

# Pseudo Real-Time Live Event: Virtualization for Nonverbal Live Entertainment and Sharing

Yamazaki Yusuke<sup>1,2</sup>, Shirai Akihiko<sup>1</sup>

<sup>1</sup>GREE VR Studio Laboratory, Japan

<sup>2</sup>Tokyo Institute of Technology, Japan

**Corresponding author:** Yamazaki Yusuke, z.yusuke.yamazaki@gree.net

**Keywords:** Nonverbal interaction – Pseudo real-time – Live entertainment – VibeShare

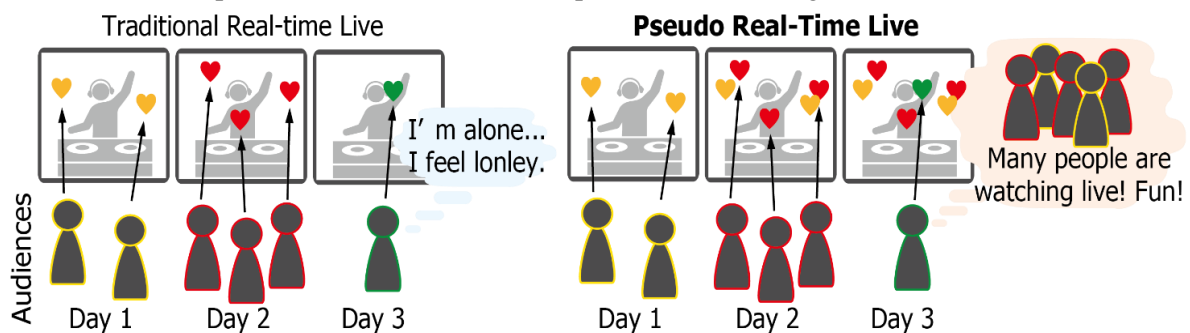
## Abstract

We have developed a pseudo real-time live system that allows users to share nonverbal interactions with past or future audiences. To test this system, we added nonverbal “Entities” such as sound and visual effects to an online video. We experimented with three conditions: (1) the Entities were added to only the first half of the video, (2) the Entities were added to only the second half, and (3) no Entities were added. The results showed that more participants were attracted to the experiment under the first condition than the others, and participants spontaneously interacted with the added Entities. This suggests that pseudo real-time interaction enhances the user experience for online video audiences.

## 1. Introduction

This paper aims to contribute to computer-human interaction in the post-Covid-19 era. Video conference tools and broadcast services solve distance and physical restrictions in online classrooms, international conferences, and live performances. However, the interaction between the performers and the audiences is limited to sending emoticons and questions and answers via text comments. These limited interactions, further limited by time zone differences, lack some nonverbal elements experienced at live events: the presence, applause, cheers, and vibes from audiences. To address the loss of nonverbal engagement, we developed VibeShare (GREE VR Studio Laboratory, 2021), which converts nonverbal input into multimodal feedback. VibeShare enables nonverbal, real-time live interaction between the performers and audiences (SHIRAI et al., 2019).

This paper proposes a pseudo real-time live system (Figure 1), which enables asynchronous nonverbal communication and reports how it affects the user experience of watching online video content.

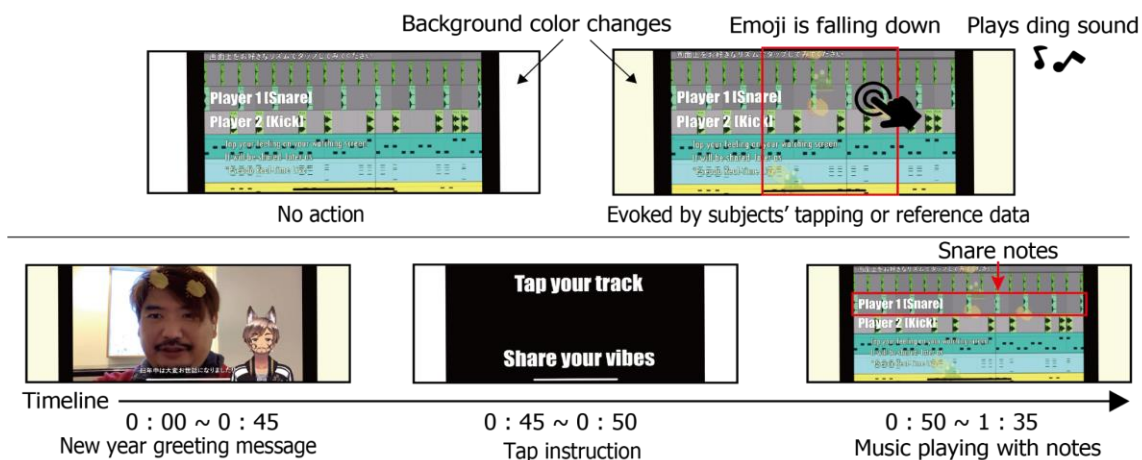


**Figure 1: Concept of “pseudo real-time live.”** The audiences watching a traditional real-time live event can only see the reactions of those present. The audiences watching pseudo real-time live can enjoy the reactions of past participants and feel like they are participating with them, even if they are the sole participant at that particular time.

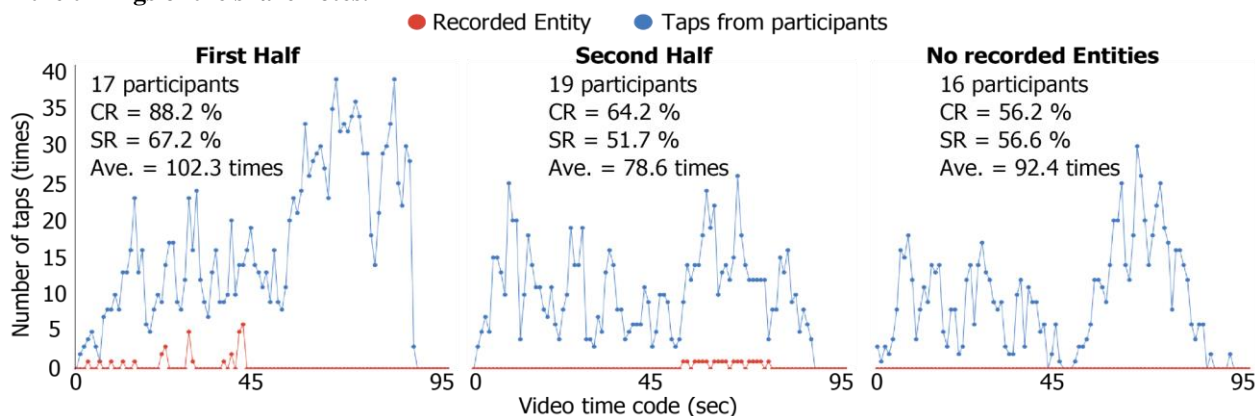
## 2. Evaluation

To examine the effect of our concept on user experience, we prepared the video shown in Figure 2 and experimented with three conditions: (1) the recorded sound effects and emoticons (hereinafter called Entities) were added to only the first half of the video (the condition called *FH*), (2) the Entities were added to only the

second half (*SH*), and (3) no Entities were added (*NO*). An experimental web page (<https://vibeshare-ex2101.herokuapp.com/>), including the video and Entities, was developed in JavaScript. The URL was shared as an experiment with anonymous participants via mailing lists and Twitter without explaining the aim. The participants were able to drop out of the experiment if they felt bored. We defined “completions” as instances of participants watching the video to the end.



**Figure 2. Depiction of the video and Entities.** The top part shows the Entity that occurs when a player touches the screen or the recorded Entities play. The bottom part shows the sequence of the video. *FH* had Entities at appropriate times, such as at the end of the greeting message and on beat with the music. *SH* had Entities appearing in the timings of the snare notes.



**Figure 3. The number of taps associated with the video time code.** The red series shows the number of recorded Entities. The blue series shows the total number of taps from all participants. “CR” stands for completion rate, the percentage of participants who watched the video to the end. “SR” stands for the second-half tap rate. “Ave.” stands for the average number of taps per participant.

### 3. Discussion and Conclusion

In Figure 3, the highest completion rate (CR) of *FH* suggests that the Entities that appeared in the first half probably attracted the participants and prevented them from dropping out. The second-half tap rate (SR) was also highest in *FH*, even though there were no recorded Entities in the second half. This indicates that the recorded Entities helped familiarize participants with the proposed experience and encouraged them to feel free to tap and enjoy making the Entities. These results suggest that the proposed experience, which expresses the past presence of others by Entities, even if asynchronously, positively attracts the users. We expect the pseudo real-time live system can redesign the interaction between online audiences.

### 4. References

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