

# Multimodal analysis of expressive gesture in music and dance performances

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**Abstract.** This paper presents ongoing research on the modelling of expressive gesture in multimodal interaction and on the development of multimodal interactive systems explicitly taking into account the role of non-verbal expressive gesture in the communication process. In this perspective, a particular focus is on dance and music as first-class conveyors of expressive and emotional content. Research outputs include (i) computational models of expressive gesture, (ii) validation by means of continuous ratings on spectators exposed to real artistic stimuli, and (iii) novel hardware and software components for the EyeWeb open platform ([www.eyeweb.it](http://www.eyeweb.it)), such as the recently developed Expressive Gesture Processing Library. The paper starts with a definition of expressive gesture. A unifying framework for the analysis of expressive gesture is then proposed. Finally, two experiments on expressive gesture in dance and music are discussed. This research work has been supported by the EU IST project MEGA (Multisensory Expressive Gesture Applications, [www.mega-project.org](http://www.mega-project.org)) and the EU MOSART TMR Network.

## 1. Introduction

*Expressive gesture* is a key concept in our research (Camuri et al., 2001). This paper tries to face it and introduces two experiments aiming at understanding the non-verbal mechanisms of expressive/emotional communication.

Several definitions of gesture exist in the literature. The most common use of the term is with respect to natural gesture, which is defined as a support to verbal communication. For Cassel and colleagues (1990) "A natural gesture means the types of gestures spontaneously generated by a person telling a story, speaking in public, or holding a conversation". McNeill (1992) in his well-known taxonomy divides the natural gestures generated during a discourse in four different categories: iconic, metaphoric, deictic, and beat. In a wider perspective Kurtenboch and Hulstijn (1990) define gesture as "a movement of the body that conveys information". A survey and a discussion of existing definitions of gesture can be found in (Cadoré and Wanderley, 2000).

In artistic contexts and in particular in the field of performing arts, gesture is often not intended to denote things or to support speech as in the traditional framework of natural gesture, but the information it contains and conveys is related to the

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