The Design of Technology-Mediated Audience Participation in Live Music
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Abstract

Technology-mediated audience participation (TMAP) offers a wide variety of ways to enhance the involvement of spectators during the performance of live music. Technological change has created rich new opportunities in this area. However, interactions of this kind can be hard to design effectively. Musicians and audiences have distinctive requirements, as does musical coherence, and there can be wide variation among both groups. Thus, the effective design of TMAP generally requires balancing knowledge from diverse perspectives and the taking into account requirements of very different roles in live music performance.

Research in this distinctive area of interaction design, and the provision of guidance for designers is at present highly limited. Hence, this thesis identifies and analyses issues in the design of technology-mediated audience participation (TMAP) from a variety of perspectives and synthesises a framework for supporting the design and evaluation of TMAP. This framework describes the design space of TMAP in a practice-oriented way to support design-related processes around TMAP in live music.

Methodologically, the overall strategy is based on a research through design approach, using a mixture of mostly qualitative methods in two main research strands: field exploration and framework construction.

The first strand, the field exploration, starts with two user studies. These are interviews and a survey to study requirements of musicians and spectators and to identify potential design strategies for case studies. Two subsequent case studies focus on live concerts as in-situ studies and explored two contrasting approaches to realising TMAP in practice.

In the first case study, smartphones were used to let the audience control the guitar sound collaboratively. This case study was guided by a participatory design approach involving both spectators and the performing musicians during development. The second case study focused on the composition of a song crafted with TMAP in mind, and its live performance. During performance, a big balloon in the audience allowed spectators to control piano sound effects.

The field exploration enabled the identification and analysis of issues affecting the design of TMAP in live music. These contributed to framing challenges and potential design strategies for the second strand where the TMAP Framework was developed.

The TMAP Framework was synthesised using both the experience of the field exploration and a systematic review of related work to identify design characteristics. The framework was then iteratively evaluated and refined through a series of studies testing its use for analysis and design tasks. To support this, two different presentations of the framework were developed. TMAP Online is a web-based tool used for classification exercises within a class of students to describe a range of existing examples for TMAP using the framework. TMAP Design Cards (a set of 46 cards) are a tangible instantiation of the TMAP Framework, used in groups to reflect on design sessions.

Finally, the TMAP Framework was improved with feedback from different experts throughout development and evaluation. The final version of the TMAP Framework contains 180 entities in a tree-like sorted structure on four levels.

Alongside the contribution to knowledge to the design of technology-mediated audience participation in live music, the TMAP Framework has practical potential, making contributions to idea generation as well as guidance during design processes in this innovative and distinctive area of interaction design.