Previous works on modelling musical expression have focused on parametric representations of expressive performances (e.g. tempo-loudness curves, rules for expressive performance, and for emotional response). Those studies compared performances of musical excerpts based on the same sequence of notes. Conversely, works on modelling musical improvisation have focused on implementing real-time patterns along which musicians could perform. Often, these works focus on idiomatic forms of improvisation such as jazz.

This paper focuses on measuring similarity between musical gestures (a sequence of musical events with a contour but not anchored on specific melodic or harmonic conventions), as well as their relationships to one another within an improvisation session. Improvised gestures maintain neither a fixed sequence of notes nor fixed list of expressive parameters. Thus, they may not be efficiently comparable using rule-based methods.

This research devised an empirical approach to compare improvised performances with gesture models provided by the performer himself. Twelve distinct gesture models (i.e. characteristic contours used in a particular improvised practice) and six improvisations have been recorded by a professional pianist on a disklavier. The improvised performances themselves do not directly quote the initial gestures presented by the pianist but at times refer to the contour models in the database.

Feature vectors based on pitch profiles, interval vectors, note dynamics, overall dynamics contour and inter-onset-intervals are analysed using distance measures and hierarchical clustering. Results provide a space within which improvisations can be represented and compared. This representational space can make a significant contribution to the analysis of free improvisation by focusing on performer-specific musical languages and articulating aspects of repetition and difference. In this context, this work complements interaction-based models of improvised practices such as proposed by Healey et al. A discussion on musical tension and expectation is also provided.