A Theatrical Turing Test:
An Encounter of Telematic Bodies

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Abstract

In our daily interactions with technology, we have accepted digital reproductions of others' voice and image as alternatives to the real ones. This paper examines human perception and sensitivity towards detecting the immediacy and relevance of responses in telecommunication. We studied participant interactions in our participatory performance piece, "The Body is Present?"(2015). We sought to quantify the participants' ability to correctly identify whether or not they were interacting with live or recorded video streams when presented with a sequence of both stimuli. Our study explores the new dynamics of human interaction in telecommunication and the significance of the co-presence of another human on the other end.

Author Keywords

Non-verbal interaction; liveness; gaze; video-mediated communication; telepresence; eye-contact; telematic encounter; digital performance; audience perception.

ACM Classification Keywords

H.1.2. Models and Principles: User/Machine Systems: Human Factors; H.4.3 Communication Application: Computer conferencing, teleconferencing, and videoconferencing; J.5 Arts and Humanities: Arts, fine and performing, performing arts (e.g., dance, music).
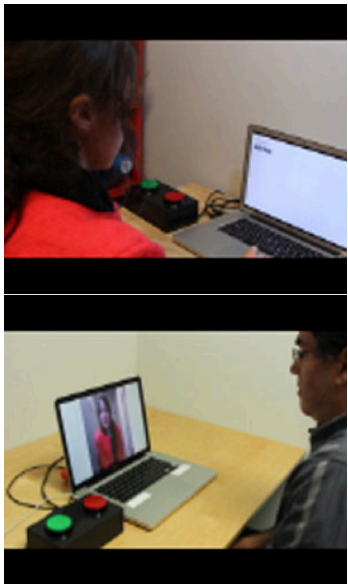
Figure 1. The two participants sit inside two separate rooms and interact with each other via a telecommunication medium, experiencing nine different modes of liveness, as summarized in Table 1.

At the end of each mode, they should answer the question, "Was the other participant interacting with you?" using the arcade buttons, in order to proceed to the next stage.

Introduction

"The Body is Present?" is a durational participatory performance piece, which premiered at the Media Arts and Technology Program's (MATP) annual exhibition at the University of California, Santa Barbara in May 2015. This piece is a digital reenactment of Marina Abramović's 2010 performance, "The Artist is Present," at the Museum of Modern Art in New York City, where she sat still, in silence, across from the museum visitors, gazing into their eyes, for the total duration of 750 hours [2, 4]. "The Body is Present?" is a theatrical Turing test [5], examining the spectator's perception towards the presence of the other body on the other side of the digital medium.

In this piece, two participants sit in two different rooms, each behind a computer station, and interact with each other and the artist telematically. They go through nine stages of liveness, as shown in Table 1. They are asked to look into the eyes on the screen, and answer one question at the end of each stage: "Was the other participant interacting with you?" (See Figure 1) We also ask the participants to leave us video comments at the end of their experience.

The video feeds of the two participants' interactions are simultaneously streaming live on two screens facing one another, located in the main hallway of the gallery. There are two arcade buttons (red and green) in front of the screens with a question asking the gallery visitors: "Are these two participants interacting with each other?" (See Figure 2) This is a second level of acquiring participation from the audience, which extends the performance piece from inside the closed doors to the hallway of the gallery. The responses are collected in this level as well, in order to study the

perception of the public audience towards the liveness of virtual interactions between the participants in the rooms.

In this paper, when we refer to the participants, we mean the exhibition visitors who actively participated in our performance piece inside the rooms. And when we refer to the audience, we mean the visitors who observed and assessed the participants' live video feeds on the screens in the hallway, during the performance.

Stage	Participant A	Participant B	Artist
1	Artist-Recorded	Artist-Recorded	-
2	B-Live	A-Live	-
3	Artist-Live	Artist-Live	A, B-Live
4	B-Recorded (Stage 1)	A-Recorded (Stage 1)	-
5	B-Live	Artist-Live	A-Live
6	B-Live (1-Sec Delay)	A-Live (1-Sec Delay)	-
7	Artist-Live	A-Live	B-Live
8	B-Recorded (Stage 2)	A-Recorded (Stage 2)	-
9	Artist-Live	Artist-Live	Artist-Live

Table 1: Stages of Interaction with Different Modes of Liveness. A-Live means the live video feed of participant A. A-Recorded (Stage 1) refers to the pre-recorded video of participant A at Stage 1.

Objectives

We wanted to reduce video communication to its simplest and yet powerful core - non-verbal interaction - and examine the participants' ability to identify the liveness of telematic interactions [1, 3] by impulsive

Figure 2. The gallery's audience members are simultaneously viewing the camera feeds of the two participants, streaming live in the main exhibition space.

They are asked to answer the question, "Are these two participants interacting with each other?" using arcade buttons. After pressing a button, they are notified about the percentage of other audience members who have agreed with their response in that stage.

interactions with eye contact and micro expressions. Our hypothesis was that the participants would be able to identify the live interaction in live streaming video (Stage 3) from the lack of interaction in recorded ones (Stage 4 and 8). However, we were not sure about the stages in the grey area of liveness: the delayed interaction (Stage 6), the circular (indirect) interaction (Stage 5 and 7), and the one-sided interaction in a live streaming video (Stage 9). We were curious to see the participants' responses to understand how they perceive those situations. We were also interested to observe the audience's perception towards different levels of interactivity from an outsider's point of view.

Live or Not Live: That is the Question!

Since there was no audio, the only means to identify a live interaction was to look for the simultaneity of transmission and reception: mutual virtual gaze, the spontaneity of responses (such as the immediate counteractions, or repetitions of the actions), and gestural empathy (such as a concurrent smile, laughter, or yawn). Detecting if the other participant was interacting live or not was a hard task in most cases, according to the participants' video comments. We observed that many similar gestures kept repeating in different (live and recorded) stages of interaction among every group of two participants (and the artist). And sometimes they were intentionally and playfully hesitant to respond to each other's expressions. Therefore, overall it was hard for the participants to know the correct answer.

Data Analysis and Results

We have analyzed the participants' responses, using Cochran's Q test, accompanied by the McNemar test with a Bonferroni alpha correction (as a post-hoc test

for the Cochran's Q). Considering the nature and number of our variables, we have decided to use Fisher's exact test for the analysis of the audience's response. Figures 5 and 6 show the plots of the participants' and audience's responses. The participants' sample size was 40 and the audience's sample size varied in each stage between 19 and 35.

The results of Cochran's Q on the participants' data with $p=.0046$ ($p<.05$), demonstrated a statistically significant difference between the responses in some of the stages. After a McNemar test (with a Bonferroni alpha correction), we discovered that Stage 4 data was significantly different from Stages 3, 5, and 9, and Stage 8 data was significantly different from Stages 3 and 5. Stages 4 and 8 were the only stages with pre-recorded videos, while Stage 3 was the only one with a live telematic interaction.

In Stages 5 and 9, the other participant was co-present on the other side, but the interaction was not live, placing them both in the grey area, but more towards the live side. We believe in Stage 5 some gestures were transmitted among the participants in a circular way, creating a sense of liveness in the virtual interaction. In the case of Stage 9, the playful repetition of gestures from the prior stages by the artist, despite her lack of direct interaction with the participants, was perceived as live by some of them. (See Figures 3 and 4)

The results of the McNemar test on the participants' responses for Stages 4 and 8 have greatly confirmed our hypothesis about the participants' ability to distinguish a live telematic interaction from a recoded video (or the other participant's live interaction with another person). As for the Fisher's exact test, the
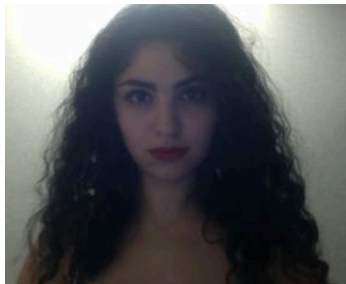
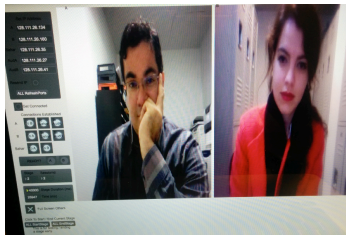**Figure 3.** The artist as an actor and super-user

Figure 4. The artist has access to the live video feeds from the participants' web cams. In her performance, she playfully uses the micro expressions emerging and lingering in the virtual air between the participants in order to accentuate the interactivity and gestural sympathy between participants and to simultaneously create disruption in the flow of interaction.

results of the analysis on the audience's data did not demonstrate any evidence that the audience could correctly distinguish between the two scenarios.
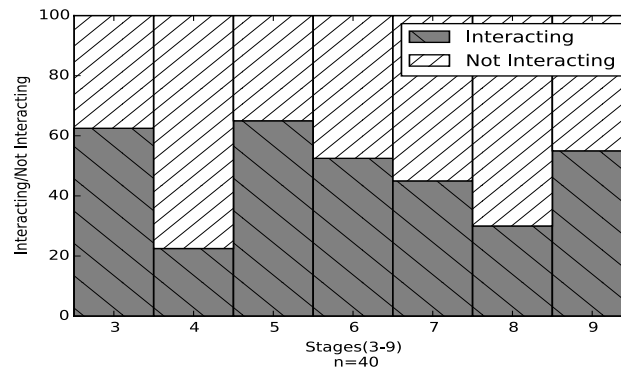

Figure 5: Percentage of participants' responses in different stages, as described in Table 1. The data from Stages 1 and 2 were not used for analysis, because they were always the first two stages of the encounter (for artistic purposes and data collection). The order of the remaining stages of interaction was randomly selected for every group of two participants.
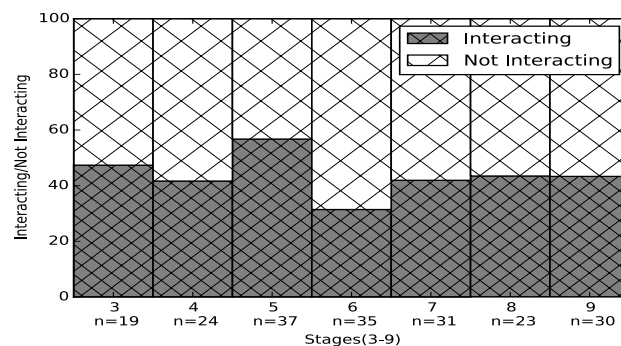

Figure 6: Percentage of audience's response in Stages 3 to 9, as described in Table 1. "n" is the sample size at each stage. The data is corrected to exclude the non-compliant input, which occurred as a result of numerous pressings of the buttons under one second.

Future Work

While we obtained interesting and significant results regarding the difference between off-line video and the interactive or indirectly interactive conditions in our previous exhibition of this piece, we feel that we could get more results regarding the differences among the various conditions if we modify some of the setup variables. In particular, for the interactivity section of CHI 2016 conference, we will perform a version of this piece with the following modifications: the actor will be substituted with a third participant, and we will specifically compare the live, recorded, and delayed scenarios with different latencies.

Acknowledgment

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