

Joint drum-dance improvisation in Balinese performing arts: an ethnographic and computational approach to describing, analyzing and modeling *kendang tunggal*

Kendang tunggal or *gupekan* denotes a specific mode of improvisational Balinese solo drumming used to accompany improvised solo dances and the improvised parts of otherwise choreographed dances. Previous studies on *kendang tunggal* have mainly been music-analytical in nature, pointing out that such patterns can be compared by their structure to sentences of a spoken language, consisting of a finite number of elements that are put together in a specific way. Although dance and music are strongly interrelated in a performance, the influence of dance movements on the structure and configuration of *kendang tunggal* patterns was mentioned but not considered in previous analyses. Also, no Balinese concept or explanatory model has yet been formulated in regard to what, from a Western point of view, might be called "improvisation". This study aims to fill these informational gaps by investigating how this Balinese form of joint drum-dance improvisation – a phenomenon that cuts across performance media – is learned, practiced, taught by Balinese expert drummers. It asks the questions: What is the philosophy behind this mode of improvisation? What are the rules that are applied when performing *kendang tunggal*? How does a dancer influence a drummer's choices in arranging his/her patterns?

To answer these questions, I propose a multidisciplinary approach that necessarily combines methods and theories from anthropology, ethnomusicology, ethnochoreology, sound and music computing (MIR, algorithmic composition) and linguistics. By first conducting fieldwork in Bali, comprising me learning from and interviewing drum and dance instructors of the local art university as well as so called *guru alam* – artists who have developed their extraordinary skill by training exclusively in the village context and outside arts institutions –, insights into the philosophical and practical aspects of *kendang tunggal* will be gained. Based on this knowledge, I intend to design a computer program that is capable of automatically transcribing, analyzing and generating *kendang tunggal* drumming patterns. By revisiting my drum teachers with the implemented software, letting them evaluate the correctness/playability/likelihood of the computer-generated musical material and repeatedly adapting the generative algorithm in regard to their feedback, an algorithmic model of a drummer's improvisational rules is formalized. I anticipate that my ethnographically informed computational approach to describing, analyzing and modeling the Balinese improvisational practice of *kendang tunggal* could also be used for investigations of other forms of joint music-dance improvisation in other cultures, proposing a new and in my opinion efficient and systematic way in researching this mode of improvisation.