

Special issue on evolutionary music

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1 Introduction

Computing technology is becoming increasingly ubiquitous in all aspects of music. Smart sound design and synthetic music pervades a wide range of creative practices, from avant-garde contemporary music to entertainment media for mass consumption. Computer technologies have a profound impact on how music is studied, composed, performed, listened to, stored and distributed. For instance, software sound synthesis techniques offer musicians the possibility of creating bespoke digital musical instruments capable of producing an unprecedented range of novel sounds; and Computational Intelligence techniques allow for the design of sophisticated composition methods that would have been impossible to conceive otherwise.

This special issue was born in New Orleans, a relevant place for twentieth century music history, where the first workshop on evolutionary music, EcMusic 2011, was held, and where attendants had the opportunity to both learn from researchers and also listen to EC-generated music. An open call for paper launched there gave rise to the special issue we are introducing.

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This special issue deals with all aspects of evolutionary algorithms and their application to music-oriented tasks. The interest in the topic has steadily grown during the last few years, and we considered the opportunity of an issue of Soft Computing Journal devoted to this research area.

2 Summary of the special issue

Five papers have been carefully selected for publication in this special issue.

Kaliakatsos-Papakostas, Epitropakisa, Florosb and Vrahatisa present the application of an Interactive Evolution (IE) System with the aim of evolving melodies by means of Genetic Programming (GP). Authors encode functions that create 8-bit waveforms that are evolved to produce melodies. Well-known concepts for GP community are considered in relationship with the problem at hand, such as tree depth and genotypical distance.

Dostal introduces the design of novel mutation and fitness operators for autonomous evolution of human-competitive rhythm accompaniment using genetic algorithms. Autonomous evaluation of computer-generated musical pieces is considered as an open problem and some proposals are formulated to overcome it, which includes several fitness operators that autonomously evaluate the quality of generated rhythm phrases.

Vatolkin, Preuß, Rudolph, Eichhoff and Weihs present a Multiobjective Evolutionary approach to the problem of instrument recognition, when polyphonic audio is processed. This is a problem of interest for Music Information Retrieval community. Given the classification problem at hand, authors develop a multiobjective feature selection procedure before building the classification models.

Eigenfeldt presents a set of intelligent agents capable of combining melodic and rhythm phrases that are previously evolved by means of a generative real-time composition system. An offline analysis of a corpus—namely 16 measures of the traditional Javanese gamelan composition *Ladrang Wilugeng*—is first applied and the initial population derived from it, so that the generative process can proceed.

Mitchell addresses the problem of evolutionary sound matching: systems in which evolutionary algorithms are used to automatically derive the parameters of a synthesizer to produce a sound that matches a specified target sound. A novel clustering evolution strategy is presented which enables the concurrent optimization of multiple distinct search space solutions.

These papers constitute an interesting sample of the current research that we consider useful for other researchers that may be interested in both Evolutionary Computation and Music.

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