



HugPrint

HugPrint: Capturing the Essence of Connection Through XR Technology

Hugprint is an interactive MR experience exploring the sensation and power of a hug between two people.

A shared intimacy, an exchange of energy, touch plays an essential part of our social lives. Rooted from reality and genuine human connection, HugPrint leads you on an experiential journey and exploration of hug. Leave your own hug print, and find the story of your hug.

Introduction

The COVID-19 pandemic amplified feelings of loneliness and isolation, which continue to affect people worldwide. Research highlights the profound psychological and emotional benefits of human touch, particularly hugs, as a powerful way to foster connection and improve mental health. However, modern lifestyles, reliant on virtual interactions, often make such physical connections unattainable.

The HugPrint Metaphor

Like a fingerprint captures the unique identity of an individual, a "hug print" captures the emotional and physical essence of a hug—a moment imbued with meaning, connection, and health benefits. HugPrint crystallized these moments into personalized digital or physical artifacts, embedding data such as hug duration, emotional states, and participants involved. This approach transforms the simple act of hugging into a tangible, meaningful representation of emotional well-being.

Mission

HugPrint leverages XR technology to redefine how we experience connection. By combining immersive environments, haptic feedback, and emotional intelligence, we aim to bridge the gap between physical absence and emotional presence. Our goal is to provide users with meaningful, health-improving experiences that combat loneliness and foster emotional well-being.

Problem Statement

The Challenge

Loneliness adversely impacts brain activity related to social connection, reducing the ability to



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maintain meaningful relationships. This creates a cycle of emotional disengagement, increased risks of mental health disorders, and even chronic illness.

Why It Matters

Loneliness is a global public health crisis affecting vulnerable populations such as the elderly, immigrants, and individuals in long-distance relationships. Addressing this issue enhances social bonds, promotes emotional resilience, and improves quality of life.

Project Goal

HugPrint aims to create an XR-based solution that not only replicates the warmth of a hug but also captures and preserves its emotional essence. Through immersive experiences and the concept of a "hug print," we strive to foster connection, alleviate loneliness, and promote emotional well-being.

Solution Overview

Core Concept

HugPrint redefines connection by letting users experience the emotional and physical essence of a hug through haptic feedback and immersive environments. Each hug generates a unique "hug print," a personalized artifact that captures its emotional depth and meaningful data, preserving the moment for reflection.

User Experience

Users wear a VR headset and find themselves in a MR environment, dim light and calm audio creates a safe environment to immerse. Users will first learn to control their body by interacting with the environment, changes created by their body movements will lead them to find where their hugging companion is hiding. More touching stories around hugs unfold as the users hug the genderless and transparent avatar. Seeing the model they are hugging gradually lightened up, users will experience the feeling of hug through a combination of haptic feedback, immersive sounds and touching stories around how touch plays a significant part in social interaction. As the companion fades away after a hug, users see an artifact of their hug at the final hugging position. When the user points their hand at the artifact, it comes closer to them. Each hug leaves a unique mark and tells a story, allowing users to save their own hug as an artifact and revisit the moment whenever they wish.



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Key Features

- HugPrint Artifacts: Users create a unique "hug print" for each hug, which can be visualized as digital statues that encapsulate the hug's details, such as duration, emotional state, and participants.
- Single-Player Mode: Begin with a guided interaction where users hug an avatar sharing a heartfelt story about the power of hugs. This acclimates users to the virtual environment and establishes the emotional tone.
- Multiplayer Mode: Allow users to hug loved ones in a shared virtual space, creating meaningful connections enhanced by Phantom touch technology.
- Phantom Touch Integration: Leverage Phantom touch research to simulate the tactile sensation of hugs, making the experience deeply immersive.
- AI-Driven Emotional Intelligence: Incorporate AI to analyze and personalize the experience, adapting haptic feedback, environment aesthetics, and emotional tone to each user's unique interaction.

Technical Approach

Technology Stack

- Development Platform: Unity for building immersive interactive XR environments.
- Target Devices: Meta Quest 3S for accessibility and wireless functionality.
- Haptic Integration: Advanced SDKs for body tracking and tactile feedback.
- ShapeXR : enable us for rapid prototyping of XR environments and interactions, facilitating collaborative design, interaction testing, and concept validation, allowing quick iteration on hug experiences and user flow
- Blender: Designing 3D assets like avatar, cold and bright environment , VFX and statue

Current Progress

We have developed a complete user flow in Unity as well as a prototype demonstrating basic haptic feedback, body tracking, and immersive environments in ShapeXR.

Challenges

- Designing and presenting a compelling user story where each part engages the user, encouraging them to proceed and experience a hug
- Refining Phantom touch simulations to ensure realistic and impactful tactile feedback.
- Ensuring accessibility while leveraging advanced hardware features.



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- Designing a more humanoid avatar.
- Creating an environment that evokes feelings of connection and belonging.
- Guiding users in a way that tracks their body and hand movements.
- Incorporating an engaging user story around hugging that keeps users curious, eager, and motivated to find their HC and continue interacting with it.

Target Audience

Primary Users

- Individuals experiencing loneliness or homesickness (e.g., international students, remote workers, long-distance couples).
- People seeking emotional comfort during special occasions or challenging times.

Value to Users

HugPrint provides a powerful alternative to physical hugs, offering comfort, emotional well-being, and a unique, personalized artifact that preserves the essence of the experience.

Impact and Value Proposition

Unique Value Proposition

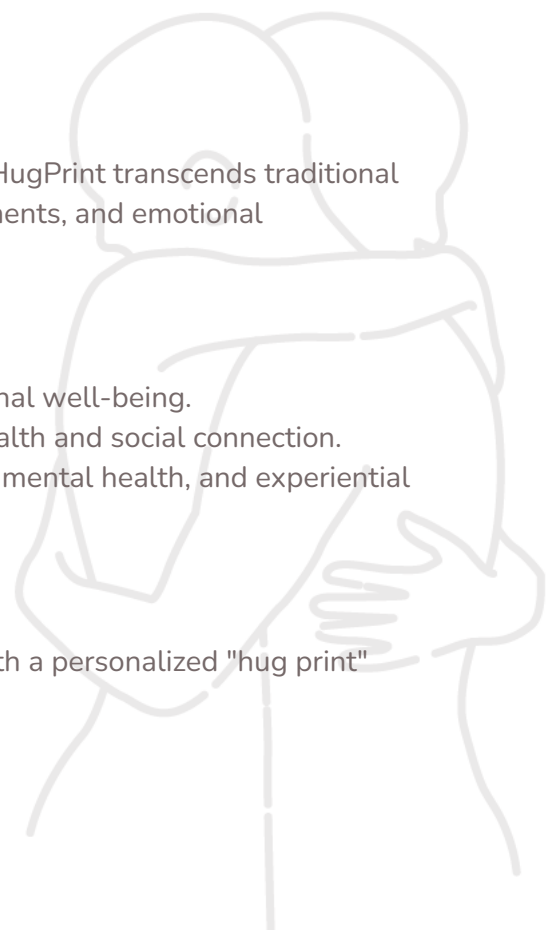
“Capture the moment of a hug, and keep its essence forever.” HugPrint transcends traditional video calls by integrating tactile feedback, immersive environments, and emotional personalization.

Impact

- Social: Addresses global loneliness and fosters emotional well-being.
- Technological: Innovates XR applications for mental health and social connection.
- Economic: Opens new opportunities in communication, mental health, and experiential XR services.

Value Creation

- For Users: Emotional comfort and connection, along with a personalized "hug print" artifact.





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- For Businesses: Differentiated products in communications, mental health, and education.
- For Stakeholders: Expanded opportunities for XR innovation across hardware, software, and content creation.

Feedback Needed

1. How can we enhance the storytelling aspect to strengthen emotional engagement?
2. Are there opportunities for deeper AI integration to personalize or analyze "hug prints"?
3. What additional use cases could make HugPrint more impactful or accessible?

Next Steps

1. Refine single-player mode and start the multiplayer-mode prototyping
2. Conduct user testing to validate emotional and tactile impact.
3. Develop partnerships with XR hardware providers and researchers in emotional intelligence.

Team Members

- Sharifeh Alaei: Data Scientist, Researcher
- Felicity Chen: XR Filmmaker, UX Designer, Researcher
- Esteban Kong: UX/UI Designer, XR Specialist
- Briam Mora: Software Engineer, XR Specialist
- Mario Nava: Software Engineer, XR Specialist
- Sarthak Sthapit: Technical Artist, Software Engineer

P.S. [self-hugging](#) is one of the most significant types of hug that we strived to develop through XR technology. HugPrint's single-player mode extends this concept through XR technology. We use a companion to help people see themselves more clearly and feel a stronger connection with it.

