



MetaMood: AI-based Shared Emotion Visualizations in Immersive Healing Space

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Introduction



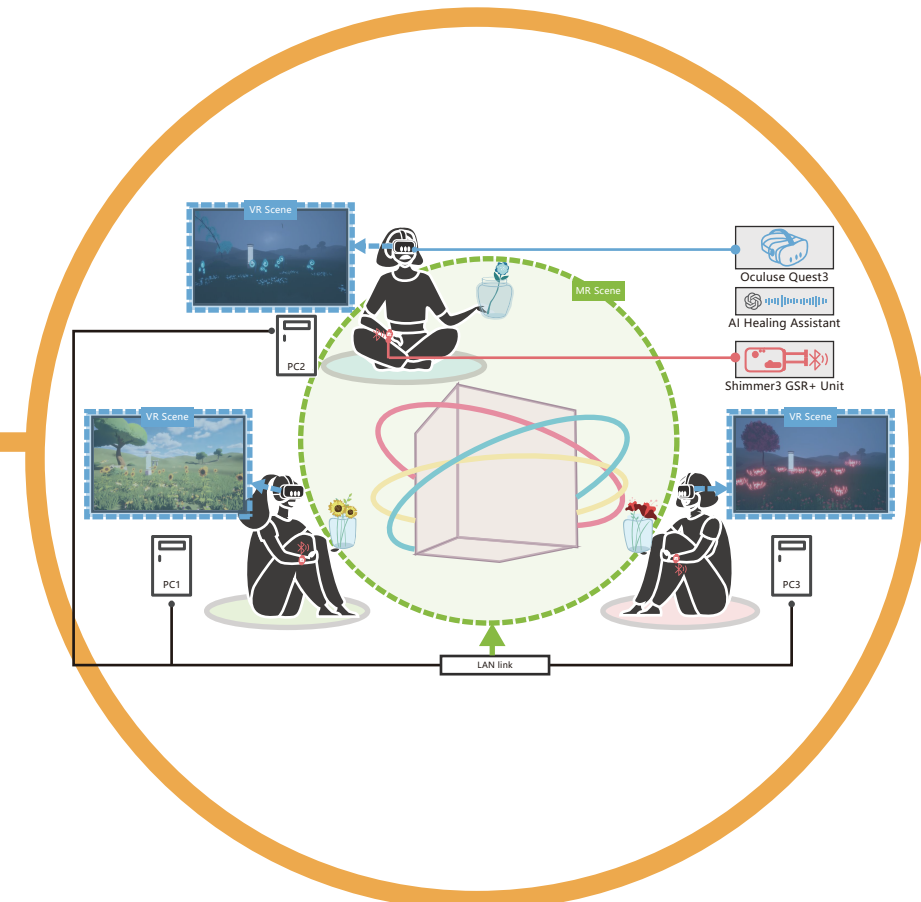
It is challenging to accurately and visually present the dynamics of emotions during people's face-to-face communication.



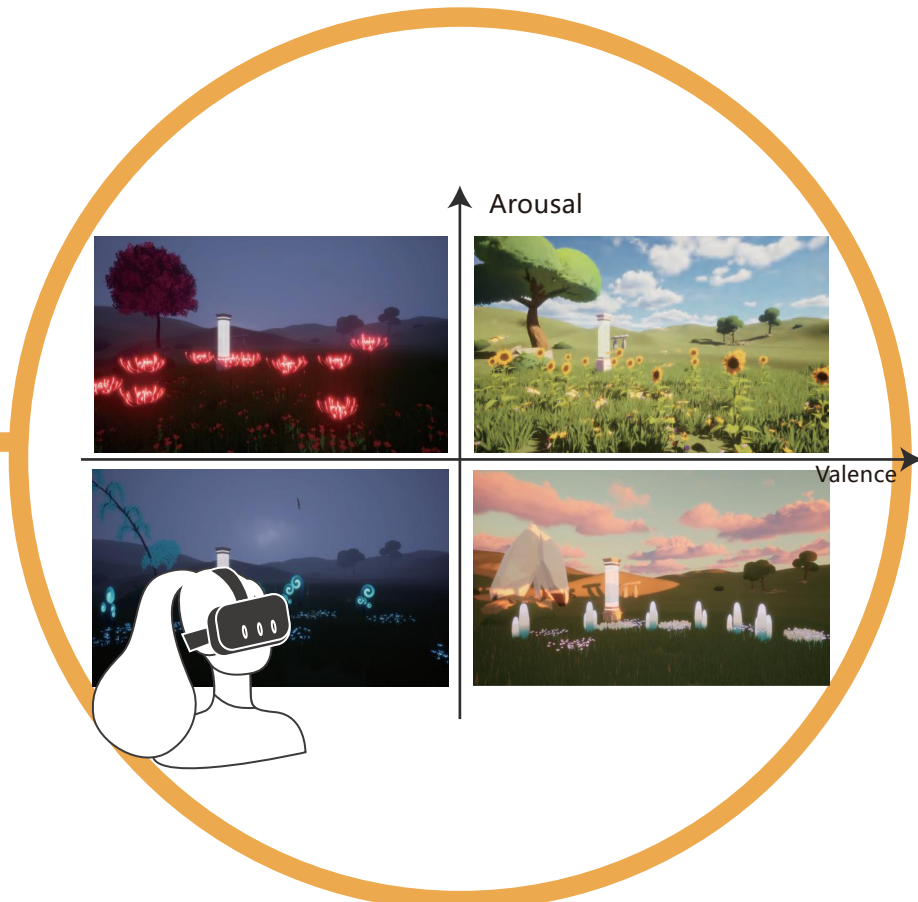
In group art therapy, visualizing emotions through artistic creation is a challenge.



As a result, many researchers are turning to visualization to represent the complexity of emotions.



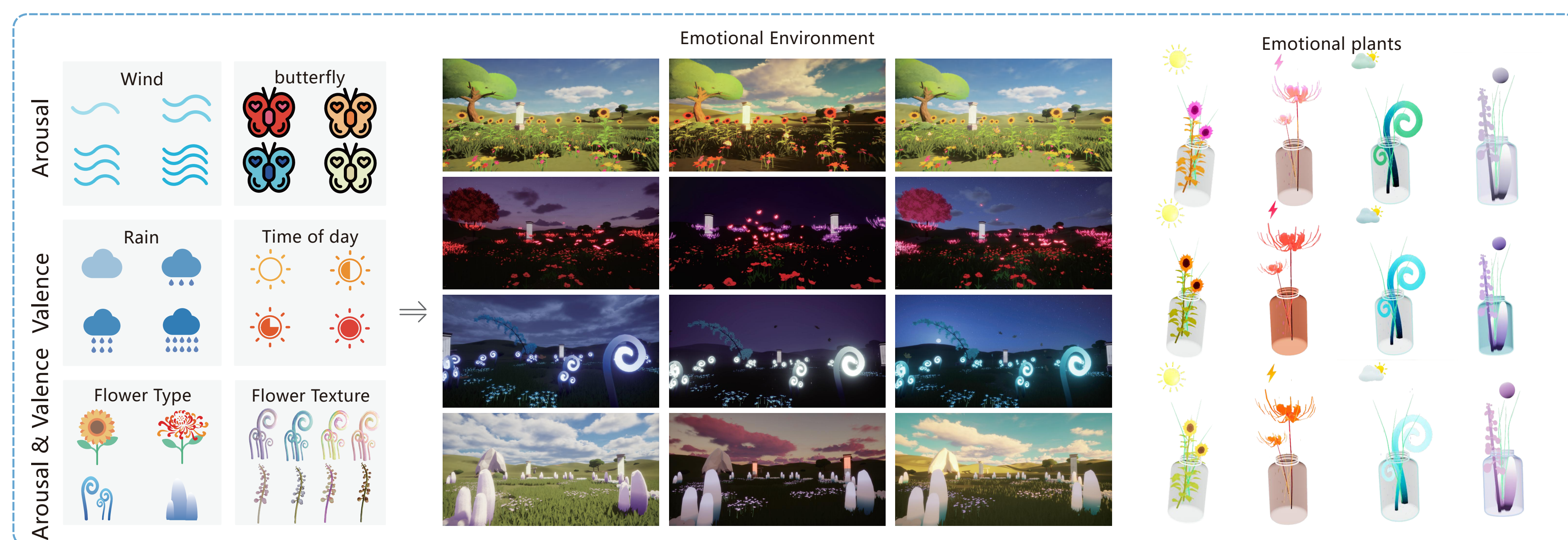
Based on this, We propose a new AI-based method for automatically generating emotional visualizations, including individual and Explicit Shared Emotion visualization methods and deploying them in both Virtual Reality (VR) and Mixed Reality (MR) environments.



Based on real-time analysis of participants' emotional states, AIGC technology is used to generate immersive spaces and object elements corresponding to participants' emotional states.

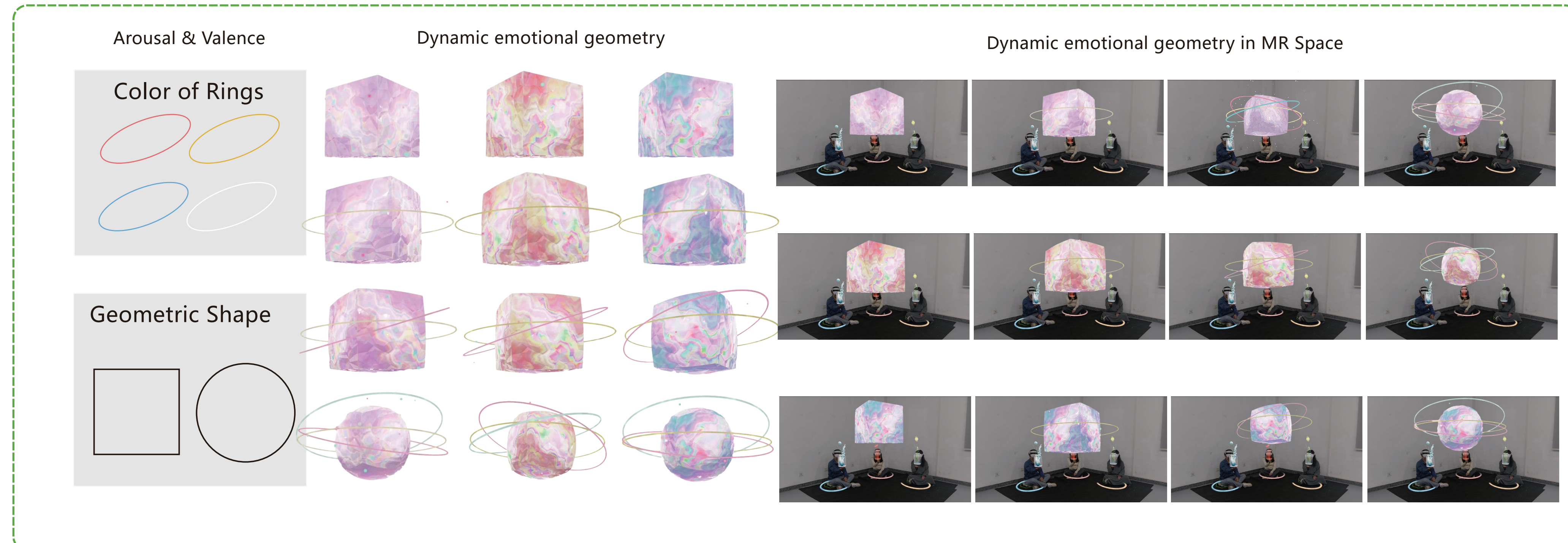
Visualization Overview

Individual emotional visualization



For the generation of emotional environments, Higher valence brings a time closer to noon and more butterflies. Lower arousal brings more rainfall and stronger wind. For generating the appearance of mood plants, upon detecting the participant's emotions during personal meditation stage, the system automatically generates the corresponding plants and uses bywordGPT to generate keywords. These keywords are transmitted to MeshyAI to generate plant textures in real-time, reflecting the changes on the plants. In expressive group therapy stage, mood plants are represented as plants inserted in vases. The weather elements of the emotional environments are also presented as 3D icons above the vases.

Group Shared Emotional Visualisation

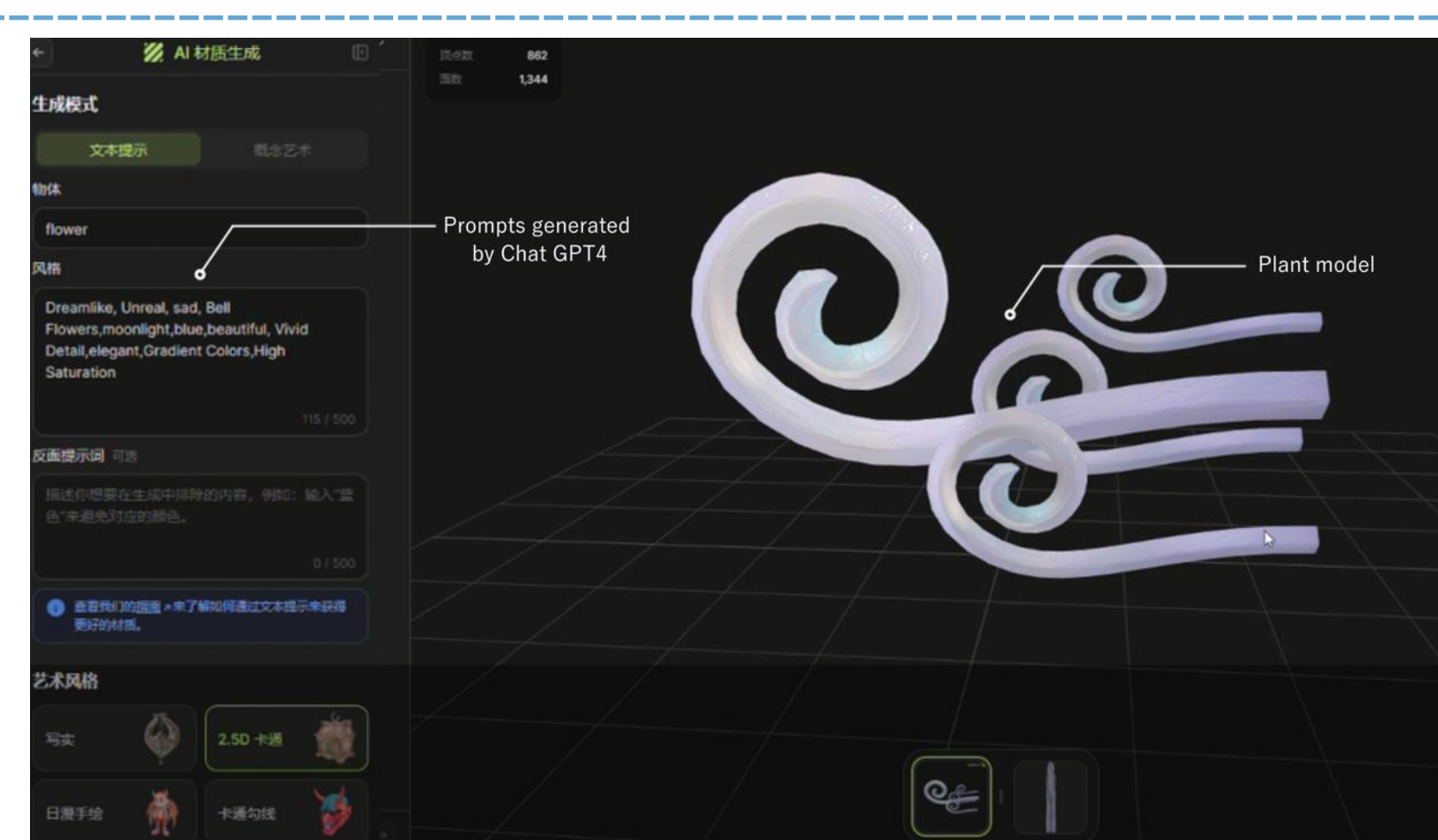
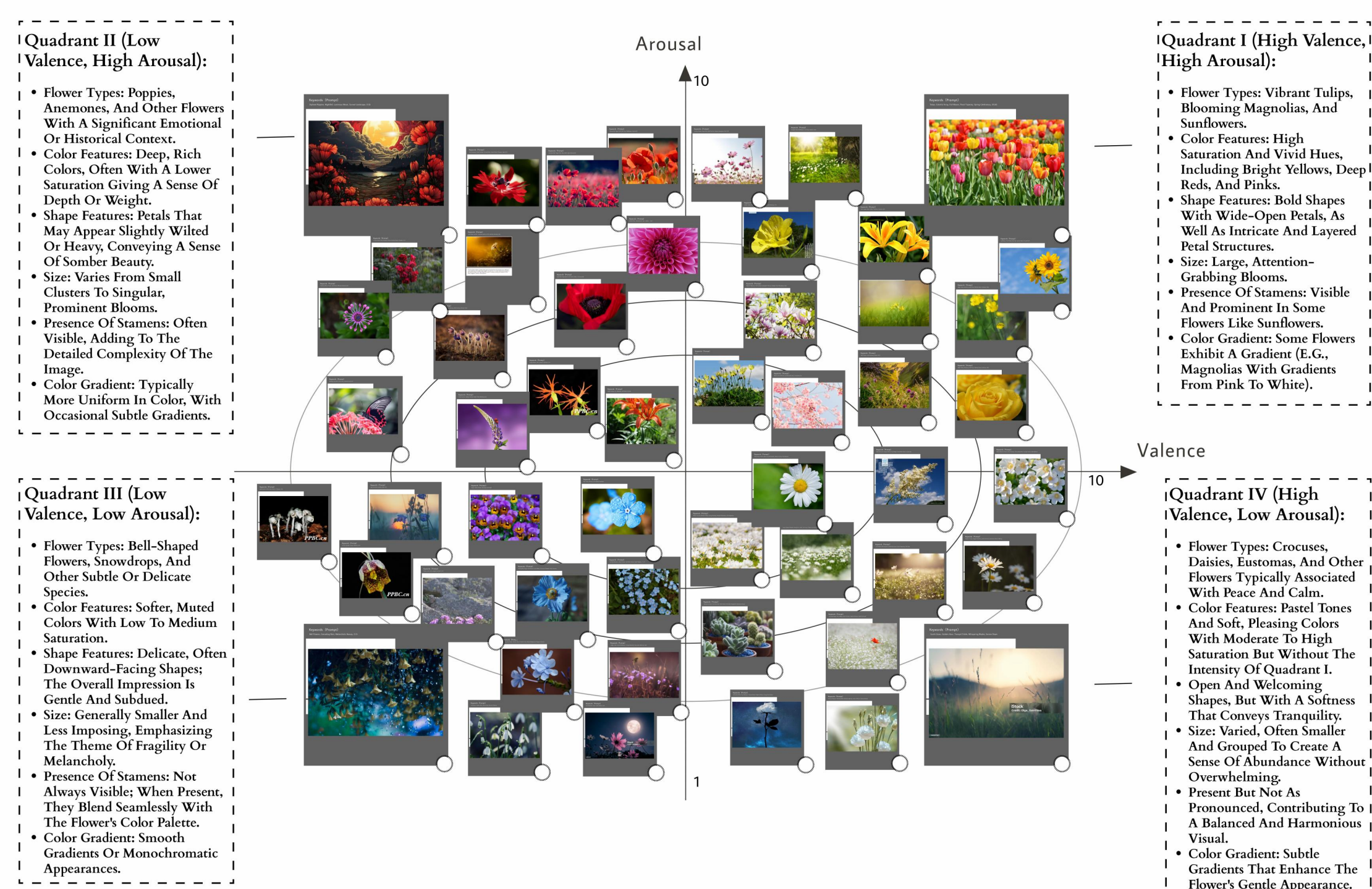


In practice, we map the arousal and valence levels of three participants to a central geometric shape. When the average valence is high, the geometric shape transitions from a cube to a sphere, while it rises. Also, the color intensity of the geometric shape increases because of higher valence and arousal levels, leading to different visual results for each experience group. Furthermore, when individual's arousal and valence levels are high, rings representing their personal emotions appear around the geometric shape. This approach seamlessly merges group and individual emotions, creating a dynamic visualization effect, and allows us to reasonably combine the group's emotions with individual emotions to achieve dynamic visualization.

Visualization Methods

Personalized visual feedback

To determine how emotions map to visual presentations in virtual space, we designed our own database of plant environment photos and weather photos to test participants' emotional responses to different plant types, their growth environments, and various weather seasons. From preliminary surveys, we identified visual elements related to emotions (such as day-night changes, rainfall, wind strength, and butterflies) and the representative plants for the four emotional states according to the emotional coordinate (sunflower, red spider lily, glossy privet, and cactus).



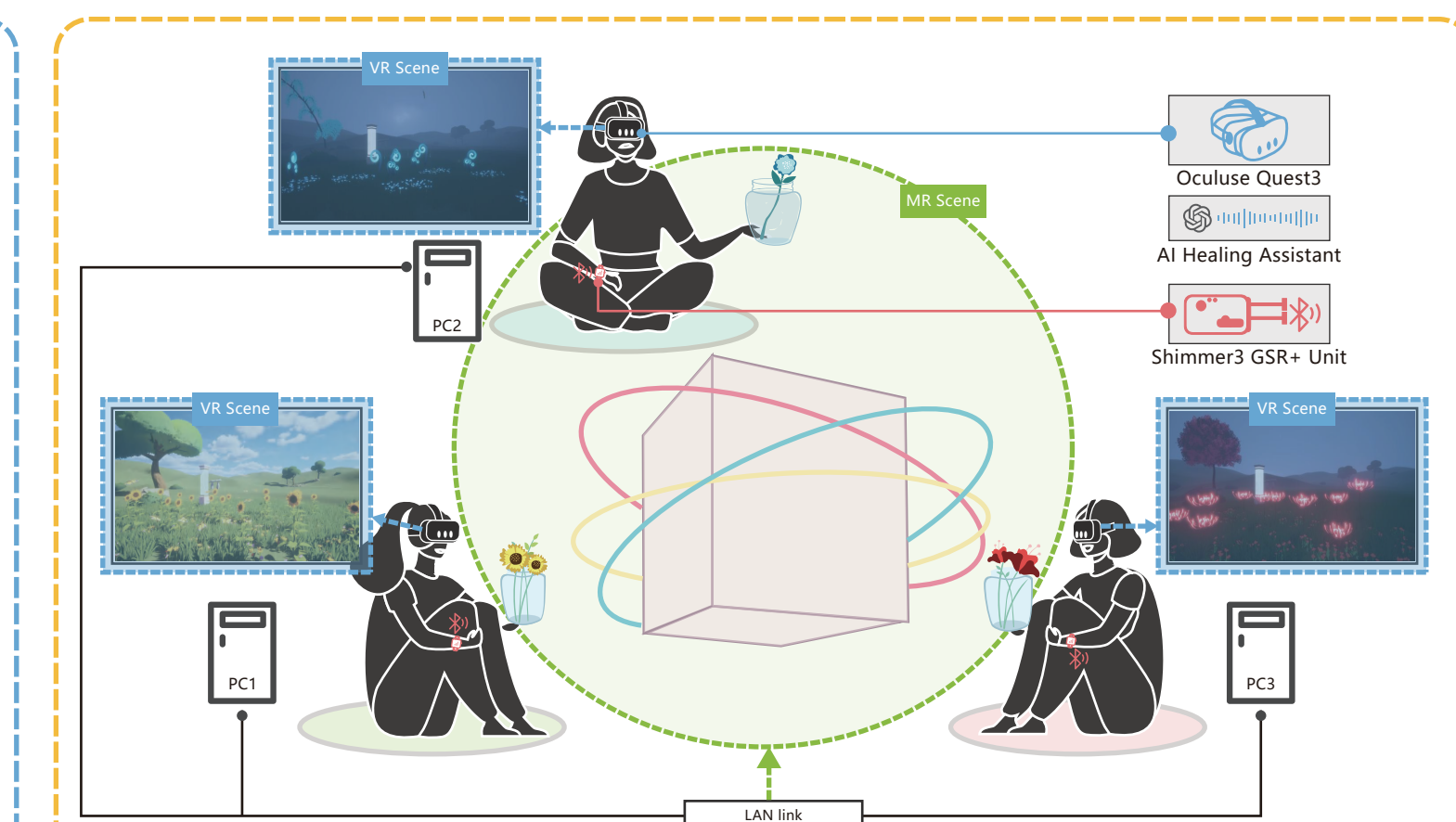
Given the coordinates (3, 6), the plant falls into Quadrant 1, which corresponds to a sunflower with a primary color of yellow. Here are the descriptive keywords:

- Color:** Golden yellow, lemon yellow, amber highlights
- Texture:** Velvety petals, coarse stem, slightly fuzzy leaves
- Shape:** Broad circular flower head, radiating petals, sturdy upright stem
- Size:** Large flower heads, tall stalks, wide leaves

These keywords paint a vivid picture of the sunflower's appearance, focusing on its characteristic yellow tones and distinctive textures.

Based on these features, we trained our own bywordGPT to generate prompts for real-time mood plant texture mapping to dynamically alter the appearance of plants in the scene.

Usage Scenario



Meta-mood supports an art therapy experience involving multiple participants, including three current system participants, as well as three control computers and three Oculus Quest3. Utilizing Unreal Engine 5.3, we developed VR and MR environments that support both individual and Explicit Shared Emotion methods. Participants could interact with the virtual environment using hand gestures. The computers were networked via a local area network (LAN) to the same scene in UE5, allowing participants to simultaneously receive visual feedback of both individual and group physiological signals. The system consists of three important components