

DMIs Design

Fostering Authorship of Composers and Creativity of Performers

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Abstract

My project aims to study the adoption of scores in mixed performances with DMIs and traditional instruments fostering performers' creativity while keeping the composer authorship over the piece. I intend to develop my research in the context of professional music performances and pedagogic scenarios. In this paper I introduce related works on DMI, touching the concepts of the composed instrument and composer-performer. I give an overview of existing literature that investigates relations between score and music technology, and I describe in detail the methods I intend to apply to achieve my goal. In general, my project relies on User-Centered design approach. In my research two artifacts – scores and DMIs – and three actors – composers, performer, teachers – are involved. All the actors and the artifacts are described. The conclusions of the paper present some work already done.

Keywords

Digital Musical Instruments
Novel Interfaces for Musical Expression
Human-Computer Interaction
User-Centered Design
Score
Music Performance

Introduction: Research Objective

My project aims to study the adoption of scores in interactive scenarios with Digital Musical Instruments (DMIs). My project particularly focuses on mixed performances with DMIs and traditional instruments. More in detail, the objective of such study is to provide performers with some degree of freedom, facilitating their expression of creativity when performing with or along DMIs, while maintaining the composer's authorship of the music. A secondary objective of the study is improving the development of creativity for students in pedagogic scenarios: in this case, music students will be the performers. Scores are fundamental in western musical practice. For this reason, an academic investigation over the adoption of scores can play an important role to facilitate mixed initiatives with classic instruments and DMIs.

1. Research Context and Related Works

In the last decades, music technology literature has explored the expressive potential of human-computer interactive performances. Since the birth of the NIME conference, the computer-music academic community started borrowing tools from HCI to evaluate new interactive music technology (Wanderley and Orio 2002): interactivity gradually became a central topic in computer music academic investigations. The concept of composed instrument was theorized for those tools whose design embeds the aesthetic of the music itself (Schnell and Battier 2002). This practice often overlapped the roles of composers, performers, and designers. For this reason, there is no need of scores, and scores are not widely studied from an HCI perspective. Few examples exist. For instance, score following algorithms are used in music performances where the electronic component follows the timing of human performers (Orio, Lemouton, and Schwarz 2003). With score following, the musicians have freedom in phrasing and timing, but the approaches to scores remain quite standard. Another approach is presented

by Magnusson, who considers live coding as a new interactive form of musical notation (Magnusson 2015), but does not really focus on mixed performances with acoustic instruments. Recently, Gurevich presented the idea of using existing scores to inspire the design and the creation of new DMIs (Gurevich 2017).

2. Work Plan and Methodology

My research will rely on User-Centered Design approach (Abrams, Maloney-Krichmar, and Preece 2004) organized in three main steps: 1) collection of requirements, 2) design and development, and 3) evaluation. The project involves three groups of users as actors in the design process: performers; composers; teachers. Performers are directly involved in the interaction with and alongside DMIs. This category includes DMI performers and classical instrumentalists, both professionals and students. Composers produce scores. Teachers have a crucial role even if they are not directly involved in the interaction. The first step of the design process will rely mainly on qualitative methods, quantitative questionnaires will also be used. The design/development phase will consist of a recursive loop of increasing fidelity prototyping. To guarantee the ecological validity of the evaluation, real concerts and classes will be adopted. In this phase observations and interviews will be conducted. The main outcomes of the design process will be a novel DMI and a framework concerning the adoption of scores with DMIs. The framework will be a theoretical work that provides composers with heuristics to infrastructure their compositional work within the interactive context, keeping into account the creativity of the performers.

3. Achieved Results

I started to work on the topic of my research using an autobiographical design approach, to investigate design issues related to the adoption of scores. In this phase, I am playing both the role of the designer/researcher and that of the composer. I developed Penguin, a system for

live scoring; I involved a performer in the design process (Masu, and Correia 2018). In parallel to the work with Penguin, I started to approach scores as a design object investigating the affordances and the constraints of such objects. Primary results have been achieved analyzing a composition for Cello and Chimney, a novel DMI (Masu, Correia, and Morreale 2018).

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