Beyond the Recording: Musical Performance as a Combinatorial and Kinaesthetic Game

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Abstract

Computational cognitive musicology has made significant advances in modelling listener-side processes, such as expectation, segmentation, and tonal hierarchies, using corpora of recordings, scores, or symbolic encodings (cf. Lerdahl and Jackendoff 1990; Pearce 2018). These models excel at analysing music as perceived structure, but they implicitly assume that musical cognition is recoverable from output data. This overlooks a second, equally important domain of performer-side cognition — the lived experience of navigating musical complexity in real time.

Drawing from the recent theory of 4E — embodied, embedded, enacted, and extended — cognition (Newen, Bruin, and Gallagher 2018; Schiavio and Van Der Schyff 2024), I argue that musical performance must be understood not only as a product to be decoded but as an act of situated sensorimotor agency. Empirical studies (Visi et al. 2020; Christodoulou, Lartillot, and Jensenius 2024) show that building multimodal — including motion capture, physiological data, and performer self-report — makes it possible to capture aspects of embodied performance that recordings alone miss, highlighting the conceptual and technical need for multimodal datasets in music processing.

This paper introduces a theoretical framework for modelling this neglected side of musical cognition through the concept of gameness, encompassing (1) combinatorial gameness, the cognitive challenge of decision-making under structural constraints, and (2) kinaesthetic gameness, the proprioceptive challenge of physically realising those decisions. These dimensions are absent from recordings and cannot be inferred post hoc. This framework reveals a spectrum of performer agency — from free improvisation to strict score-following — that unfolds only through the performer's embodied and situated engagement with musical material.

Rather than rejecting computational approaches, I argue that gameness offers an extension to them. I propose new modelling targets, such as cognitive load, motoric intensity, or temporal pressure, that could be explored through multimodal data. This performer-centred framework reframes musical complexity as not only structural but enacted, opening new pathways for computational musicology to model the bodily dynamics of music making.

References

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