposition to analogue music) is devoid of meaning. The society referred to has apparently reached that stage in which everyone is living in an isolated cell, as envisaged by E.M. Forster in his short story "The Machine Stops". At least karaoke, which appears to have been the inspiration for this project, involves convivial social interaction. But most damningly, by enabling "users to do more than just passively listen", it returns essentially to the stage of making music oneself, but at a far lower level than actually playing an instrument.

Finally, there is NICE,[5] funded by the 6th Framework IST (information science and technologies) thematic priority. This one is headed "Chatting freely with animated historical characters". The example described is a virtual Hans Christian Andersen, who can "hold visitors' attention for up to 15 minutes, chatting with them about himself and telling his fairy tales… thanks to some 600 output templates and primitives, the NICE system recreates the original author's personality. It also enables Andersen to chat with others about his life and stories, or to respond correctly to both verbal and non-verbal input."

Is our future really a world in which our personalities can be recreated with "600 output templates and primitives" (incidentally, the project's next target is Sir Isaac Newton)? Perhaps I should put a clause in my will specifying that "no parts of my written and verbal output made during my lifetime may be used as input for NICE". But NICE is ambitious: it offers "genuine interaction with characters". Although, as mentioned above, it enables the recreated character to respond "correctly", it is also stated that "input and output errors made by the character and visitors are not important", so one wonders what contorted definition of "correct" the project's protagonists are using.

In reading the accounts of these innovations, one is reminded of St Paul's "all things are lawful for me, but not all things are expedient".[6] Those putting their life's efforts into them do

not seem to ask the question whether the innovations are really useful, or whether they actually elevate the human race. Of course, everyone is at liberty to do as they please, provided they do not impinge on the liberties of others, but since the accounts of these projects appeared in a publication devoted to European Union research and innovation, I must presume that these projects receive, or have received, at least some public funding, and public criticism is therefore in order.

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