The Disklavier in Network Music Performances

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Abstract

Traditionally, the concept of performance is tied to the actual space-time frame that both performer and auditor share. However, in the current era of network communication, Telematic Art appears to question successfully such paradigmatic approaches of performance practice. Moreover, current aesthetics quite often seem to challenge and question notions of spatiality, reality and actuality. It is as well intriguing how complex concepts as *telepresence* (Dixon, 2007) and *interspatiality* (Birringer, 2008) are getting increasingly incorporated in the vocabulary of performance practitioners. Additionally, performances that implement technologies that embody such concepts are to be seen more and more.

This article means to be a brief chronicle of certain music instruments developed for Network Music performances. It charts a number of technological implementations that suggest innovative telematic approaches in music performance, and therefore music-making. By focusing particularly on Yamaha's Disklavier and its network possibilities, the research illustrates how an instrument's features may advocate and technically suggest the proliferation and exploration of telematic aesthetics in music performance practices.

Key words: Remote performance, Network performance, Telematic performance, Disklavier

Telharmonium (also known as Dynamophone) was the first music instrument particularly made for Network performances. Developed by Thadeus Cahill in 1897, the Telharmonium was a keyboard instrument similar to the organ. It was made to broadcast its audio signal over a wired network. Cahill's initial idea was the development of an instrument that would distribute its audio signal through the telephone network into houses and venues. Three versions of the instrument were made (Mark I, Mark II and Mark III) and a number of trials were realised between the years 1906-1915.

However, the project was not prosperous, as it did not get fully embraced by the audience. The reason for that was primarily the particularity of the timbre of the instrument, a synthesized sound based on additive synthesis principles. In addition, the project faced complaints from the telephone company customers. Crosstalk interferences were caused by the high frequency resonances of the instrument while getting transmitted over the primitive telephone network of the time. Cahill's project indeed was to fail due to the underdeveloped technology of the time. That is why the Telharmoniums

never managed to get massively produced. The last surviving instrument got eventually destroyed in 1962. Unfortunately, for almost hundred years of exponentially expanding technologic developments, Cahill's dream did not get fulfilled. The development of a conventional instrument that would offer network performances had not been completely accomplished and for years Telharmonium was the only instrument specifically designed to provide music performances of the kind.

Years later, in 1987, YAMAHA introduced the first Disklavier in the United States of America. The Disklavier is a mechanized piano, based on the concept of player-piano (also known as pianola or autopiano). In principle Disklaviers are traditional grand pianos that can be used as such. However, they incorporate electromechanical sensors and actuators within their structure in addition to the standard grand-piano mechanism. Moreover, Disklaviers feature a dedicated operating system that is linked to both the actuators and sensors and thus permits music data collection/retrieval and music data reproduction. Due to these additional technological features, Disklaviers are able to record the performance of a piano player and reproduce it accurately. Ever since their appearance, these instruments have been used broadly in public entertainment such as in cafés and piano bars as well as in education. Due to the technical implementations incorporated into their mechanism, Disklaviers are ever increasingly attracting the attention of researchers around the subject of Network Music performances, Telematic music performances and the aesthetics of Telepresence.

The first known Network Music performance of Disklaviers took place in 1992. It was during the Transatlantic Concert, organised by Michel Redolfi. During the concert, Terry Riley with Jean-Claude Risset where in Nice, while David Rosenboom with Morton Subotnick were in Los Angeles at the Electronic Café. The two places where using a satellite connection to link to Disklaviers located thousands of miles away (Risset, 2012). The musicians were able to play one piano in one continent and another piano would respond automatically reproducing the exact performance remotely. The satellite telecommunication technology of the time facilitated the first long distance Telematic Music performance of Disklaviers ever known.

Unfortunately, the technology used during the endeavor (in particular the use of satellite telecommunication) was financially unsustainable for the further development of the project. That prevented research in any similar direction from happening. Therefore, the development of an instrument with the technology necessary to provide network based music performances was still to happen.

During the following years, due to the dissemination of Internet and the growth of music technologies, a number of projects of Network and Telematic Music performances were developed (Oliveros et al, 2009). Still, no specialised instruments that would incorporate network performance applications were broadly developed. In 2004 YAMAHA released a new generation of Disklaviers, the Mark IV series, featuring an innovative operating system that allowed Internet connectivity. Quite interestingly, the name of the Disklavier model bore the sequel name of Cahill's Telharmoniums (Mark I, Mark II and Mark III). However, whether that was a coincidence or on purpose it is not known. Nonetheless, the release of Mark IV, and in particular the Internet connectivity feature it incorporated, introduced the possibility of a revolution for music-making of the time. In addition to that, three years later, in 2007, Yamaha released a software application that allowed the Internet-based remote connection of up to four Disklaviers. The application called *Remote Learning* contributed massively to *e-learning*. The

benefits of *Remote Learning* in education, and higher education in particular, has been exposed in previous research outputs (Polymeneas-Liontiris & Loveday Edwards, 2012).

Furthermore, during the 2013 annual expo of the National Association of Music Merchants in Los Angeles, USA, YAMAHA launched the *Remote Live* application. Such platform facilitates the connectivity of a large number of Disklaviers around the world through the Internet, for the purpose of remote live music performances. To celebrate the launch of *Remote Live*, during the event sir Elton John performed in Hyperion Theater in Anaheim, California one Disklavier, while numerous Disklaviers around the world reproduced his performance live. Falmouth University, in partnership with Yamaha, participated in the project, being the only UK institution hosting the event.

The concert was a unique experience. The event suggested a re-conception of music performance from a site-specific experience to a *digital inter-spatial* experience (Birringer, 2008), or even better to a *multiple telematic* experience (Dixon, 2007). The fact that different audiences around the world can witness pianos reproducing accurately the same live performance of a pianist situated thousands of miles away, resulted in a global network of parallel experiences in telepresence. The instrument, in conjunction with the particular technology, conveyed a unique performance experience. The keys and pedals of the piano were moving, and it was quite thrilling to think that they were moved because somebody was operating them by playing on a piano thousands miles away. On the other hand, the use of such medium in the event raised questions and conveyed suggestions that might alter the nature and therefore the definition of live music performance.

Looking at it as an experiential process, one might argue that the Disklavier used for such performances would not provide a much different experience than the one of a live radio or television broadcast. However, the experience is way different due to the physicality of the instrument. The fact that it is a real three-dimensional entity; a body in space with all its tangible, visual and aural features converts the actual experience from a mere audiovisual event to a unique kinesthetic one.

The medium itself and the technology that it incorporates challenge paradigmatic concepts of spatiality, reality and actuality of music-performance practice. The event and the use of the instrument questioned whether a live music performance requires a musician present in space in order to be called as such. They questioned whether a performance requires the performer or the audience to be in a certain space or whether both performance and audience could be scattered remotely. One might quite rightfully say that concepts of the kind have been thoroughly observed and analysed in the past through art-based research on performing arts. However, there has never been a case of a conventional medium that would so bluntly suggest concepts of telepresence within music performance. Therefore, it is the inherited technological features of the particular instrument, in combination to its suggested usage, that challenge the certain site-specific aspects of traditional music performance.

Due to the inherited teleological aspect of telepresence the instrument has, performances of the kind may raise existential questions in relation to the notions of *Here* and *Now*. Particularly from the point of view of the performer, the medium challenges the human capacity of understanding one's physical body extension in space. It challenges therefore the proprioceptive ability of the performer. The performer's body is extended in a global space. The expansion of one's body actuating ability to a global network is exceptional. The performer's body becomes part of a global machinery. The

performer's brain becomes the brain of such machinery. The medium facilitates therefore the formation of a global network of kinaesthetic reproductions of the performer's aesthetic choices. It is as if the technology suggests the metaphor of a performer with invisible limbs, which extend to a global scale, being able to physically control a unique network of pianos. The notion of a number of pianos placed around the world synchronically reacting to a single performer's aesthetic decisions taken remotely makes this experience absolutely unique.

Disklavier is the only conventional instrument that features technologies that can facilitate Network Music performances. Without knowing whether more instruments like that will be developed in the future, or being able to foresee whether the future of music concerts will be partially or completely based on Network technologies, we are confident to say that the time has come for the development of both instruments and compositional tools that would foster research on live music performance practices, seeking experiences beyond the paradigmatic ones.

Currently at the Performance Centre of Falmouth University we are developing a number of research projects using both art-based and empirical methodologies to further understand the capacities and possibilities of the Disklavier. Seeking to push the boundaries of what is defined as music performance, we are developing projects that challenge the traditional definition of music performance.

More than hundred years have passed since Cahill started researching on the development of an instrument that would facilitate Network Music performances, but it is only Disklavier that made us confident enough to say that his dream has finally viably materialised.

References

In Conversation on November 10 2012, with Jean-Claude Risset, in IKS2012, *Interactive Keyboard Symposium 2012*. 09-11 November, 2012, Goldsmiths College, London

Oliveros, P. Weaver, S. Dresser, M. Pitcher J. Braasch, J. & Chafe, C. (2009). Telematic music: six perspectives. *Leonardo Music Journal*, *19*(1), pp. 95-96.

Polymeneas Liontiris, T. & Loveday Edwards, A. (2012). The Disklavier: From Educational Tool To Digital Interspatial Performance Explorations. In ICERI2012, *5th International Conference of Education, Research and Innovations*. 19-21 November, 2012. pp. 1821-1825, Madrid: Spain

Birringer, J. (2008). *Performance, Technology And Science*. New York, NY: PAJ Publications.

Dixon, S. (2007). *Digital Performance, A History Of New Media In Theatre, Dance, Performance Art, And Installation.* Cambridge, MA: The MIT press.