

An Approach to the Content-to-Content Interactivity in Performing Arts over Networks

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Abstract. This paper discusses another potential dimension of interactivity in networked performance that enables the real time imagery of performer's impression and the continuous reaction of actors in different locations as if they were in the same stage. To realize this, an artist makes croquis of the scene immediately during the actual performance seeing the video received from far end site in real time via internet. Simultaneously, the captured video of the drawing croquis is transmitted back to the screen of the far end site. As a result, the content-to-content interactivity can form an sympathetic stage. To demonstrate its effectiveness, the author applied the concept to the Internet2 Distributed Interactive Multimedia Performance at NYU, US.

Keywords: networked performance, interactivity, communication.

1 Introduction

High-speed networks and those wide applications are recently getting popular. For example, within high-speed network-based application are such fields as tele surgery, weather observation, monitoring of cosmic radio, distance education, cultural exchange, and so on. One of cultural exchanges using internet is performing arts over networks. It has several synonyms of a distributed performance, a telematic performance, a cyber performance, and a networked performance, but all of them commonly have the meaning of sharing performing arts among multiple stages using networking techniques. To borrow Steve Dixon's phrase, "Telematic conjunctions enable real-time audiovisual collaboration between artists or performers both in the private context of process-based development work and rehearsals and in the public context of final performances." [3]

A networked performance can take various physical formations according to purpose of its producer or characteristics of intended performance content. It can be set up with diverse technical settings: bidirectional manner, server-operating star structure, or master-slave structure among peers. Regardless the form or topology employed, research on networked performances emphasize deriving interaction among the stages [1, 7].

Interactivity is generally classified into the three dimensions according to its subjects: human-to-computer, human-to-contents, and human-to-human [2, 4-6]. This

categorization also can be apply to the interactivity in a networked performance as a communication medium since a networked performance platform surely supports those three kinds of interaction. For examples, performers use computer systems to send or receive their video and audio (human-to-computer), performers watch and react to what the platform displays (human-to-content), and performers have interaction each other (human-to-human) through this kind of communication channel in most cases. Also, some of the examples can, not necessarily, apply to the reaction of audience. In this paper, this classification is used as a framework, or a theoretical lens, to examine the concept of interactivity in a networked performance.

2 The Positioning of Networked Performance

Media artists utilize network technology as a new media besides using it as a means for real time data transmission. When two areas meet, this case being technology and art, both areas should be able to complement one another. In this perspective, we should consider the technical and artistic positioning when dealing with networked performances. As shown in Fig. 1, the aim of networked performance is to expand the reach of artistic expression by effectively utilizing state-of-the-art media/network technology.

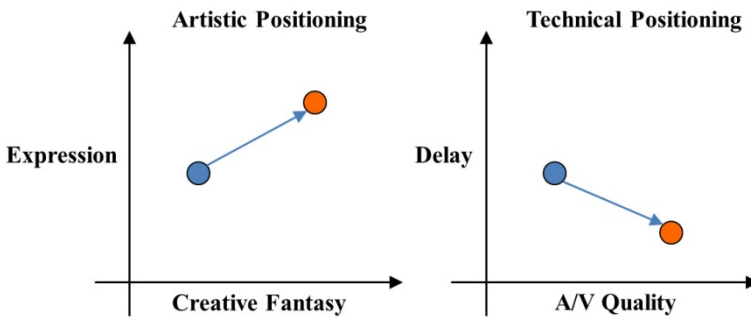


Fig. 1. The positioning of networked performance

2.1 Artistic Positioning

In an artistic perspective, a networked performance should increase the possibilities of realizing creative fantasy and give stronger impressions. However, if the total (network and system) delay makes exchanging feelings difficult, performers cannot be immersed in the networked performance, impressions of the audience drops, and the networked performance loses its vital power. Thus, it is essential to find out the content-to-content interactivity in networked performance.

2.2 Technical Positioning

On the technological side of the network, the media (audio/video) quality that is being transmitted is extremely important for realistic experience. However, increasing the definition of the video increases the data size and using compression technologies increases the latency as well as the complexity (and associated cost). As the total (network and system) delay becomes longer, no matter how high the quality may be, it becomes a hurdle for a networked performance that is based on sympathizing with one another in real-time. Therefore, the main issue in network technology needed in supporting networked performances is to increase the media quality while keeping the latency low. In this case, gigabit networks were used to guarantee high speed of the connections.

3 Approaches

A networked performance, named “Memory”, was conducted in 2010. The performance consisted of ten pieces of modern dance, music, and media arts under the main theme of memory. It had three stages connected via high-speed networks to send and receive video and audio streams: KAIST in Republic of Korea, New York University, and University of Colorado Boulder in the United States of America. Each venue had its own stage, performers, staffs, and audience. Thus, audiences on three locations could watch and listen to the stage which had pieces being played in real-time. The simplified and abstract configuration of the performance is depicted in Fig. 2.

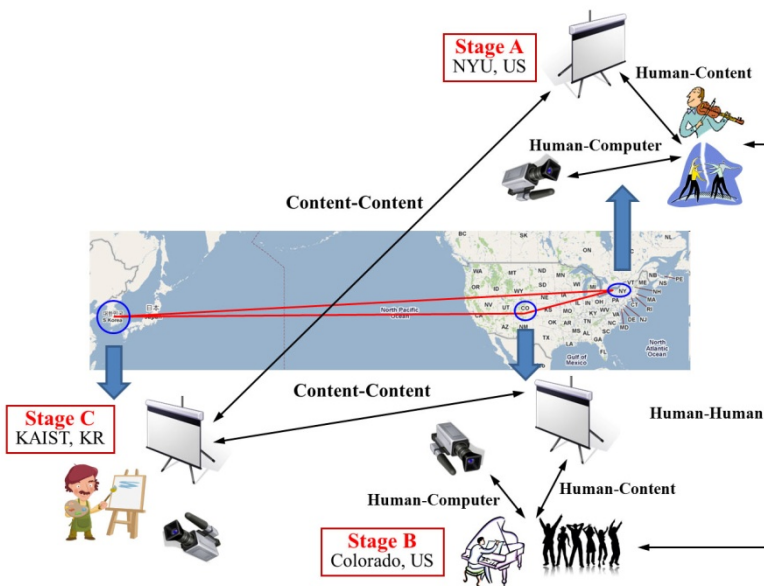


Fig. 2. Configuration of the Memory

3.1 Memory

Upon the basic configuration for a three-way networked performance, a unique experimental addition was made. As it appears in Fig. 2, a professional painter participated in the stage C. This was situated by the author in order to observe what non-traditional interactivity could be found in networked performance settings. In other words, unusual element of interactivity was introduced into the performance for the observation. The painter's role was watching the performance and drawing what he saw and felt into croquis. The painter produced several croquis which was impromptu and intuitive throughout the performance. For example, while dancers in stage A were dancing, the painter expressed his impressions and feelings from the dancing into a croquis and finished the work when the piece did. When musicians in stage B started to play the next piece, the painter began another croquis, in turn. The drawing processes and the results were also shared in real-time among the audiences on each screen of three sites via internet.

To sum up, the painter in stage C was drawing a piece being influenced by a dancer's motion and movement in stage A. The dance affected the color, stroke, shape he drew, and so on. Meanwhile, the drawing was displayed on screens in stage A to affect the improvised dance again. As a result, from the perspectives from audiences on three sites, as the thirds agents of the communication, they could observe that contents were influencing each other. As shown in the Fig. 3, the improvised drawings during the performance among three locations seem to have shown high level of content-to-content interactivity via the medium of networked performance platform. This means that the third participant to the communication, such as audience, could watch "interactive" contents in the performance.



Fig. 3. Screenshots of the performance

3.2 Conceptual Review

The interactivity in Memory can be summarized as follows. The medium for interaction was networked performance platform, which consists of transmission application, gigabit networks, screens, and so on. Interaction agents were the performers and the audiences on the three sites. Performers more actively exchanged their messages each other and the reactions from the audiences were relatively implicit. They could interact through telematics audio and video of the performers' movements, gestures, and plays. Following the aforementioned categorization [2, 4], the interactivity in Memory can be systematized in the same way. Showing up in front of the camera with some gestures and singing into microphones of performers were examples of human-to-computer interactivity. Audiences were passively participating in the interaction by watching the content via the platform. Watching performance of performers and audiences reflected human-to-contents interactivity, though there were generally little means to directly affect the content as reactions. Human-to-human interactivity was also observed when performers on two or more sites danced and played the music together through the networked performance platform. This category of interactivity also appears in interaction between performers and audiences.

4 Results and Discussion

The three existing dimensions: human-to-computer, human-to-contents, and human-to-human, however, couldn't embrace all aspects of the interactivity observed in the networked performance. Rather, the author was able to discover another sort of interactivity from the observation. In this paper, the finding is named as content-to-content interactivity and it is defined in communication with three or more agents as the extent to which un-predefined contents in messages bidirectionally influence each other from perspective of the third agent. This another potential dimension stems from the real time imagery of performer's impression and the continuous reaction of actors in different locations as if they were in the same stage.

5 Conclusion

The paper concludes by mentioning some of the further problems raised by this approach to the interactivity in performing arts over networks. The content-to-content interactivity has been newly observed as another potential dimension of interactivity from interactions in networked performance. The interactive communication is an important factor both in performing arts and social networking service. The areas of art and networking technology often dealt with networked performance, but there were little studies from the field of communication media or information systems. This paper included the discussion on one of significant concepts in networked performance, as a distinctive kind of communication media, which also exploits unusual form of communication. To greatly improve the interactivity of networked performance, it requires diverse challenges from artists, engineers, and producers as a novel

kind of media, thus what, how, where, and who of the interaction in networked performances should be discussed further. Networked performance will be a form of entertainment in the near future's digital society, and a field in which cutting-edge technology and artistic direction are important.

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