Exploring Multimodal Interaction with Virtual Pets in VR *

Richard Carroll
Colorado State University
Fort Collins, CO
rocarrol@colostate.edu.edu

I. Abstract

This project explores how people interact with virtual pets in Virtual Reality through multimodal interfaces, including controllers, gaze, and speech. As VR technology evolves, it offers unique opportunities for users to form connections with virtual beings, which can have implications for entertainment, therapy, and companionship. Understanding how different interaction methods affect user experience and emotional connection with virtual pets is essential to designing more immersive and meaningful VR environments. This project aims to investigate the impact of various interaction modalities on user engagement and emotional response, contributing to the broader field of Human-Computer Interaction (HCI).

II. Introduction

This project investigates the role of multimodal interaction methods in Virtual Reality (VR) for fostering emotional connections with virtual pets. It explores how various interaction techniques—controller input, gaze-based interaction, and voice commands—affect user engagement and emotional response in a VR setting. As virtual beings become more common in VR applications, understanding their impact on user emotions and connections will be crucial for developing more immersive VR environments that have the potential to support entertainment, therapy, and companionship.

A. Background

Research has shown that multimodal interaction enhances user immersion and realism in virtual environments. Studies suggest that combining voice, gaze, and touch-based interactions with virtual beings can significantly affect the sense of presence and emotional involvement. Lee and Jung (2023) explored the combination of speech and gaze to control virtual entities, finding that this approach improved users' sense of presence and emotional involvement. Similar work demonstrated that interacting with virtual animals through voice and touch could evoke real emotional responses, suggesting the potential for virtual pets to provide companionship or emotional support.

B. Aim

This project aims to investigate how interaction modality affects emotional connection with virtual pets in VR. By focusing on controllers, gaze, and voice commands, the project seeks to identify which interaction methods are most effective for fostering user engagement and emotional attachment to virtual beings.

III. Method

The experiment will assess how interaction modality affects user experience and emotional connection. The independent variable will be the type of interaction modality (controller, gaze, voice), while the dependent variables will include measures of user engagement, emotional response, and perceived connection to the virtual pet. Data will be collected through post-experience questionnaires, with the aim of identifying how different modalities influence emotional bonds with virtual pets.

IV. Experiment Design

The VR prototype will feature a virtual environment where users can interact with a virtual pet using three distinct interaction methods: controller input (petting, feeding, playing), gaze-based interaction (looking at the pet or objects to trigger responses), and voice commands (calling the pet, giving verbal cues). The goal is to evaluate how these interaction methods influence user engagement and emotional attachment to the virtual pet. The experiment will involve a series of tasks where users interact with the pet through each modality, followed by questionnaires to assess their emotional responses and sense of connection.

V. Previous Work

Multimodal interaction research has demonstrated its effectiveness in enhancing user experience and emotional involvement. Cheok et al. (2011) explored mixed-reality interaction and play for small pets and humans, while Lin et al. (2017) investigated affection-oriented virtual pet game designs. Both studies highlight the importance of incorporating various interaction modalities to improve user attachment and engagement with virtual beings.

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VI. Results and Discussion

The findings will provide insights into the effectiveness of different interaction methods in fostering emotional bonds with virtual pets. By comparing user responses across modalities, the project aims to identify which methods most effectively enhance engagement and emotional attachment. This research could inform the design of future VR applications in therapy, education, and entertainment, where virtual beings are used to promote well-being and user interaction.

VII. Conclusion

This project aims to deepen our understanding of multimodal interactions in VR by exploring how users engage with virtual pets through controllers, gaze, and speech. The findings could inform future VR applications in therapy, education, and entertainment, highlighting the potential of VR to simulate meaningful relationships with virtual beings.

VIII. CCS Concepts

- **Human-centered computing** *[Interaction paradigms, Interaction design]*
- **Computing methodologies** *[Virtual reality]*
- **Applied computing** *[Artificial intelligence, Computer games]*

IX. Author Keywords

Multimodal Interaction, Virtual Reality, Virtual Pets, User Engagement, Emotional Connection, Human-Computer Interaction.

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