Digital Musical Instruments for Participatory Music: Designing Internal Experience

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Abstract

The Argentine tango concept of connection refers to the transcendent experience of complete synchronicity between self, partner, music, and the rest of the dancers on the floor. This paper examines how musical interactivity can enhance this type of experience in the context of participatory music, in which participants engage in their community via musical activities. *Interactive Tango Milonga*, an interactive system giving tango dancers agency over music in order to increase this sense of relation between both partners and music, will be used as an illustrative example.

Author Keywords

NIME, interactive dance, participatory music, social dance, Argentine tango

ACM Classification Keywords

H.5.5 [Information Interfaces and Presentation]: Sound and Music Computing – Systems

Introduction

Participatory music describes music as a social act, in which the musical actions of all participants, including playing, singing, clapping and dancing, contribute to motion and sound integral to the event [10]. Via these

musical actions, participants are engaging with the community, often utilizing specific music and dance traditions. Participatory music emphasizes internal experience and social connectedness rather than the presentational aspects of music. Thus, the design of digital musical instruments (DMIs), should help facilitate experiences similar to the Argentine tango concept of connection, an intense experience of feeling at one with dance partner, other participants and music. Two facets of achieving this aim are 1) taking into account specific social and cultural contexts, 2) giving users musical agency, so that their contributions are essential to the musical outcomes. *Interactive Tango Milonga*[1] is an example of a DMI engaging with these issues, as it allows tango dancers to drive musical/sound parameters in real-time via their movements within the social dance context [2].

What is Connection?

In Argentine tango, connection refers not just to the transcendent experience, but also to the physical relationship between partners and technique allowing nonverbal communication and improvisation [7]. In this paper, connection will indicate the experience rather than the tango movement technique unless otherwise noted, although each aspect feeds the other.

Aspects of connection, such as complete absorption in an activity (dancing), strongly resemble Mihaly Csikszentmihalyi's concept of flow, a state of intensified concentration [4]. Time seems to disappear along with distractions, and one is entirely in the present, focused on a task [4]. Judith Becker's work on trancing reveals a similar consciousness, involving timelessness as well

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[1] Milonga refers to an Argentine tango social event

as the sensation of losing one's individual self and becoming one with music, associated with both 'deep listening' and religious ritual [1]. However, while the feeling of being at one with a partner is integral to connection, being in a flow or trancing does not necessarily require another person. Connection is also related to William McNeill's 'muscular bonding' defined as "the human emotional response to moving rhythmically together in dance and drill", also noting the features of timeless and blurring the lines between the individual self and others engaged in synchrony [9].

Recent research suggests humans experience music as embedded with physical gesture, perceived similarly by differing people [8]. Then, if music encodes physical gesture in perceivable ways, it suggests an avenue for musical creation to facilitate a connection experience [2]. For, instance, musicians also report similar experiences of a connected flow state when playing in an ensemble. They experience their relation to one another mainly via sound rather than touch. Thus, while connection is mediated through the Argentine tango tradition, this concept has implications for similar states induced by participatory music.

Most of these experiences are described as pleasurable, and some resemble ecstasy. Involvement via movement (eg., playing, dancing) tends to lead to deeper, more intense experiences than listening alone [10]. In our research, many subjects interviewed cited connection as the main motivation for their participation in Argentine tango social dance. As the focus of participatory music is on social activity and internal experiences such as these, rather than presentation for spectators, the design of DMIs for participatory music should reflect these priorities.

Designing for Social Context

Social dances, Irish music sessions, drum circles, and other participatory music events rarely occur on stage. Rather, the venues, etiquette and how participants are invited to contribute are dependent upon the specifics of each subculture. DMI design must take context into account, so that they enhance rather than impede normal social and musical activity. Generally, users must be comfortable performing their activities in order to experience flow, which is related to connection.

For example, many aspects of *Interactive Tango Milonga* are constrained by the particularities of the social context of tango[2][9]. Milongas occur in dance halls, restaurants, and bars, and so the motion tracking technology had to be mobile and easily deployed in different locations. Many couples dance together at once, in a close embrace, leading to the choice of inertial sensors, which are both portable and perform well despite occlusions [9]. Dancers also move onto and off the dance floor regularly, and thus, the sensors, in order to accommodate shifting populations of dancers, should be easy to take on and off.

DMIs for participatory music must also engage with the existing music and movement traditions, maintaining the social context. Our system also produces music in the tango tradition, including both original music and arrangements of traditional songs so that participants using *Interactive Tango Milonga* still have the sense that they are dancing in a milonga.

Designing for Multiple Musical Agencies

Designing musical agency in participatory music presents several issues. First, how do designers orchestrate for multiple participants for a satisfactory musical outcome without the 'chaos' referenced by MIT's *Interactive Dance Club* (1998), an early participatory interactive dance system [11]? *Interactive Dance Club* solves this problem via DJ as well as designing distinctive interactive zones, in which interaction is more about addressing the specific technological interfaces than the social act of dancing. Later related work by Feldmeier and Paradiso (2009) also uses a DJ to direct musical outcomes while not disrupting general EDM social practice but without engaging with a specific movement vocabulary [5]. These solutions are less applicable to participatory music with specific movement vocabularies and greater participant democracy, such as Western partnered social dances like Argentine tango. *Interactive Tango Milonga* addresses this problem by limiting the number of dancers couples using the DMI at the same time to a current maximum of four couples. Each individual and couple take on different musical roles. For example, the movement of one couple may drive melody density, another, accompaniment density. Dancers may change roles during breaks between song sets, when dancers generally socialize and change partners. In the case of DMIs designed for participatory musical ensembles such as drum circles and Irish music sessions, this issue may not be as relevant, as they may utilize existing structures for ensemble organization.

Another issue is how to negotiate participant agency and musical outcome quality. While musical quality is paramount for performance, this quality, while important, is secondary in participatory music. Novices are often playing and dancing with and next to experts. Therefore, what kind of mistakes, if any, does the interactive system permit its users? The ability to make mistakes, that is, create undesired sounds that may be

tedious, off the beat, or out of key, is crucial to the experience of musical agency. If the system filters out undesirable sounds, the participant may begin to perceive the locus of control to be outside of her body. Thus, granting agency in participatory music contexts can possibly affect musical outcomes. For instance, if dancers using *Interactive Tango Milonga* step out of musical time, the musical result is similarly off-rhythm. A related issue lies in the learning curve of the DMI. Compelling systems allowing expert use tend to necessarily have relatively steeper learning curves. If this curve is too steep, few will engage and novices will very negatively impact resulting musical outcome. However, while design should not neglect musical outcome, it should be secondary to user agency. Yet, musical outcome should be pleasing enough so that so that participant experience is enjoyable.

Conclusions and Future Work

This paper raised issues developing DMIs for participatory music, such as *Interactive Tango Milonga*, arising from its focus on internal experience, particularly connection, and social functionality and context. One open question is: what quality of participant impact on outcome engenders 1) a sense of musical agency 2) an intense connection experience. Allowing users musical mistakes is integral to agency, but musical outcomes may be imperfect. When and what kind of undesirable sounds are acceptable in different contexts? Western society has often privileged presentational performance over participatory music [10], with these priorities generally being reflected in DMI design. Designing for participatory music opens up new users to DMIs, allowing for greater impact.

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