Interweaving Technology
Understanding the Design and Experience of Interactive Performances

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Abstract
This thesis builds on the growing interest in studying interactive performances within the fields of Human-Computer Interaction (HCI) and Interaction Design (IxD). The overarching goal of this research is to investigate how creative teams and artists can incorporate interactive technologies into their artistic productions. This thesis draws on four empirical studies of interactive performances carried out in collaboration with artists, performers, and designers. These studies focus on: (i) investigating scenarios of sensor-based and bodily tracking technologies in interactive performances, (ii) investigating how professional guitar players experience and express the smart qualities of a smart guitar in their artistic practices, (iii) investigating the audience's sense of immersion in a mixed-reality performance through introducing the concept of friction, and (iv) exploring frictions as a design resource in sketching scenarios of performances with VR. Two main methodological approaches were used throughout this research: Research through Design (RtD) and performance–led research in the wild. Beyond the result of these investigations, this thesis also presents the following contributions. First by presenting insights and knowledge generated through explorations of the incorporation of interactive technologies in performances through ideation, through studies of technology in use, and through design activities. This includes discussions around artists' and audience members' experience of technology including novel opportunities of interaction and participation, their collaborative roles and their agency and control within artistic productions. Second, by introducing friction as a Strong Concept to analyse interactions within a mixed-reality performance and to discuss how immersion is experienced throughout such performances. Finally by further developing the concept of friction through the collaborative design and staging of a novel mixed-reality performance.

Keywords: *Human-Computer Interaction, Interaction Design, Interactive Performance, Mixed-Reality Performance, VR, Friction.*

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