

Chapter 40

From Cochlear Implants and Neurotology to Brain Computer Interfaces: Exploring the World of Neuron Synapses for Hearing Impairments

Dionysios Politis

Aristotle University of Thessaloniki, Greece

Miltiadis Tsaligopoulos

Aristotle University of Thessaloniki, Greece

Georgios Kyriafinis

1st AHEPA University Hospital Clinic on Otorhinolaryngology-Head and Neck Surgery, Greece

ABSTRACT

This chapter focuses on the framework of non-deterministic Brain Computer Interfaces within the context of Human Computer Interaction. A very special subgroup of these interfaces, emerging from the world of hearing loss, comprises the Cochlear Implants that affirmatively expose direct manipulation techniques. Short and long memory experiments with musical exploitation can prove shortcomings in inner-knowledge handling and provide understanding of how the language mechanism provides steady, un-biased speech. A model and a protocol for parameterizing sustainable aural communication skills are presented.

INTRODUCTION

Although the concept of a wearable device that integrates advanced mobility characteristics is getting more and more endorsement within the wide public, the notion of transplantable devices is rather new even to the techno community (Figure 1).

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Figure 1. Sequences of evolving species for wearable and transplanted devices



It would be commonplace to note that in today's thriving society, there is hardly any form of transaction either in communications terms (i.e. mobile telephoning, SMSing, remote videoconferencing) or social engineering (i.e. participation in social or professional networks, administration, voting, shopping, teaching and learning) that is done without ICT. The new concept that emerges besides e-business, e-commerce, e-banking, e-learning, e-registration, etc., is e-health. Already, by using devices like Google Glasses[®], users have readily gained a primordial approach to sensitive instruments of their organism, as is their eyes. When the wearable devices outspread to instruments like cochlear implants (Figure 2b), there is an even further increase in intervention by a factor of 10 (Politis et al., 2014).

Although the leader in mass technology penetration was desktop computing for more than a generation, neither its *metaphor* nor its *paradigm* seemed to pander more than 1 billion broadband installations right now (Rogers et al., 2011). To make things worse, its marketing seems to be shivering and the offered services are less appealing for the everyday user. On the contrary, mobile computing and mobile communications are awe-inspiring the new generation and provide technological substrates for global integration and deliverance (Figure 3. For more see Pesaran et al., 2006).

Figure 2. a. Left, Google Glasses[®] b. Right, a SONATA[™] cochlear implant, magnified



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