

## Chapter 58

# Multiculturality and Multimodal Languages

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### ABSTRACT

*The way by which people communicate each other changes in the different cultures due to the different communicative expectations and depending on their cultural backgrounds. The development of the Internet has caused an increasing use of computer systems by people from different cultures, highlighting the need for interaction systems that adapt the interaction according to the cultural background of the user. This is one of the reasons of the growing research activity that explores how to consider cultural issues during the design of multimodal interaction systems. This chapter is focused on such a challenging topic, proposing a grammatical approach representing multicultural issues in multimodal languages. The approach is based on a grammar, that is able to produce a set of structured sentences, composed of gestural, vocal, audio, graphical symbols, and so on, along with the meaning that these symbols have in the different cultures. This work provides a contribution to the area of mulsemmedia research, as it deals with the integration of input produced by multiple human senses and acquired through multiple sensorial media.*

### INTRODUCTION

The dialog among different cultures, the differences and diversities emerging in the present multicultural society give rise to communication issues. The way by which people communicate each other changes between different cultures

(Foley, 1995) due to the different communicative expectations and depending on their cultural backgrounds. The multicultural society impacts on communication and therefore it gives birth to a multiplicity of verbal and non-verbal interactions.

The subjective cultural attributes, which characterize similarities and differences within and between user groups with different cultural models, need to be considered in HCI design pro-

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cess (Allostath, 2006) (Allostath & Wright, 2005). However, the HCI design does not often consider any cultural model (Barber & Badre, 1998), or it adopts cultural models that are not designed in according to the interpretation design based on culture (Smith et al., 2004). In the last years HCI studies have been focused on cross-cultural development often based on some consideration of cultural cognitive models. In particular, Stivers, Enfield & Levinson (2007) provide the study of language acquisition and conceptual development, and the study of the relation of speech production and comprehension to other kinds of behaviour in a cultural context. In (Ein-Dor & Segev, 1990) cultural differences in end-user computing collecting data from end users in the USA and Israel have been investigated. This study has analysed the effect of national environments on four features: organization, structure, procedure, and behaviour. All seems underline the growing need to consider cultural issues during the design of Human Computer Interaction (HCI), and in particular, of multimodal interaction systems. This implies that culturally different user groups have to be considered during the design of interaction systems. Several studies have been focused on the design of interfaces for specific target cultures, and this activity is not able to produce an appropriate result in term of a system to be shared among users from different cultures (Bourges-Waldegg. & Scrivener, 1998). Furthermore, this challenge has been faced defining guidelines and generalizations that are often not sensitive to the actual context of a system because they are described by a bounded set of variables of the target cultural system, without taking account of the continuous interactions between cultures and their evolutions. However, Gustavsson (1999) has analysed an approach for designing in multimodal systems a context that can be shared by culturally diverse user groups because it can be used as a basis for the design.

In this chapter, the influence of cultural differences in human-human and human-machine communication is investigated. We start from

a review of the basic notions about multimodal systems in human-computer interaction (HCI). We have investigated several research studies for understanding how culture has influenced the design of usable computer systems. Afterwards, we have analysed the existing literature on anthropological linguistics for identifying the major linguistic distinctions and peculiarities in different languages linked to the different cultures. This analysis is oriented toward the definition of a multimodal language. This language is based on a grammar, that is able to produce a set of structured sentences, composed of gestural, vocal, audio, graphical symbols, and so on, along with the meaning that these symbols have in the different cultures.

Consistently with the recent advances of old multimedia towards the use of multiple sensorial media (mulsemmedia), this work provides a contribution to the area of mulsemmedia research, as it introduces a new grammatical approach representing multicultural issues in multimodal languages. The proposed approach is general enough to be applicable for whatever modalities and in whichever culture.

## **MULTIMODALITY IN HCI**

Globalisation processes and the wide development and pervasiveness of the Internet have increased the number of computer systems and personal devices intended to be used by people from different countries and cultures. The wide use of these systems in everyday life implies the need to consider different communicative users expectations and their cultural backgrounds. Therefore, model of cultures have a great impact on the design of the interaction systems.

Multimodal Interaction has emerged as the future paradigm of HCI. This fact is gathered also by the increasingly application of the multimodal paradigm to computer interfaces making computer behaviour closer to human communication.

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