SELF-KARAOKE PATTERNS: AN INTERACTIVE AUDIO-VISUAL SYSTEM FOR HANDSFREE LIVE ALGORITHMIC PERFORMANCE

ALICE ELDRIDGE

University of Sussex
United Kingdom

alice@ecila.org

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Self-karaoke Patterns, is a proposed audiovisual study for improvised cello and live algorithms. The work is motivated in part by addressing the practical needs of the performer in 'handsfree' live algorithm contexts and in part an aesthetic concern with resolving the tension between conceptual dedication to autonomous algorithms and musical dedication to coherent performance. The elected approach is inspired by recent work investing the role of 'shape' in musical performance.

1. OVERVIEW

1.1. LIVE ALGORITHMS

The Live Algorithms for Music framework (Blackwell and Young, 2004) aims to support the analysis and development of music performance systems which exhibit some degree of musical autonomy. Shown in Fig. 1, Blackwell and Young offer a modular PfQ model, dividing the performance system into three functionally distinct components: P, the audio analysis system (ears); Q, the audio synthesis elements (voice); and f, the transformative and/or generative patterning process which links them (brain).

These components represent distinct fields of research: analysis (P) modules deploy machine listening and learning algorithms; synthesis (Q) modules deploy computer music and sound design techniques. The framework is intentionally agnostic toward the design of the patterning process (f) and approaches to this range

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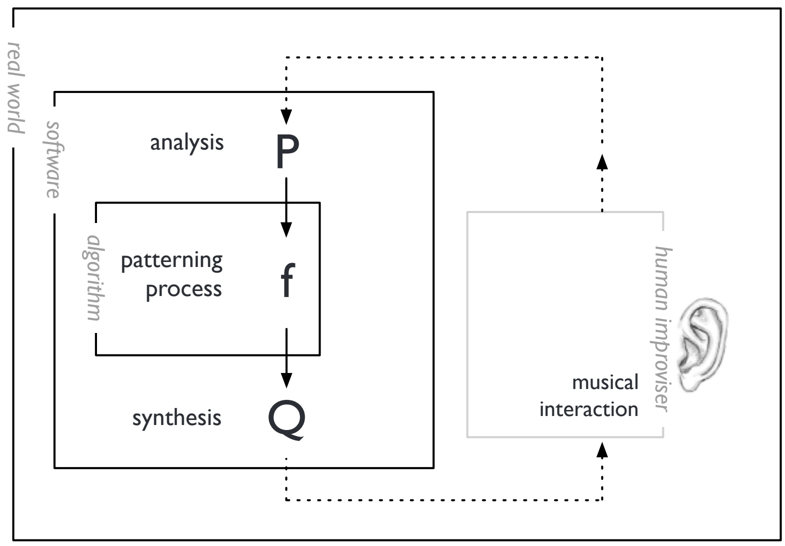
from AI-like simulation of human musical behaviours (e.g. Cope, 1992, Biles, 2001) to manipulation of idiosyncratic musical contexts (e.g. Di Scipio, 2003). The last decade has seen a trend for investigation of dynamical, self-organising systems which aim to capture some of the organizational forces in play in non-idiomatic group improvisation (e.g. Blackwell, 2004)

Fig. 1 Elements of the *PfQ* model for a Live Algorithm. Interaction is via real-time audio data in shared acoustic environment.



As research interactive performances move from the confines of conference halls to more mainstream venues, it becomes relevant to address some of the associated practical and aesthetic performance issues. The current project aims to address two issues:

1. PRACTICAL DIFFICULTIES OF HANDSFREE PERFORMANCE

As a cellist, I can't hover of my laptop in performance: I can't tweak input levels, synthesis parameters nor prod the system out of stasis or curb runaway behavior. At the same time, a desirable sense of security on stage requires some means to monitor system state, beyond that which is acoustically available in the moment.

2. BASIC AESTHETIC CONSIDERATIONS

Amongst human improvisers, endings are rarely planned, but are negotiated, or appear and are recognized (or not).[1] Programming an algorithm capable of recognizing an ending in open form improvisation is a non-trivial task. A related issue in algorithmic composition in general is achieving a balance of generative autonomy and

1 Evan Parker, personal communication.

musical coherence (Pearce and Wiggins 2002). A highly constrained system may guarantee a well-formed result but lack variation or surprise: Greater algorithmic freedom can result in delightful, challenging or at worst, offensive surprises.

1.2 INSPIRATION FROM CURRENT RESEARCH INTO SHAPE IN MUSICAL PERFORMANCE

There is a growing musicological interest in understanding the significance of the pervasive use shape in musical discourse, formal and informal (Leech-Wilkinson and Prior, forthcoming). We use linguistic metaphors of shape in rehearsals, teaching, programme notes and reviews; we shape music physically with our bodies as we play and represent music in visual shapes on staves or graphic scores. The basic premise of this interdisciplinary research programme is that shape (in a slightly nebulous and multifacted way) seems to be core to musicking, but is little studied or understood.

The predominant focus to date has been on classical musicians (e.g. Prior 2011). In an online survey (Eldridge, 2014), we recruited responses from improvisers in order to explore their phenomenological experiences of shape. Many improvisers described a marked distinction between how they think about music offline (planning, learning, practicing) versus online (improvising). Many talked about explicitly 'shaped' strategies in their pre-performance activities – a saxophonist practicing specific rhythmic and melodic patterns or a livecoder literally drawing out the shape of their set in 2D before performance. Whilst performing however, most described a more subconscious mode, or flow state (Csikszentmihalyi 1997), in which they are engaged in and supported by, but not consciously analyzing, their musical environment.

> *When I listen I'm outside the shape looking at it. When I'm playing I'm inside it, travelling, with no overall sense of its size or layout. I've worked with African musicians who, when we've been working out arrangements, use the phrase "you can come inside" when it's your turn to play.* – *Stephen Hiscock (Percussionist)*

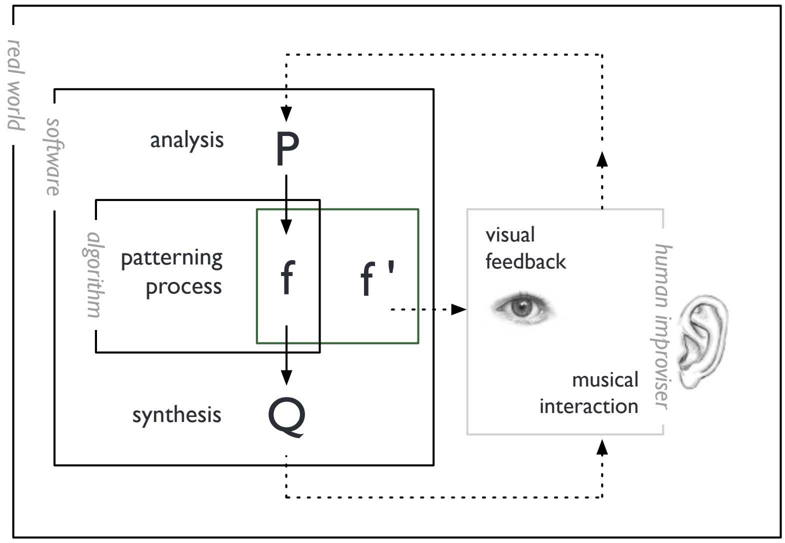


Fig. 2 The PfQ model with added visual component. The visual patterning process (**f'**)may be distinct from, but coupled to the audio algorithm (**f**). Audio interaction is augmented by visual feedback, allowing further insight into current state of system as well as history.

2. SELF-KARAOKE PATTERNS

These initial findings inspire an approach to live algorithms in which a structured, generative visual module becomes a core functional component of the patterning process. This has the potential to provide feedback to the instrumentalist during performance – allowing them to be 'inside' the shape. The design of such a process provides a vehicle for structuring performances on a longer time scale, leaving freedom for short-term interactions.

A two tier model of 'intermedia' composition is developed: on a short timescale interactions are designed between human performer, generative algorithm and digital animation system, mediated by machine listening; on longer timescale, the form is 'narrated' by a visually presented structure.

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