Gulliver's Game: Multiviewer and Vtuber Extreme Asymmetric Game

Jiahao Li
Interactive Media Design and Technology Center
Tsinghua University
China
lijiahao21@mails.tsinghua.edu.cn

Ke Fang
Interactive Media Design and Technology Center
Tsinghua University
China
fang.ke@sz.tsinghua.edu.cn

Xing Sun
Interactive Media Design and Technology Center
Tsinghua University
China
sunxking844@163.com

Zhouyi Li
Harbin Institute of Technology, Shenzhen
China
190210418@stu.hit.edu.cn

Xinyang Wen
Harbin Institute of Technology, Shenzhen
China
intoasea@foxmail.com

Wai Kin Victor Chan*
Tsinghua-Berkeley Shenzhen Institute
Tsinghua University
China
chanw@sz.tsinghua.edu.cn

***Abstract*—Although live streaming has grown increasingly popular, the interactive channels between the streamer and their viewers stays limited - mostly via live chat and virtual gifting. To improve this situation, thanks to the rise of Virtual Youtuber (Vtuber), we design a new game model - Multiviewer and Vtuber Extreme Asymmetric Game (MVEAG) - that profoundly enhances the interactivity of virtual live streaming. In the MVEAG model, massive viewers interact with the Vtuber streamer in the very game scene where they play together, but with extremely asymmetric roles. The Vtuber plays the main role whereas the viewers play supplementary roles. Both roles are indispensable in achieving the game objective so that the Vtuber has to establish different interactive strategies with their viewers in the gameplay. We design the Gulliver's Game as an example of MVEAG model, in which we demonstrate spontaneous and complex in-game interactive behaviors, when multiviewers experience direct collaboration and confrontation with the streamer.**

Keywords—live streaming, virtual idols, interactive design, virtual Youtuber

I. Introduction

In ordinary live streaming, viewers interact with streamers and other viewers via virtual gifts, screen bullet, live chat or other modalities in real-time. In the rapid development of the live streaming in the past few years, Virtual Youtubers (Vtubers) have occupied more and more popularity. Vtubers stand out in live streaming by offering fascinating virtual avatars and fantastic virtual environments [1], which results in the close relationship between the viewers and virtual idols. Based on motion-capture technology, Vtubers can not only control their virtual avatars, but also establish their virtual live streaming rooms. In virtual live streaming rooms, viewers may have an unprecedented feeling because the virtual avatars and virtual environments break the boundary between real and virtual.

Compared with video games, virtual live streaming has some features more suitable for real-time interaction: 1) The embodied action of vtubers give an extra interaction channel between them. Vtubers can interact with embodied action in addition to the voice, screen bullet, and other channels in traditional live streaming[1]. Vtubers' embodied action in real time provides a new interactive channel for virtual live streaming, which is a cornerstone for our game design. However, in most video games, players can only interact with AI with fixed modes, or with teammates who can only make fixed actions. 2) Virtual live streaming provides a better playground for emergent behavior between Vtubers and viewers. The interactions between Vtubers and viewers can generate new ideas and new topics, instead of the more fixed pattern of video games.

Research shows[2] that the viewers usually show a strong interest in interacting with the Vtubers, so we argue that the interactive games can provide more fun for the virtual live streaming. We put forward the idea of the MVEAG model in which the viewers are no longer the bystanders of the live streaming, but can interact with the Vtubers and participate in the interactive games. We hope that the virtual live streaming can change from traditional media to an Internet amusement park. We designed an extreme asymmetric game mode between the Vtuber streamer and viewers. The live streaming rooms usually contain one streamer and multiple viewers. Therefore, the game is designed as a One-to-Many asymmetric game. In order to highlight the difference between the Vtuber and the viewers, the streamer becomes a giant, and the viewers incarnate into dwarfs with different division of labor. Viewers can play the game together with the streamer in the process of live streaming. The game scene is very similar to the scene in Gulliver's Travels, so we named it "Gulliver's game".

II. Concept and Design

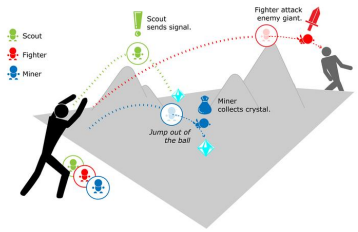

Fig. 1. Game Design.

We design the "Gulliver's Game" to demonstrate the MVEAG model (Fig. 1.). In the Gulliver's Game, the Vtuber plays a giant in a fantasy virtual world. For his own survival, the giant needs to collect a special kind of blue crystal, while fighting against other enemy giants in the same scene. For some reason, the giant cannot move in this world, but he can

use the help from a number of much smaller dwarfs surrounding him, played by the Vtuber's multiple viewers. The powerful giant can throw the dwarfs to certain locations at a distance, so that the dwarfs can help the giant to collect the valuable crystal or attack the enemy giant.

The interactive strategies between the Vtuber and their viewers can be very diverse. To better guide the players, we design several basic types of dwarfs that fit in different scenarios, i.e. scenarios where dwarfs look for crystal, collect crystal and fight against the enemy. (Fig. 2.)

Fig. 2.Viewers enter different balls and turn into scouts, miners or fighters in the game map with hills and blue crystal.

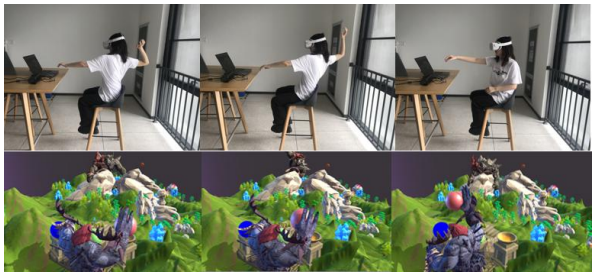

Fig. 3. Vtuber plays giant and throw the ball that carries dwarfs.

1)Looking for crystal: When the dwarf (played by a viewer) enters the green ball, he turns into a "scout" dwarf. The scout, when travelling in the air with the green ball, can shoot a flare to send signals. As shown in Fig. 4(a)., we designed a game map that the blue crystal distributed all over the scene. We designed some hills to bring about blind spots for the giant. When used wisely, the scout can send the right message to the giant, especially when the scout flies through areas that are not directly visible to the giant. After shooting the flare, the scout's life will come to an end, and he will respawn near the giant before starting a new task.

2)Collecting crystal: When the dwarf enters the blue ball, he becomes a "miner" dwarf. The miner, when travelling in the air with the blue ball, can choose the right moment to jump off the ball, and land under the viewer's own control. As shown in Fig. 4(b), if the viewer lands well, he will soon arrive at a blue crystal and start to collect them. Otherwise, he will not be able to reach the crystal as his lifetime is short after jumping (6 seconds in our game). When his lifetime is up, the miner will respawn near the giant, with or without the crystal. The collecting task needs the Vtuber and viewers to closely collaborate. The task will fail easily, if the ball, thrown by the giant, travels nowhere near any crystal, or the miner makes a poor landing.

3)Fighting against the enemy: When the dwarf enters the red ball, he turns himself into a "fighter". The fighter, like the miner, can choose when to jump off the ball. But unlike the miner, the fighter's task after jumping off is to hit the enemy giant with his own body. As shown in Fig. 4(c), Fighter's different flying and landing skill may cause the fighter to hit different spots of the giant, which cast different damages. Whether he hit the enemy or the ground, the fighter will instantly respawn near the giant for another round of play. The fighting mechanic demonstrates the confrontation between the Vtuber and the viewers, if the enemy is played by another Vtuber. Although not movable, the giant do have the ability to dodge the attack by moving his upper body, a movement ultimately made by the streamer and captured by the mo-cap device.

Fig. 4. (a) Scout (b)Miner (c)Fighter.

III.Implementation

We implemented the game based on mo-cap and cloud server technology. In terms of output hardware, we provide two interfaces: PC screen and virtual reality headset. The virtual reality interface is provided to Oculus Quest2, which can be used by connecting the PC. We recommend using VR to play Gulliver's Game because the players' embodied cognition will improve the immersion (both the Vtuber and viewers) of the giant and dwarfs. Considering that our model is promoted for mass media, our mo-cap device adopts Kinect, and we designed programs based on it.

We first set up virtual scenes in Unity and implement the interaction logic using C#. As shown in Fig. 5, we use Lua programming language to implement the cloud server framework. The mo-cap data of the streamer is transmitted to the cloud server database and broadcast to the clients of the viewers through the server. The operation data of the viewers is also transmitted to the database, but in order to optimize the transmission efficiency, the viewers' data and the streamer's data adopt different channels.

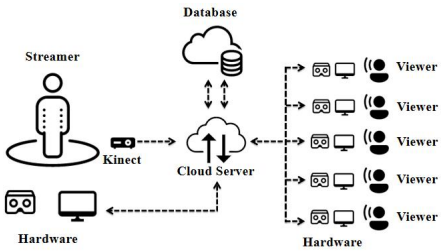

Fig . 5. Data flow.

IV.Reflection and Future Work

This paper presented the design of MVEAG model, and we designed and implemented Gulliver's Game to demonstrate this extreme asymmetric game model. Our game design is based on the relationship between multiple viewers and Vtuber in virtual live streaming. Giving viewers and Vtuber different avatars provides diverse interactive strategies between them. Based on the MVEAG model, more interactive strategies will be designed and implemented. In order to foster our game design, we will conduct further play tests in live streaming platform, and thus to improve balancing and increase more fantastic interactive experience in Vtubers' virtual world.

Reference

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