

Data Transfer Interaction Technique for Multi-source Visualization in Mixed Space

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Abstract:

This paper presents a data transfer interaction technique for multi-source visualization in mixed space. The technical solution consists of three parts: a Web client to parse existing 2D visualization data; HoloLens mixed reality client that handles gestures and immersive visualization data; and the server that receives and distributes messages. The user selects data elements on the existing 2D visualization through natural free-hand interaction and drags them to the 3D visualization space. The Web client completes data extraction, the server completes data transmission, and the mixed reality terminal is responsible for gesture interaction recognition and rendering in the process of data transfer.

Keywords: Mixed space visualization, Multi-source visualization, data transfer.

1 Introduction

In multi-source visualization of mixed space, the data transfer of visualization data between multiple devices is usually completed directly in the background, lacking intuitive and explicit interactive driving methods. Therefore, it often leads to user interaction loss and is not conducive to collaborative interaction between multiple devices and multiple people.

In this work, we transform the data transfer process from a background transmission to an interactive operation in a multi-source visualization of mixed space. Users are allowed to independently control the data transfer process to improve the naturalness of collaborative interaction in mixed space.

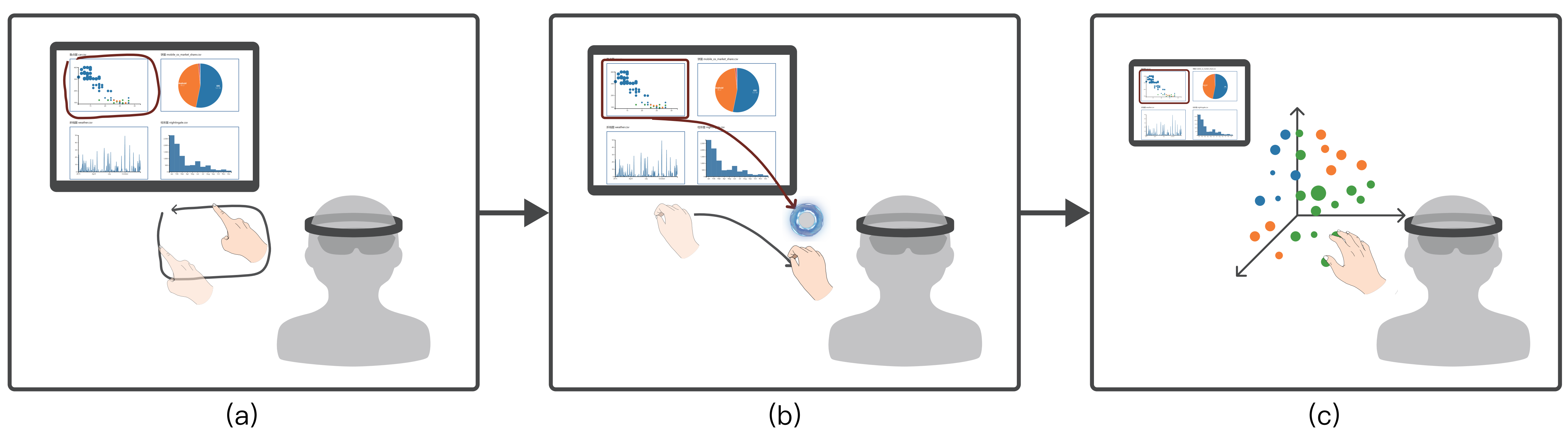


Figure 1: Interactive Flow chart. (a) Select 2D visualization; (b) Data switching between different device spaces; (c) Interactive data monitoring in multi-source visualization of mixed space.

2 Design

This paper presents a mixed space interactive technique for data transfer between multi-source visualization devices.

Fig. 1 is the task flow of the data transfer interaction. In the multi-source visualization scene of mixed space, users can use gesture to select the visual elements of 2D visualization, for the sake of parsing and extracting the original data within this range. The obtained visualization data is then captured by the HoloLens terminal for the construction of immersive visualization. Finally, the visualization of both terminals enters the real-time monitoring state of user interaction operation.

The technical framework of data transfer interaction is divided into client side and server side, as shown in Figure 2. The server is responsible for receiving and forwarding data information from the client. The clients for multi-source visualization of mixed space include the Web side which presents 2D visualization and the HoloLens mixed reality side which presents immersive visualization.

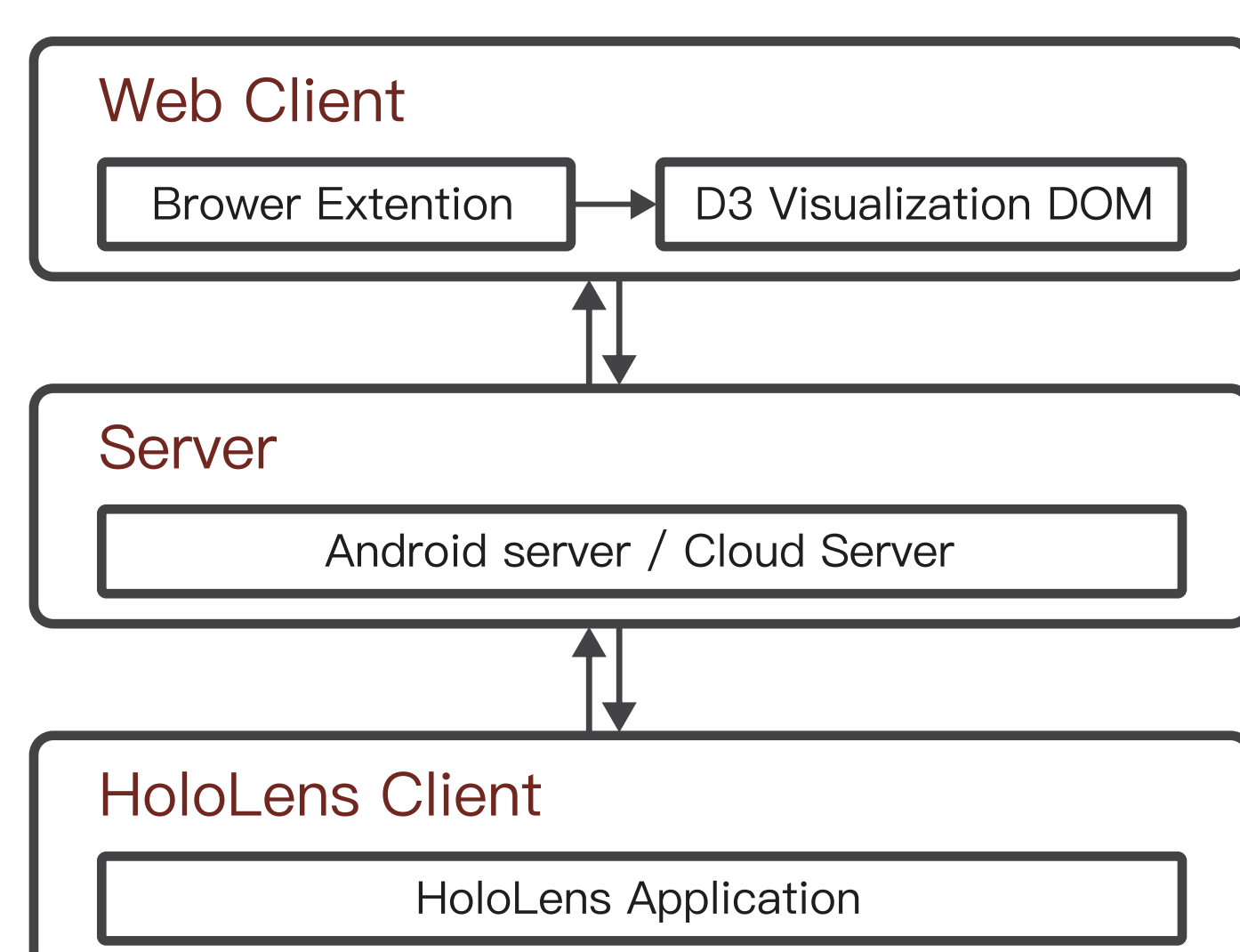


Figure 2: Technical architecture overview.

In terms of the specific functions of the data transfer interaction, the entire data transfer interaction technically can be divided into four modules: data extraction, data transmission, gesture interaction and visual feedback, as shown in Figure 3.

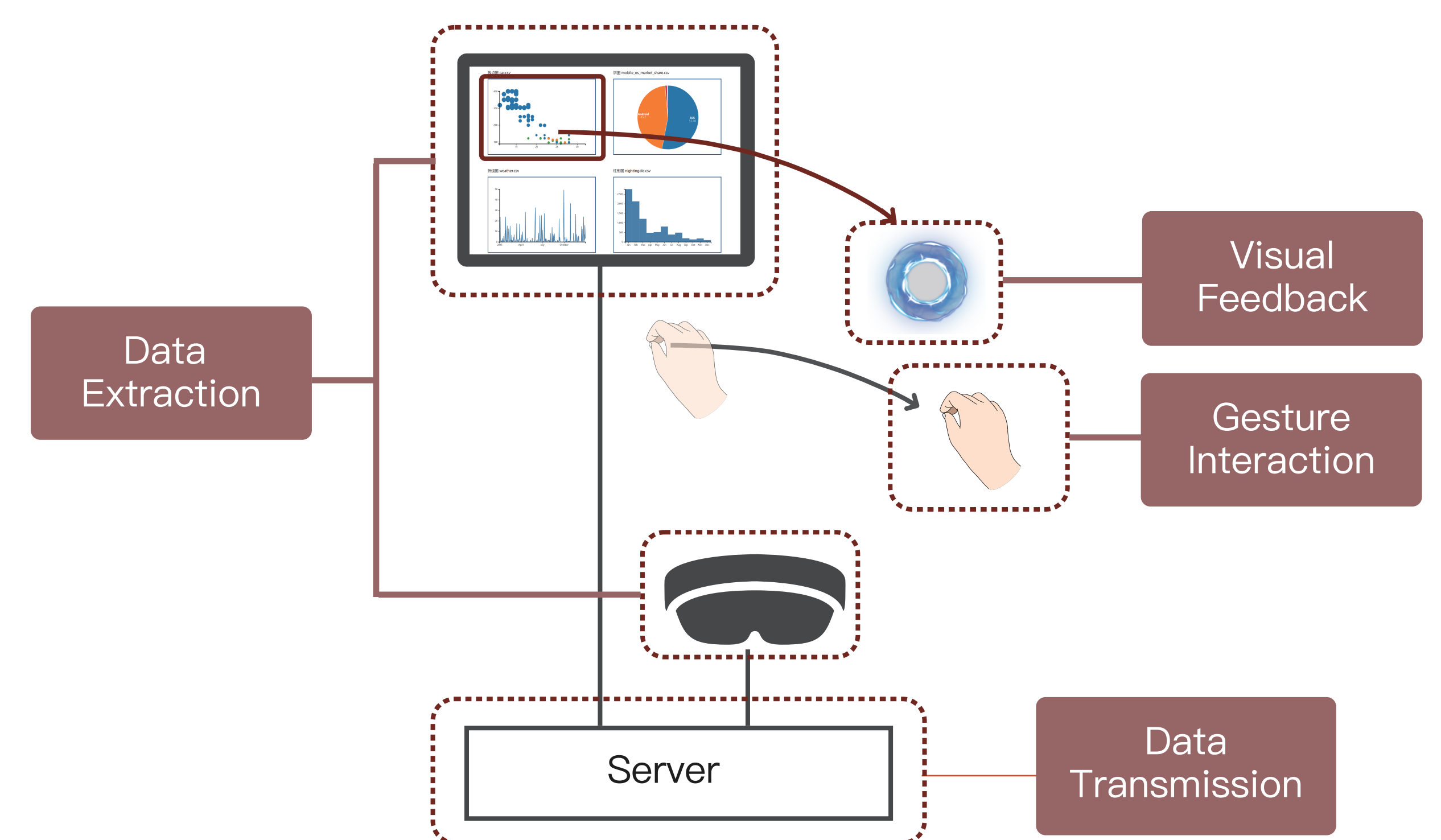


Figure 3: Functional framework.

3 Conclusion and Future Work

This paper proposes a data transfer interaction technique scheme for multi-source visualization in mixed space, which simplifies the process of building multi-source visualization for mixed space. The user selects the existing visualization on the Web side through freehand interaction and transfers the original data extracted from the visualization to the HoloLens side for creating immersive visualization. The visualization on the Web terminal and HoloLens terminal are also associated through the original data, thereby realizing the linkage of multi-source visualization in mixed space.

In the future, we will realize packet data forwarding and improve user interaction experience.