On the Music through Network

Telematic Performance of 《Telequantum》

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ABSTRACT

Telematic music contains a new type of performance through both networks of technology and of human relations. It requires the next-generation internet infrastructure, high-speed audio transmission and musical strategies of audio-visual interactions. The use of various networking protocols is indispensable to provide synchronization of the performers. The use of interactive mapping enables one performer's information to control another's. My new piece, 《Telequantum》, has multiple remote interactions which do not restrict the performers' musical actions.

1. General Situation of Telematic Performance

Network performance has been known as a style of digital music ensemble since the 1990's. It started before the pervasion of the Internet. As the word *network* signifies a more general communicative situation, or at most, communication through the omni-present internet, musicians prefer the term *telematic music* for their new style of pieces.

Pauline Oliveros, who had experienced a six-city transmission concert in 1991 and realized an ISDN performance in 1996, defines telematic music as "music performed live and simultaneously across geographic locations via the internet". She expects a more technical ability to link with partners, since connecting her friends is no less than a method of <meditation> by way of <deep listening>.

Twenty years of her telematic experience has witnessed several phases of communication technology; video image with 5-second updating, picture-tel 4000 on ISDN, internet, iCHAT AV for Macintosh and JackTrip with a video conference system.

Now we ouselves are presenting on the second stage of JackTrip, which supports any number of channels (as many as the computer/network can handle) of bidirectional, high quality, uncompressed audio signal steaming on Mac OS, and which has infiltrated into Asian countries across the Pacific Ocean. JackTrip can be operated within a group of three programs; Jack pilot, q-jack and the terminal. Jack pilot controls the overall audio-streaming server including the buffer size and the on/off matrix for connecting. Q-jack can set up the server and can graphically make connections between the corresponding applications. Audio-streaming begins when <jacktrip –s> or <jacktrip –c> are written on Terminal. If MAX patches and/or Ableton Live are used on the same computer machine, it is easier to make sound effects, to control the mixing and to manage the complex rewiring.

2. Concepts and Aesthetics of Telematic Performance : ontology of remote-presence and multiple interaction

The technical and musical demands of a telematic piece requires the initiation of new types of network connectivity, the development to deal with a next-generation internet infrastructure, the musical strategies for visualization of the acoustical connectivity no less than the human interaction of a musical ensemble etc. Also important is how the audience knows the performance on the stage in front of them is actually connecting with the remote places, if any interaction is planned between the remote places. Performance ensemble is based on the human interplay between the players, and the interactive system adds another interplay through the interactive program. The telematic presence provides a third interplay, that is, composition with/for latency.

I want to quote here the statements by Kenneth Fields, specialist of the telematic arts and digital music.

"The internet is not just a conduit of communication anymore, it's a new space, a new medium for creation and performance. Our research focuses on the idea of 'telepresence,' how we can accentuate the feeling of presence between performers and audiences who aren't in the same room."

Do people in the situation of telepresence share the same time scale? This is a big issue in the ontology by Edmund Husserl. Two realizations of a piece may be performed simultaneously. The image of the separated places is crucial to show the multiple time is running. JackTrip as the medium has an inherent delay of approximately 200-250 msec, and iCHAT or Skype as visual medium has much longer delay. It is the

composers who should make their own decision within this audio-visual delay.

3. Inter-Asian Network Program on Ipv6

An asian network for electroacustic music was proposed in EMSAN2010 by Ken Fields. EMSAN is basically a community, where both musicological research and creative topics about electroacoustic music are discussed, and a branch of EMS, founded by Leigh Landy. Fields has also accomplished a gigantic work of translating digital music terms into the Chinese language. He was co-organizer of CEMC's annual *Musicacoustica* festival in Beijing from 2005-2007.

In *Musicacoustica2011,* the first inter-Asian network concert was featured on October 26th. The program of the concert and the photos of the performances are shown in Figure 1.

Figure 1. *Telematic Concert* in *Musicacoustica2011,* Beijing

My piece《Net Leodamia》, for two Shakuhachis and computer, was premiered in *Telematic Concert* in *Musicacoustica2011*. The piece was performed by two Shakuhachi players ; Hozan Nomura in Nagoya and Bruno Gremo in Beijing. Before the concert I had some experiments between Waitkato and Nagoya, or, Calgary and Nagoya. In both cases the latency had been measured about 200msec. As New Zealand should go to US before going to Beijing, it takes about 1 sec from Nagoya to Beijing via Waikato. There is another selection which makes shorter latency ; Calgary is to bounce from ipv4 to ipv6 in order to connect Nagoya to Beijing. In technical viewpoint, it is a better method, but there are some problems of task managements for related people. Three problems are to be discussed concerning the Japanese situation for network performance; social system for network server administrators, tele-conference popularity and accessibility to the experimental applications.

4.《Telequantum》

4-1. Preliminary tasks of networking

Network administration should be the primary task for telematic performance because JackTrip is an application as infrastructure among the universities. The transmission on JackTrip can be successful only among the identified IP addresses. The specified numbers of ports must be opened. The condition is also necessary for coreMIDI communication.

4-2. Interaction between geographically separated locations

This piece contains four types of technical interaction.

a. flute solo sounds go from Tokyo to Nagoya through JackTrip, modified by the MAX patches in Nagoya and come back to Tokyo again through JackTrip.
b. flute solo sounds received in Nagoya are mapped onto midi note number and make phrases on the Disklavier.
c. flute solo sounds received in Nagoya are also mapped onto graphical information of the original visualizer, which is to be merged with the camera image capturing the pianist in the studio of Nagoya City University.
d. MIDI signal produced by the pianist in Nagoya goes to Tokyo and makes visual effects to the captured image of the flutist in Tokyo.

4-3. System integration and work flow of human operations

The system integration and the sample connections of 《Telequantum》 are shown in Figure 2. Audio buffer size is to be set 128. MIDI is to be sent and received on coreMIDI.

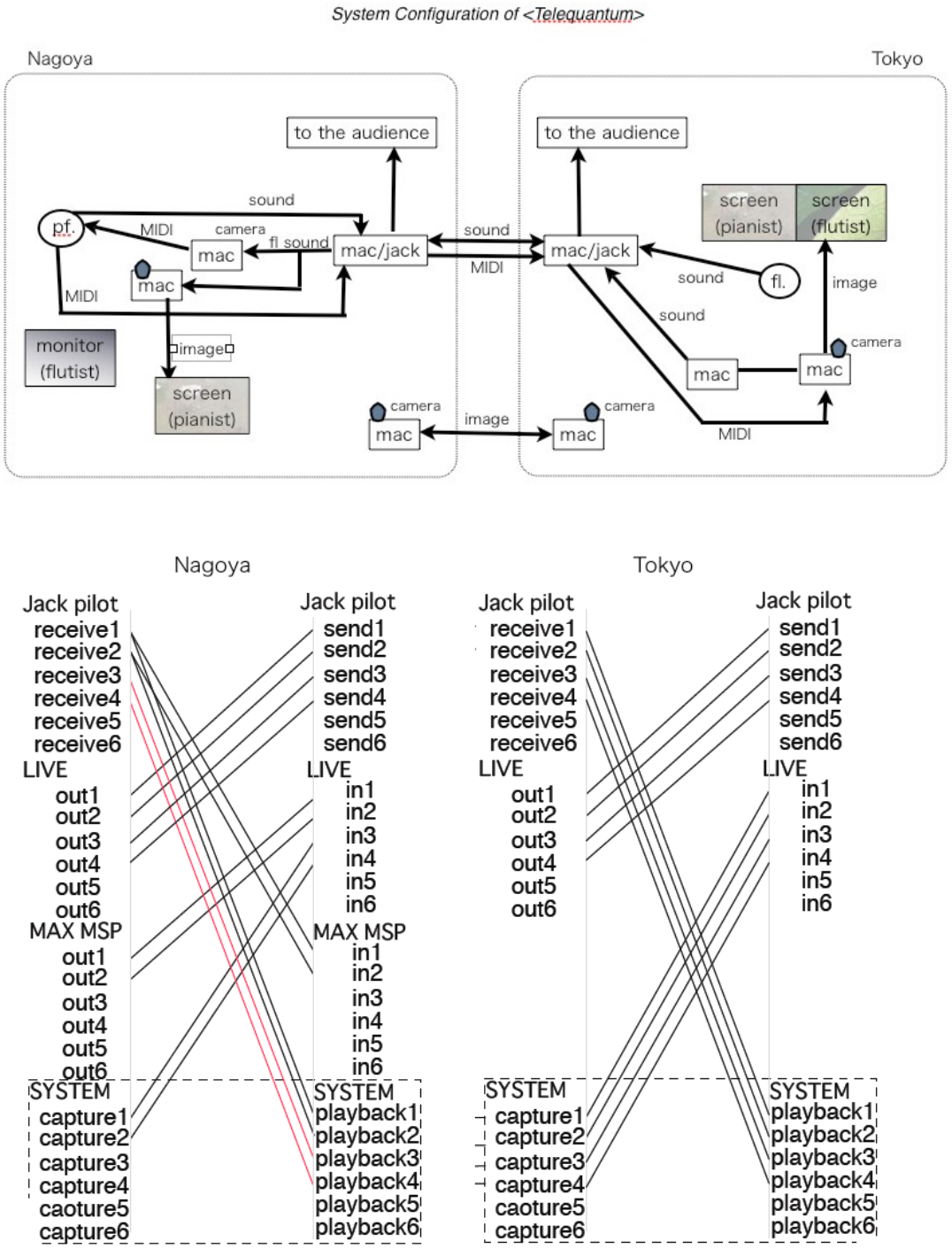

Figure 2. System Configuration and Connecting Sample of <Telequantum>

4-4. Musical structure and materials of the electroacoutic sounds

The title《Telequantum》is a word compounding the prefix *tele* (remote) with a Latin word *quantum* (quantity). The performance of the remote located musicians are digitally captured.

Two players, flutist and pianist, follow the partly indeterminate score, which refers to the Japanese traditional musical correspondence. As the

latency between Tokyo and Nagoya on ipv4 is about 200msec, as is traced by *treaceroute.* It is not problematic for this piece. The accuracy of musical ensemble in the sense of the normal metre is not necessary but the response time of each player may be longer than that latency. The pianist follows the flute sound and the flutist plays like solo or interacts with the electronic sounds. The electronic sound materials sometimes resemble to the flute and the piano sounds, but are generally recorded and edited on various types of eletroacoustic aesthetics; enlargement/reduction, symmetrical time progression, graphical simulation of sound patchwork, story telling of hearing and so on. The part of the electronic sounds are to be played by the composer.

4-5. Meaning of image presentation

Visual images are important to show the remote ensemble both for the players and for the audience. This piece needs two screens and projectors to show both places of the performance.

5. References

[1] Pauline Oliveros, From Telephone to High Speed Internet: A Brief History of My Tele-Musical Performances. In:*Leonard Music Journal 19*, 2009.
[2] Sarah Weaver, Telematic Music Performance Practice:Sound Transcending Distance. In:*Leonard Music Journal 19*, 2009.
[3] http://ccrma.stanford.edu/groups/soundwire
[4] Kenneth Fields, Liveness. EMS Conference2011 paper presentation.
[5]Ian Whaley, Bringing Music Tradition in Netspace. EMS Conference2011 paper presentation.

6. Author's Profile

Composer and musicologist. Graduated from Tokyo University(aesthetics) and Aichi Prefectural College of Arts and Music. Master degree for composition. Dr. of Engineering on the theme <Space Concept in the Contemporary Music>. The pieces were premiered in France, Austria, Hungary, Germany, Italy, Republic of Moldova, USA, Australia, China and Japan. in several cities in Japan. Writings were published including The *History of Japanese Contemporary Music After WWⅡ*. Professor of Nagoya City University, General Director of JSEM/MSJ Symposium and Concert of Electroacoustic Music2009, Committee member of Japanese Society of Electronic Music(JSEM).