

Chapter XII

Prospects for Thought Communication: Brain to Machine and Brain to Brain

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Abstract

In this chapter, we take a look at the realistic future possibility of thought communication—brain to machine and brain to brain. Technical details are presented on experimentation carried out thus far using implant technology and the route ahead involving brain-computer interfaces is described. Some of the social issues raised by such a novel technological development are also developed. Of importance is the fact that, once a new technology is globally accepted, its use tends to be considered as the normal way of being, which may lead to the creation of new disabilities for people unable to use the technology. The two authors agree about the analysis, but, as a result of their two completely different backgrounds, they disagree about how much benefit thought communication can bring to human beings.

Introduction

Talking about informatics applied to medicine will undoubtedly raise a large number of different issues in several different directions, such as medical technology or patients' files. In this chapter, the authors are concerned with the patients themselves, and their physical merger with computers. In particular, technology is now becoming available which is opening up the realistic possibility of thought communication (brain to brain and brain to machine) being achieved in the forthcoming decade, through the use of brain-computer integration. The first trials along these lines are even now occurring in several research labs (Hochberg et al., 2006; Kennedy, Bakay, Moore, Adams, & Goldwaith, 2000; Warwick et al., 2004). New technical methods presently being looked into (e.g., nanotechnology) are only likely to further enhance the results obtained thus far and speed up the rate of progress in this area.

Witnessing the dawning of a completely new and revolutionary technical capability for humans raises a multitude of questions in terms of what it means for all aspects of society and humankind. It is interesting to consider what we can learn by looking back to relevant new directions when they have occurred in the past. In this chapter, the authors make an attempt to indicate the chief areas of interest and have a stab at pointing to pertinent events that relate to the situation as of now, and from which we may take heed.

It is important to realise that it is always extremely difficult, given any new technological discovery or invention, to realistically assess its potential future impact on and in society. At a particular instant, attempting to bring together commercial interests, fashion trends and political alignments is troublesome enough, let alone being faced with the effects of international incidents, extreme weather conditions and natural disasters. Yet all of these can seriously influence not only the immediate reaction to a scientific announcement but also its eventual take up and long-term usage.

The particular new technology considered here is the novel area of direct brain to machine, or brain to brain communication between individuals. This last potentially could change our human concepts of language, individual emotions, and even education. Thus far, a telegraphic form of communication has been successfully achieved between the nervous systems of two humans through neural signalling via implants in the nervous system. The next step, a repeat of the experiment from brain to brain appears to be straightforward enough. But, if successful, which most likely it will be, it will push humanity forward in a way that is perhaps most similar to the era when the first telephone conversations were held.

The following section gives an overview of the state of the art in the field of brain to machine and brain to brain communication. Then, two case studies concerning technological implants—conducted in 1998 and 2002 by one of the authors—are used to discuss some social and ethical issues related to these technological break-

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