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On Creativity, Music's AI Completeness, and Four Challenges for Artificial Musical Creativity

OVERVIEW ARTICLE

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ABSTRACT

This article explores the notion of human and computational creativity as well as core challenges for computational musical creativity. It also examines the philosophical dilemma of computational creativity as being suspended between algorithmic determinism and random sampling, and suggests a resolution from a perspective that conceives of "creativity" as an essentially functional concept dependent on a problem space, a frame of reference (e.g. a standard strategy, a gatekeeper, another mind, or a community), and relevance. Second, this article proposes four challenges for artificial musical creativity and musical AI: (1) the *cognitive challenge* that musical creativity requires a model of music cognition, (2) the *challenge of the external world*, that many cases of musical creativity require references to the external world, (3) the *embodiment challenge*, that many cases of musical creativity require a model of the human body, the instrument(s) and the performative setting in various ways, (4) the *challenge of creativity at the meta-level*, that musical creativity across the board requires creativity at the meta-level. Based on these challenges it is argued that the general capacity of music and its creation fundamentally involves general (artificial) intelligence and that therefore musical creativity at large is fundamentally an AI-complete problem.

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