
Material-Oriented Musical Interaction

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Abstract

This paper lays out a particular approach to engaging with musical instruments and creative tools more generally, referred to here as *material-oriented interaction*. This approach is typified by a view of the tool as a site for exploration and the development of ideas, as opposed to being a transparent medium through which pre-existing ideas are realised. Adopting a material-oriented approach highlights the significance of unpredictable elements in creative interactions. This approach is discussed in relation to free improvisation — an area of music that exemplifies the material-oriented perspective — and then related to related concepts in HCI such as Ludic Design, Reflective Design and Reflection-in-Action.

Author Keywords

Material-Oriented Interaction; Creativity; Exploration; Non-linear Dynamics; Surprise; Complexity; Music; Music Interaction; Digital Musical Instruments;

ACM Classification Keywords

H.5.2. [Information Interfaces and Presentation (e.g. HCI)]: Interaction styles; H.5.5 [Sound and Music Computing]: Systems; J.5 [Arts and Humanities]: Music

Introduction

In his thesis on the use of technology in contemporary computer music, Worth [20] draws a distinction between an idealist notion of artistic creation where technology is viewed as an ideally transparent medium for communicating ideas, and a more material-oriented approach which sees the technology as a necessary and creative mediation that can be a source of ideas itself rather than simply a means for their transmission. This latter approach can be traced in other areas of contemporary music such as experimental instrumental composition in the tradition of John Cage [9] and particularly free improvisation [14, 10].

The implications of a full consideration of material-oriented approaches to interacting with technology appear to contradict many of the established principles in human-computer interaction (HCI) design and research. For example, the importance of clarity, simplicity and efficiency [16, 7] appear much more closely suited to the idealist approach where the technology should be transparent and not present obstacles to the communication of existing ideas. By contrast, the material-oriented perspective foregrounds the importance of exploration and discovery in the interaction with the tool itself. The artists interviewed by Worth often describe this approach as a way to go beyond their own ideas, to create things that they could not have planned for or anticipated. For such an approach the materials need to be able “kick back” [13] against the user; there must be the possibility of being surprised by the interaction. This challenges the idea of the user being in complete control of the system, and of the importance of clarity, simplicity and efficiency. We introduce the term *material-oriented interaction* (MOI) here to refer to an approach to interaction that views the tool as a source of creativity itself. This paper examines this approach to interaction in specific musical contexts and examines its relevance for HCI.

Material-Oriented Interactions in Free Improvisation

Free improvisation provides a fascinating site for exploring the relationships between tools, musicians and musical creation, and for considering material-oriented interactions. Improvising guitarist Derek Bailey describes the instrument as “not just a tool but an ally. It is not only a means to an end, it is a source of material, and technique for the improviser is often an exploitation of the natural resources of the instrument” [1]. This attitude is common with free improvising musicians: that their relationship with instruments is bidirectional, with the instrument having a strong influence on the decisions taken by the musician to the extent that they are often ascribed their own agency [8, 4, 18, 9]. These perspectives highlight the importance of surprising, unexpected elements in creative interactions, and the importance of being able to explore.

Exploration is a key element in free improvisation; improvisers want to be able to search and discover new sounds and ways of interacting with their instruments [5] and their “natural resources”. The focus on terms like “exploration” and “natural resources” can be misleading in some ways however as it implies a separation between the apparatus used to find the resources, and the resources themselves. Although finding new sounds and behaviours is often a stated aim for free improvisation, the exploration is not merely a means to an end, but is a vital part of the process. Prévost is keen to stress at his improvisation workshops that improvised performances are not mere presentations of things that have already been found, but a continuation of these active exploratory processes [14].

A risk for HCI is to assume that the searching process is an inefficiency to be streamlined or removed to facilitate creativity. An analogy might be made with fishing, where

although the stated goal may be to return home with fish, it would miss the point to replace the boat, line, hook, tackle and bait with a machine that merely dispensed fish. McDermott et al [11] suggest that if interaction designers had been present at the inception of many acoustic instruments, they would likely have dismissed them as overly complicated. The complex nature of acoustic systems can often make for complex interactions that can be difficult to master, but are nevertheless rich and varied and allow for exploration over an entire lifetime. Reed instruments such as saxophones and clarinets exemplify this well: very subtle modifications to inputs can lead to vastly different pitches, timbres and volumes. Improvisers often exploit the unstable regions of the interaction, where unexpected things can occur [19]. In such instances, the complexity and instability of the interaction are inseparable from the “natural resources” of the instrument.

Material-Oriented Interactions and HCI

MOI can be related to several key concepts in existing HCI research. Donald Schön’s notion of reflection-in-action (RIA) [15] shares some similarities in that it highlights the importance of unexpected results and of allowing “talk back” from the emerging situation to influence the direction of the work. RIA can therefore be described as a material-oriented approach, but we distinguish it from the term material-oriented interaction as RIA is not concerned with surprises and discoveries that are a direct result of the interaction itself. In Schön’s case, the interaction itself is clear and simple. The “material” for Schön is the emerging situation rather than the materials of the interaction. Schön’s examples of pencilled architectural drawings [15], musical bells [2], design software and musical improvisors [3], are not concerned with unexpected interactions with the tools, but by relating the emerging situation back to the original task. In each case, the interaction is necessarily clear and sim-

ple. The architect would not want a squiggle to emerge where they are trying to draw a straight line. By contrast, MOI focuses on interaction designs that promote nuanced exploration of the interaction itself.

Ludic design as discussed by Gaver also provides a useful perspective that can be related to material-oriented interaction design, in that through taking play seriously it prizes interactions that foster exploration, surprise and improvisation [6].

Sengers et al bring both ludic design and reflection-in-action together into their notion of reflective design [17]. Following Schön, they support the idea that reflection is not separate from activity, but an integral aspect, and highlight surprise as a mechanism to bring about reflection. They are focused on reflection as *critical* reflection however, and while there is common ground, we are focused on surprise in relation to creativity and creative interactions.

Thinking about material-oriented interactions in HCI provides a different focus for designers, opening up engagement with unpredictable and potentially difficult, complex interactions as sites for explorations rather than inhibitors in reaching a pre-defined goal. This is explored in a recent paper by the present authors investigating the use of nonlinear dynamics in musical interactions [12]

Conclusion

Creative engagements with tools may encompass a wide range of approaches. The distinction presented here highlights an approach to interaction that embraces surprise and complexity. We demonstrate their relevance in specific musical areas, but anticipate exploring the influence of such attitudes in many other creative situations, musical and otherwise.

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