

Asian Network Music Performances with Jacktrip

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ABSTRACT

Telematic music technically presupposes today's network environment and is supposed to develop a new type of performance with communication both of technology and of human relation. It requires new musical strategies of audio-visual interactions, because musical performance primarily holds several stages of interaction from playing instruments to human interaction between the players.

The use of incompatible networking address protocols to the synchronization of performers is technically the third phase of interaction, following to performer/audience interaction as the first and audio-visual systematic interaction as the second.

This paper starts with several aesthetic thinking about the network performance in today's technological situation. Two performances with/in Japan will be reported and a new project with Jacktrip will be shown.

1. Situation of the Past Time and Today of Telematic Performance

Network performance has almost as long history as that of real-time interaction. It has been known as a new style of digital music ensemble. It started before the pervasion of Internet. Today the term <network> implies the general communicative situation through internet and even the term <network music> also indicates a real-time interaction on the stage. That is why the composers who executes performances with network connection between remotod places prefer the term <telematic music>.

Twenty years of the telematic experience of Pauline Oliveros^[1] have witnessed several phases of communication technology; video image with 5 seconds updating, picture-tel 4000 on ISDN, internet, iCHAT av for macintosh and Jacktrip^[2] with video conference system.

And Jacktrip is indispensable to realize telematic music. Now Jacktrip supports any number of channels with mixing application like Ableton Live and supplies bi-directional, high quality, uncompressed audio signal steaming on Mac OS, and has infiltrated into Asian countries across the Pacific Ocean^[3].

So we can now contemplate on rather

aesthetic situation of time and space than that of acoustic phenomenon. Ian Whally discussed the "social dimensions of music making, such as negotiation and relationship building through what goes in real-time".^[4] Along with Whally's historical survey, I start the ontological situation of music performance on the stage with or without network.

2. Remote-presence and multiple interaction

2-1. What is the aesthetic problem of Telematic Performance?

For the purpose of discussion I would like to quote a statement by Kenneth Fields. He focuses on the idea of 'tele-presence'; "how we can accentuate the feeling of presence between performers and audiences who aren't in the same room?"^[5]

Do people in the situation of tele-presence 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, and the image of the separated places is crucial to show that the multiple time is running. Jacktrip as the medium has the inherent delay, approximately 200-250 msec^[6] and iCHAT or Skype as visual medium has much longer delay.

Composers must decide how to manage the difference between audio delay and visual one.

2-2. Five Practical Problems of <telepresence>

Meanings of <telepresence> can be described along with the five phases of remoteness of the musical communication.

① : Remoteness existing in the real space between the audience and the players.

Tele-presence in the concert place can be perceived as the relation in which the stage players present in a remote place, that is, on the stage. Practically saying, <He/She/They is/are not the person with whom the audience can communicate directly>, and/or <The audience cannot know which sound comes through network if all the sounds come from the speakers>.

② : Remoteness to be perceived through

timbre.

Latency of sounds and visual remoteness are technically indispensable.

For composition, remoteness can be replaced by timbre. Telepresence can be perceived if each place sends the characteristic sound. The sound can specify the location. For example, if three different instruments are to be played simultaneously through network, the timbre can identify the location.

③ : Remoteness to be perceived through sound effect or rhythm.

Different scale of time can simultaneously exist because of the latency. If the time differences are to be set up in one place, time should be perceived as sound effect(echoing) or rhythm.

④ : Remoteness to be intently shown to the audience.

The Audience should be informed that several remote places are connected through network. Conversation before performance may be effective in some cases.

⑤ : Remoteness can be perceived in interactive design with pseudo-realtime system.

The aesthetic value of live-interactive music can be discussed in the point of system, sound and performance^[7]. Interactions in several phases can be compiled in the situation of telematic performance, because interaction can show clearly the remoteness between the performers.

The musical interaction in real-time has been approved between composer/audience, performing action and the sound as a result, the sound of the performance and the movie on the stage, etc.

But what is <real-time> with network latency?

Real-time interaction with latency is not only the delay of time. It should be crossed with some musical elements of the special remoteness.

In order to arrange the complicated communicative situation through interactive network performance, I focus on three radical and ontological <relationship>.

1. Between the performer(s) and the audience:

He/She/They is/are not the person with whom we can communicate directly.

2. Between the remote places:

We can't talk face to face with the person(s) in another place(s)

3. Between the action of making sound and the results :

We can see/hear the causality which should clearly visualize that time difference is made from space

remoteness not from interactive system.

Creating the musical pieces will mean to compose the three phases of causality together with the sounds and images. And today's technology gives us some tools concerned with remoteness as the five phases indicated above.

3. Inter-Asian Network Program on Ipv6

The first inter-Asian network concert was featured on October 26th in EMSAN2011 during *Musicaacoustica2011*(Figure1).

2011年10月26日 (周三 / 第二届北京国际新媒体艺术日)

09:00-10:20 (中央音乐学院友谊厅)
2011年国际电子音乐新技术新设备展演系列 (3)

10:40-12:00 (中央音乐学院综合楼201厅)
《网络-2011》— 亚洲跨地实时网络互动电子音乐会 (国际网络直播)

1) 《起死回生》— 网络电子音乐 (新西兰— 新加坡— 中国 / 三地实时互动)
作曲: 伊恩·威利 (新西兰)、兰斯·穆加 (新加坡)、布鲁斯·格雷高

2) Mikro—网络电子音乐, 2010 (马来西亚— 中国 / 两地实时互动)
作曲: 哈斯尼德·瓦蒂德 (马来西亚)

3) Net Leodamia — 为尺八和电子音乐而作 (名古屋— 北京 / 两地实时互动)
作曲: 水野美佳子、宝山野村和丰曾木 (日)

4) 《穿越》— 无线网络系统调制电子音乐 (台北— 北京 / 两地实时互动)
作曲: 曾毓忠 (台)

5) 《悉尼》— Max/MSP与网络电子音乐 (悉尼— 北京 / 两地实时互动)
作曲: 伊凡·扎瓦达 (澳)

6) 《六个》— 由中国、台湾、日本、新西兰、新加坡、马来西亚作曲家共同参与完成的网络电子音乐
作曲: 肯尼斯·菲尔德 (美)

13:00-13:30 (中央音乐学院友谊厅)
新媒体-2011— 新媒体艺术展演会 (1)
主讲: 朱培家 (中央音乐学院附中)
题目: 捕风捉影— 动作捕捉技术与电子音乐互动



Ian Whalley-Lence Waze (Kishickaisei) Mikako Mizuno (Net Leodamia)

Figure 1. Telematic Concert in *Musicaacoustica2011*, Beijing

My piece 《Net Leodamia》, for two Shakuhachis and computer, was performed with audio-visual transmission between Nagoya(LocationA) and Beijing(LocationB) by two Shakuhachi players; Hozan Nomura in Nagoya(PerformerA) and Bruce Gremo in Beijing(PerformerB). The score is partially indeterminate in order to adjust the time-lag through network. PerformerA played in accordance with the definitive watch. The score doesn't require him to follow all the sounds by PerformerB. Contrary to that, PerformerB should keep to hear the sound from LocationA. The sound of PerformerB controlled the MAX patch in LocationA and the echo of PerformerB came from LocationA to LocationB. The echo effect caused by the remoteness was merged with MAX effect. The third sound source was played by the composer's computer in LocationB. The loudspeakers can be set up with the mapping to each location of the sound sources.

The sound coming from the remote place can be diffused from the distant loudspeakers.

The network between Nagoya and Beijing was mediated by Waikato in order to bounce ipv6 to ipv4. As New Zealand should go to US before going to Beijing, it takes about 1 sec from Nagoya to Beijing via Waikato. Another route makes shorter latency ; Calgary is to bounce from ipv4 to ipv6 in order to connect Nagoya to Beijing. In that case we had another problems concerning task managements for the related people in each location.

4. Telequantum in Asia Computer Music Project(ACMP) 2011

4-1. Preliminary tasks of networking

The transmission on Jacktrip can be successful only among the identified IP addresses. The specified numbers of ports for Jacktrip and coreMIDI communication must be opened for « Telequantum » which was realized with audio-visual transmission between Tokyo and Nagoya in ACMP2011.

4-2. Interaction between geographically separated locations

« Telequantum » contains four types of technical interaction for the purpose of presenting the remoteness between the two cities(Figure2).

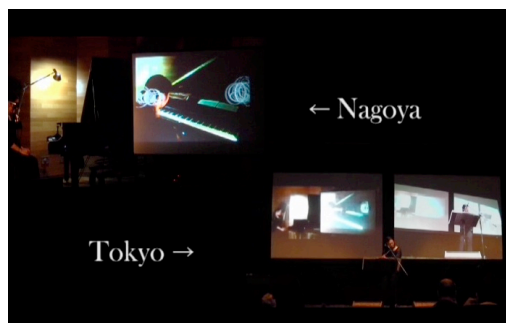


Figure2. Two-city Performance of «Telequantum»

- 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.
- flute solo sounds received in Nagoya are mapped onto midi note number and make phrases on the Disklavier.
- 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.

- 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 of «Telequantum» is shown in Figure 3. Audio buffer size was set 128. MIDI was sent and received on coreMIDI.

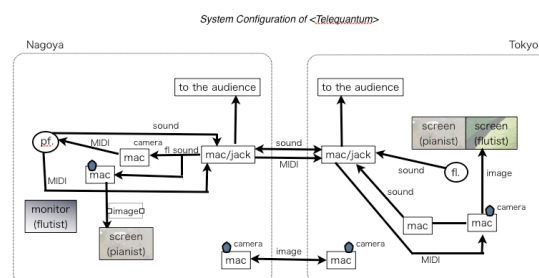


Figure 3. System Configuration of «Telequantum»

4-4. Musical structure and materials of the electroacoustic 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(PerformerA) and pianist(PerformerB), 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 *traceroute*. PerformerB follows the sound of PerformerA and PerformerA plays like solo or interacts with the electronic sounds. The electronic sound materials sometimes resemble to the flute and the piano sounds, but most of them were edited on various types of electroacoustic aesthetics; enlargement/reduction, symmetrical time progression, graphical simulation of sound patchwork, story telling of hearing and so on.

4-5. Meaning of image presentation

Visual images are important to show the remoteness both for the players and for the audience. This piece needs two screens and projectors in each location. We recognized that camera works for performance and

documentation should be so crucial that we prepared the special staff for camera control.

5. On-going project and security administration

5-1. Double Streaming per One Music

The next Japanese Jacktrip concert will be held on December 6, that is to be the pre-event for the ACMP2013 in Nagoya. This time we will use TV-conference system.

My piece for the concert 《Time-Distance》 is two-city transmission and focusses on the music that doesn't have musical communication. It realizes, so to say, double streaming.

One performer in LocationA can see the simple score-following signal generated in LocationB without sound. In LocationB, the sound produced by the performer will be mixed with the computer sounds generated in LocationB, which are precisely on the score rhythm. The computer in LocationB will change to the next page of the score in <real-time> of the performer's sound of LocationA. Here, <real-time> is based on the sound received by the Jacktrip of LocationB. The visual latency will be reflected on sound latency in LocationB. The sound heard in LocationB will reflect the time difference of remoteness as rhythm difference, that is, the mixed sound in LocationB will gradually take time lag as musical texture.

The concert will feature several types of network music, including collective pieces like lap-top performance and jazz session.

I hope ACMP2013 will collect much more variety of performance.

5-2. Security administration problems

According to the experience of the precedent two network performances and preparation for the next concert, several security administration problems became clear. Those mostly come from regional and political situation concerning network security. Some universities and public services don't permit to open the ports even though to the limited IP address. Nagoya City University(NCU) is administrated by Nagoya City and the security policy is the same as that of the municipal office. We can use the open ports only three hours per week.

6. Notes

[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.

Juan-Pablo Caceres and Chris Chafe, JackTrip/Sound WIRE Meets Server Farm. In: *Computer Music Journal* 34-3, 2010.

[3] In Japan network performance is not yet popular although some people use Ninjam and Yamana NETDUETTO system. The first inside-Japan concert with Jacktrip was realized in December 2011 between TokyoDenkDaigaku and Nagoya City University.

[4] Ian Whaley, Bringing Music Tradition in Netspace. EMS Conference 2011.

[5] Kenneth Fields, Liveness. EMS Conference 2011.

[6] From New Zealand to Japan, the network should transfer via Los Angeles, indicated <Abilene-1-lo-jmb-702.lsanca.pacificwave.net>. It took 271.653ms from Waikato to Nagoya in October 2011.

[7] Mikako Mizuno, What is the aesthetic value of live-interactive music? -----system, sound and performance, EMS Conference 2010,

<http://www.ems-network.org>

7. 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 Music 2009, Committee member of Japanese Society of Electronic Music (JSEM).