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Master's Thesis
Academic Year 2025

Yurt Portal: A Nomadic Spatial Media through
Cross-Cultural Mirroring for
Embodied Digital Tourism



Keio University
Graduate School of Media Design

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A Master's Thesis
submitted to Keio University Graduate School of Media Design
in partial fulfillment of the requirements for the degree of
Master of Media Design

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Abstract of Master's Thesis of Academic Year 2025

Yurt Portal: A Nomadic Spatial Media through
Cross-Cultural Mirroring for
Embodied Digital Tourism

Category: Design

Summary

Each country has differences in its traditions that are important for others to learn in order to create mutual cultural understanding. Modern technology helps uncover shared values in cultural differences, enabling deeper engagement and tourism promotion. Digital tourism involves using interactive technologies to experience and explore different cultures in immersive ways, without the need for physical travel. However, Kyrgyz nomadic culture - an essential part of Kyrgyzstan's identity remains largely out of reach for both domestic and international audiences due to limited exposure and promotion. This study proposes a design approach "Mirrored Culture," which is an interactive experience inside a yurt – a traditional portable house that can mirror Kyrgyz cultural elements to the physical objects near its users using artificial intelligence for human mirroring and object mirroring. The thesis describes the design process of the "Yurt Portal" exhibited in the Japanese setting. During the three exhibitions in Japan and official collaboration with the Kyrgyz government, the pavilion allowed visitors to see themselves as nomadic figures and interact with nomadic objects. The results of the study show that Yurt Portal helps users learn about Kyrgyz culture and create a digital cultural twin.

Keywords:

Interactive Design, Cultural Heritage, Human-Computer Interaction

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Chapter 1

Introduction

This chapter provides an overview of the research motivation, background, social relevance, and the main contribution in the field of cross-cultural sharing and digital tourism.

1.1. The Spirit of Modern Nomads

What does it mean to be a nomad? Some people might describe it as travelling, some will correlate it to working from different locations. However, for me, being a nomad means being connected to my culture, Kyrgyz, which has a rich nomadic history of moving around and traditions that value nature and hospitality. In the past, my ancestors were travelling around mountains, valleys, and steppes. Growing up, a spirit of traveller has always been a part of me - first through the stories of my grandparents and history books, and later through my adventures.

My first trip abroad was in 2019, when I had the opportunity to be an exchange student in Japan. It was both scary and exciting because I didn't know much about life there, and Japan didn't know much about me either. Coming from Kyrgyzstan, I realized that not many people abroad know about my country and our culture. After my exchange ended, I had the chance to travel around the world and work in Europe. Almost every time, people were surprised to hear about Kyrgyzstan. I often felt like I needed to carry a map with me, ready to show people where my hometown is. However, when COVID-19 happened and everyone was stuck at home, I realized that not only do foreigners not know much about Kyrgyz culture, but Kyrgyz people don't too, because they prefer to travel abroad rather than explore local destinations. I was probably the same back then. This situation helped me to realize that I want to contribute to my country's

representation and create a possibility for people to learn about Kyrgyzstan and its nomadic culture.

1.2. Modern Culture Sharing

Cultural traditions around the world offer unique perspectives, fostering discovery and cross-cultural understanding. Traditionally, culture sharing occurs through oral, visual, and written storytelling [1]. Then, these traditions have been expanded with museums, exhibitions, social activities, and increasingly, interactive technologies such as Extended Reality (XR), interactive museums [2, 3], and interactive projections [4, 5]. These new technological opportunities allow users to experience immersive cultural learning and engage with different historical events and traditions. Despite the integration of new technologies and expanding cultural sharing experience, it is still important to learn about different cultures by applying personal interpretations to connect with others better [6]. However, most cross-cultural exploration focuses on analyzing differences rather than drawing connections to one's own cultural background.

1.3. Research Goal and Social Relevance

To overcome this problem, this research is focusing on the creation of an interactive design approach that emphasizes cultural similarity by reflecting users' traditions onto those of another culture. The study aims to create a digital tourism tool that will enhance cultural understanding and promote lesser-known countries through well known.

This study designed a Yurt Portal interactive experience along with the Mirrored Culture design approach to emphasize cultural commonalities and promote understanding through empathy. The system employs the mirroring of humans and objects and utilizes computational interaction techniques to bridge cultural gaps in a more intuitive and relatable way. It is accessible and easy to implement to facilitate communication between different cultures. The motivation to communicate through mirroring stems from the belief that culture is intrinsically tied to geography and shaped by natural elements, environmental conditions, and

human presence. This study aimed to create an opportunity to make visible those cultures that are often overlooked, based on the belief that increased visibility can spark curiosity and encourage more people to visit and engage with these places. At the same time, the project seeks to foster cross-cultural communication and promote touristic curiosity toward lesser-known regions, which is particularly relevant in an era of oversaturated tourism.

In particular, this research aims to attract people in Japan to the Kyrgyz nomadic culture, which is less known in comparison to Japanese culture. The study focuses on finding a way to connect Japanese and Kyrgyz cultures through the Yurt Portal media design.

1.4. Purpose and Contribution

The purpose of the Yurt Portal interactive experience, facilitated by the Mirrored Culture design approach, is to enhance cultural understanding between the Kyrgyz and Japanese communities. This is the main research question this study aims to answer:

Research Question: *How can the Mirrored Culture experience, facilitated by the Yurt Portal interactive space, enhance cultural understanding between Kyrgyz and Japanese communities?*

By designing the Mirrored Culture approach through the Yurt Portal nomadic immersive experience, this research aims to attract more people to Kyrgyz culture and improve the visibility of nomadic traditions through cross-cultural understanding. The study will contribute to:

- The design of the interactive mirroring system for cross-cultural understanding
- The creation of a new digital tourism approach

This research has already been accepted to local and international venues, marking a future contribution to digital tourism and cultural sharing experiences. The

first publication was a part of the Virtual Society of Japan, a local conference in Japan, that welcomed this study in Nagoya in 2024 [7]. The Yurt Portal was also accepted as a Late-Breaking Work in the ACM CHI'25 conference venue in April 2025 in Yokohama, Japan [8].

1.5. Thesis Structure

This thesis consists of six chapters as follows:

Chapter 1: Introduction This chapter summarizes the motivation and background of this research and covers the research goals with contributions.

Chapter 2: Literature Review The second chapter will provide an overview of the Kyrgyz culture and related works on cross-cultural understanding. It will also cover cultural understanding through AI and provide an overview of existing interactive projects.

Chapter 3: Concept Design This chapter will provide details about the Mirrored Culture design approach and its implementation in the Kyrgyz-Japanese setting, using the nomadic portable house, the Yurt.

Chapter 4: Proof of Concept The fourth chapter focuses on implementing Yurt Portal through the Mirrored Culture design approach in the real world, providing results and findings.

Chapter 5: Discussion This chapter will cover the limitations of this research and future plans.

Chapter 6: Conclusion The last chapter will include a summary of this research.

Chapter 2

Literature Review

This chapter will introduce Kyrgyz culture and its current status in cultural promotion, as well as analyze existing literature about important concepts of cross-cultural understanding and their presence through technology, which is an essential part of this design research.

2.1. Culture of Kyrgyzstan

Kyrgyzstan, located in Central Asia and bordering with China, Kazakhstan, Uzbekistan, and Tajikistan, has a unique history of nomadic legacy and blending traditions.



(Source: BBC [9])

Figure 2.1 Map of Kyrgyzstan

For many centuries, the main activity of the Kyrgyz people was nomadic and semi-nomadic animal herding, which used a wide and spread-out way of managing animals. This tradition is connected to archaeological discoveries that show early

forms of nomadic herding existed in the mountains and valleys of the Tian Shan as early as the 7th century BCE [10]. Nomadism was closely linked to cattle breeding. The full cycle of nomadic migration was preserved only by wealthy households that owned large numbers of livestock. The length of migration routes varied across different regions, ranging from several dozen to 100-120 kilometers [10]. One of the important attributes of Kyrgyz nomads was a portable house called a Yurt [11]. This was the most convenient type of dwelling (Figure 2.2), which could be easily dismantled, transported on pack animals, and reassembled [10].



(Source: Photos by author)

Figure 2.2 Traditional house of Kyrgyz nomads - Yurt

The main shift in Kyrgyz culture happened in 1936 when Kyrgyzstan became a part of the Soviet Union [12]. During that time, Kyrgyz people were influenced by Soviet cultural activities, education, way of living, and incorporating the Russian language into daily life [13]. The Soviet government actively worked on the creation of a “modern” Kyrgyz culture that would be more educated and elite. However, that aspect meant surpassing some traditions like nomadism and its traditional values to become a more Western-oriented society [13]. With the progress of integrating Russian language, literature, education and values, Kyrgyz artists and writers were required to show efforts of the Soviet Union in their works and praise the Soviet regime [13]. Moreover, most masters who worked with metal and

handicrafts continued to produce their works, but learned to present their crafts in the specific requirements that fitted into the norms of the union [13]. Although the Soviet regime was trying to change most of the nomadic traditions, with the help of talented Kyrgyz writers, poets and artists, Kyrgyz people managed to keep traditions and blend some novelty without colliding completely [13].

Starting from 1991, when Kyrgyzstan officially became an independent country [12], until nowadays, the Kyrgyz government has been promoting the roots of Kyrgyz nomadic culture to attract more tourists and enhance knowledge about valuable traditions among Kyrgyz people [14]. The most famous tourist destinations connected to a nomadic lifestyle offer a unique opportunity to live inside the yurt, experience falcon hunting and horse riding that play a big role in nomadism [14]. Moreover, Kyrgyzstan has successfully hosted three World Nomad Games (Figure 2.3), which undoubtedly shapes Kyrgyzstan's image as a nomadic culture and works in its favor [14].



(Source: World Nomad Games [15])

Figure 2.3 Scene from the World Nomad Games held in Kyrgyzstan

The Kyrgyz government prioritizes tourism development as a part of its national strategy till 2040, however, there are still many limitations in its promotion due to a lack of people working in the tourism sector as well as a lack of budget [14]. On the other hand, with the recent improvement of technologies, Kyrgyzstan tries to incorporate traditions into new technologies to promote Kyrgyzstan around the world and provide more opportunities for cultural understanding. Therefore, connecting cultural heritage with technologies is an important step for the Kyrgyz Republic to foster tourism promotion and cross-cultural communication.

2.2. The Concept of Cross-Cultural Understanding

A deep understanding of another culture reveals the shared humanity of its people, helping to see them not as unusual strangers. At the same time, such understanding preserves their speciality, allowing for a more respectful appreciation of cultural difference [6].

2.2.1 Culture as a Mirror of Meaning

Geertz, in his book called “Interpretation of Cultures,” highlights the communal aspect of culture, suggesting that meanings are shared and constructed within a public context [6]. Understanding people’s culture shows that other people are equal to one another, but also unique and different from each other. By learning about the daily life of people from other cultures, it removes the mystery or confusion around them [6]. By understanding the differences of each culture, people see that culture serves as a lens through which individuals interpret and assign meaning to their experiences. This perspective is crucial in cross-cultural interactions, where misinterpretations can arise from differing communication styles and cultural frameworks [6]. Edward T. Hall, in his book “Beyond Culture,” introduced the concept of high and low context cultures, which play an important role in cross-cultural understanding and projection of one culture to another [16]. In his book, he describes high-context culture as a communication where people have layered long-term traditions, values, and nonverbal norms that have been

passed through one generation to another for many years [16]. As an example, he is using Japanese culture to show the unspoken rules and values that it has, and where people used to communicate through unspoken norms and rules. On the other hand, low-context cultures are those that prefer a direct form of communication, where people prefer direct and clear forms of expressing themselves, without hiding or guessing each other's motives through hidden gestures and unspoken rules [16]. Edward T. Hall uses American culture as an example to represent a low-context culture where society is more likely to communicate clearly and directly [16]. These two concepts are playing a big role in understanding another culture, and can also be a reason for miscommunication and stereotypes [16]. To avoid it, people have to understand one another and adapt their culture to different settings.

2.2.2 Culture as a Multi-Layered Construct

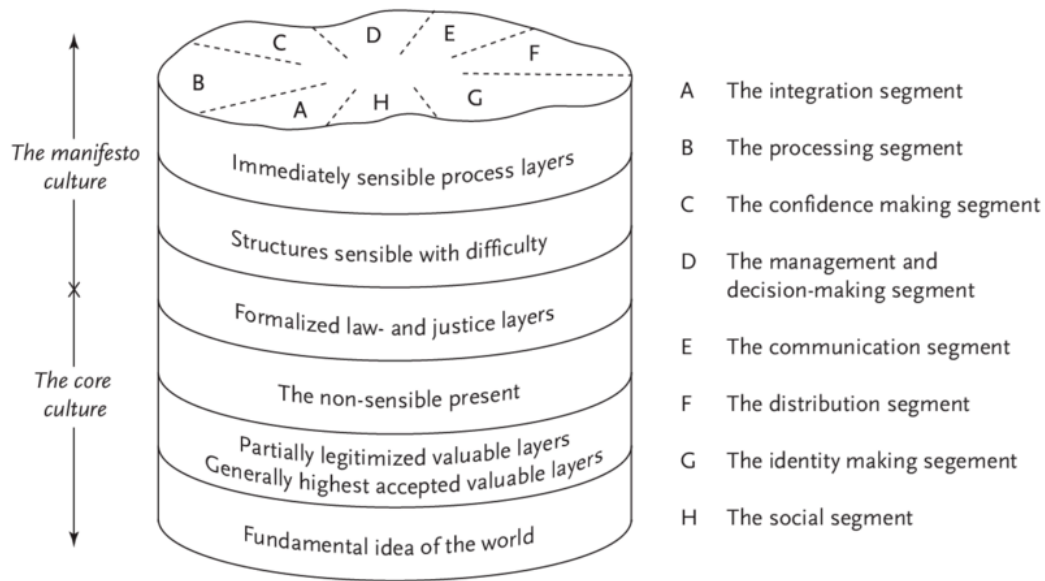


Figure 2.4 Culture as a complex entity consisting of culture segments and culture layers. The semistatic model

(Source: Gullestrup, 2006: 101 [1])

Gullestrup, in his book “Cultural Analysis: Towards Cross-Cultural Understanding”, posits that culture comprises both visible and invisible elements [1]. The visible aspects include behaviors and artifacts, while the invisible encompasses values, norms, and fundamental philosophies of life (Figure 2.4). Inside the “culture bucket” model, the “immediately sensible process” layer represents visible parts of culture like people’s behaviors, language, rituals, dress, and food. The layer “structures sensible with difficulty” shows social systems and structures such as family roles and educational systems. The layer of “formalized law and justice” represents informal rules people follow, such as laws and expectations. The core cultural layers lie beneath the surface and represent assumptions about cultures and how different people see life through their values and meanings [1]. Around the funnel, Gullestrup places cultural segments that show what helps people make sense of life, stay safe, cooperate, and belong. Understanding a culture requires delving into these underlying layers that influence observable behaviors [1]. This study mostly focuses on the first layer of the cultural bucket and aims to combine two cultures through it. Additionally, this research uses the fundamental layer that shapes people’s thoughts and assumptions about the world and others to enhance cross-cultural understanding between two different cultures.

2.2.3 Culture as a Strategic Asset for Tourism Loyalty

Culture and its differences serve as a tool allowing tourists to reflect on their own identities and values through the lens of another culture [17]. Engaging with local traditions, heritage sites, and cultural narratives provides visitors with a sense of connection and understanding, which can lead to a deeper appreciation and loyalty to the destination [17]. Oppermann suggests that by providing authentic and meaningful cultural experiences, destinations can create emotional bonds with tourists, encouraging them to return and share their positive experiences with others [17]. One good example of tourism loyalty strategy is presented in Sarah Teasley’s book “Designing Modern Japan”, where she introduces the concept of single product production by specific villages in Japan to promote regions and their popularity through mastering one skill [18]. This strategy was created by feudals in Japan during the Edo period to support regional industries that used local resources [18]. For example, Shizuoka became known for lacquerware due

to its forests and location between Tokyo and Osaka, while Yamagata specialized in metalwork and Buddhist altars, drawing on its forests and mines [18]. This strategy has been actively used by Japan to improve domestic and international tourism and encourage people to travel around the country in modern days [18].

Technology-enabled service innovation has become a vital mechanism for fostering organizational resilience, generating business value, and enhancing corporate image, particularly during periods of operational uncertainty [19–21]. The continual evolution of such innovations is transforming the global tourism sector, offering new avenues for delivering enriched and memorable experiences to tourists [22,23]. Despite recent advancements, the integration of generative AI and robotics into the hospitality and tourism sectors has not yet been fully realized [24,25]. This underdevelopment presents a valuable opportunity for tour operators to strategically implement intelligent technologies to strengthen their competitive positioning and promote sustainable growth in an increasingly digital tourism landscape [24]. As noted by Preko et al. [26], it is essential for industry practitioners to proactively integrate smart technologies to mitigate potential service disruptions and maintain consistent service quality, which is critical for sustaining tourist satisfaction and loyalty.

2.3. Technology for Communication

McLuhan [27] described how technologies extend human faculties, for example, the wheel extends the foot, the camera extends the eye, and the internet extends cognition. He emphasized that the medium itself shapes human experiences in distinct ways [28]. We live in an era where communication technologies actively shape our experiences, leading to the emergence of new concepts and approaches.

2.3.1 Vision Model and Communication

One of such concepts is style transfer - a technique that blends the artistic elements of one image, the “style image”, with the structural content of another; the “content image”, to create a new image that preserves the original content while reflecting the visual aesthetics of the chosen style [29]. The concept of style transfer has been mostly utilized for representing diverse artistic styles and visual

communication [30, 31]. While traditional style transfer focuses on applying the aesthetic properties of one image to another, there are works like BlendScape, for example, that extend this concept by dynamically blending multiple spatial contexts to create a seamless and coherent virtual environment [32]. There are more examples of spaces that integrate interactive technology into cultural understanding through the blending of environments [33]. One more example is the “Face Share” project that contains a seamlessly blending and mirroring system that mimicry of another person’s behaviors [34].

Another important concept that influenced this design is object recognition - a key process in computer vision that focuses on detecting and categorizing objects in images or videos. This capability allows machines to analyze visual data by identifying different objects [35]. Object recognition within cultural contexts involves computer vision techniques to identify and analyze objects in cultural artifacts, such as artworks and heritage objects [36]. It is also used to enhance visitors’ attention and engagement with cultural objects [37]. These applications inspired this research to develop a tool that reflects cultural twins, aiming to foster a deeper understanding of shared cultural commonalities.

2.3.2 Language Model and Communication

Global scientific knowledge for creating communication through technology and new tools comes from the human community, where internal cognition and external observation continuously feed into one another, creating a feedback loop that advances science through collaborative meaning-making, much like how shared understanding develops in language systems [38]. However, it was found that most works in CHI are Western-educated [39]. In one of the recent studies made by Stanford University, it was found that people prefer connection-focused language models over control-focused relationships when it comes to communication and cultural understanding [40]. The authors suggest that AI companies often don’t take into consideration important cultural differences in how people want to interact with a language model [40]. For instance, people from Asian cultures prefer to have AI that feels like a partner, something that can connect with them and even influence them; however, Western cultures are less comfortable with AI that tries to influence their decisions [40]. This dynamic of communication be-

tween people and a language model plays an important role in how people can express themselves and their culture through a machine.

2.3.3 Space and Communication



(Source: MADO [41])

Figure 2.5 Sony’s MADO interactive window

Communication evolves with technology and reshapes space by how and where people can connect [28, 42]. The concept of presence and connection changes together with media by compressing and evolving time and space [28]. One such example of communication through space is Sony’s telepresence system “MADO,” which connects people worldwide, enabling shared experiences like long-distance family dinners as if in the same room [41]. Another project that provides an example of communication through space is the Comado interactive system that creates a feeling of co-presence to help people who are isolated due to health reasons from their families to communicate with their loved ones at a distance [43]. The opportunity to communicate through spaces and destinations is also shown in the Atmosph Window project [44]. The concept of this project is to create a sense of being in a different location while being at home or in the work office. The interactive window allows users to change the scenery in the window and have a feeling of travelling through spaces (Figure 2.6). These ways of using

technology and communication play a significant part in this study, which will be introduced in the next section with examples that influenced the concept design of this research.



(Source: Atmosph Window [44])

Figure 2.6 Atmosph Window

2.4. Practices in Technology Assisted Cross-Cultural Activities

This section will introduce recent works combining technology, communication, and culture that inspired this research.

2.4.1 Portable Spaces

Recent technological innovations have transformed the way cultural knowledge is shared, enabling more engaging and interactive experiences that are spatially dynamic. These immersive approaches, often implemented in museum contexts,



(Source: Portals [45])

Figure 2.7 Portals project

have proven effective in deepening cultural awareness and engagement [5, 47–49]. Despite these advancements, conventional museums face limitations in appealing to diverse audiences due to standardized exhibition formats, limited emotional reliability, and few links between different cultural narratives [50]. In contrast, portable miniature museums have emerged as an adaptable and inclusive alternative [50]. A compelling case is Pierre Sernet’s project “One” [46], which brought the Japanese tea ceremony into unexpected public and private spaces around the world, inviting strangers to participate and reinforcing the idea of shared human connection while spotlighting underrepresented places. Another interactive space that influenced this research is the Portals project [45], which used real-time video streams to connect cities through effortless interactions. This project is one of the main inspirational works that influenced the design of the Mirrored Culture approach.



(Source: Sabukaru [46])

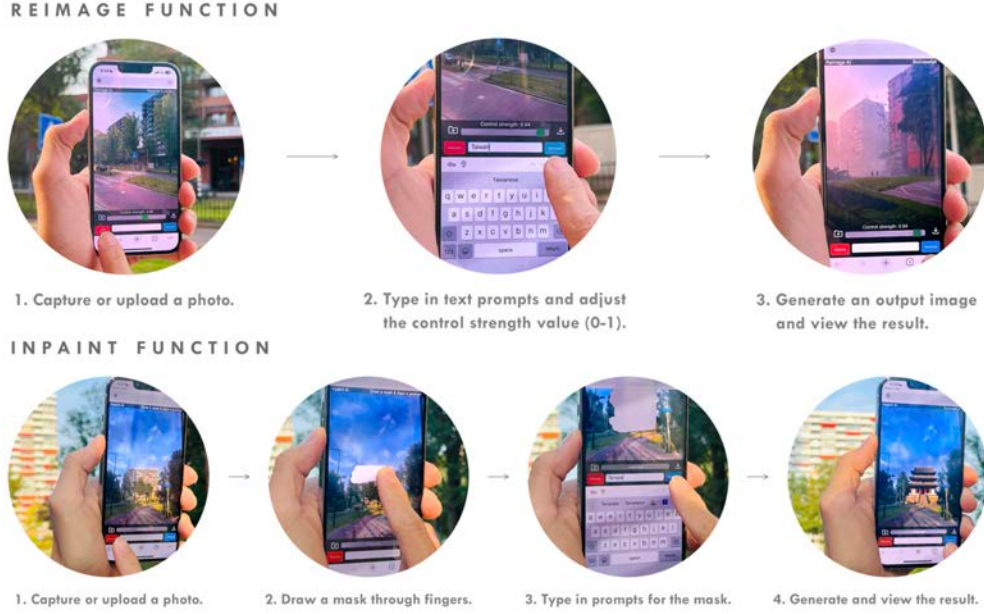
Figure 2.8 Pierre Sernet's project "One"

2.4.2 Interactive Digital Platforms

Several digital platforms promote cultures through interactions. One example of an interactive tool for the rarely appeared culture of the Sami people was introduced as a digital touchscreen program for an Indigenous Sami museum, presenting traditional clothes of the Sami people [52]. One more project, which was published as a full paper at CHI, provides a platform "iWonder" (Figure 2.9) that allows users to use generative AI, change urban areas, and add playful designs [51]. However, no interactive spaces currently focus on both-way mirroring, allowing users to find a cultural twin by immersing themselves in two cultures simultaneously.

2.5. Summary

Every culture has unique traditions and values that add to the global history and make us all global citizens. This study focuses on promoting Kyrgyz nomadic



(Source: Generative AI as a Playful yet Offensive Tourist: Exploring Tensions Between Playful Features and Citizen Concerns in Designing Urban Play [51])

Figure 2.9 iWonder application interface

culture through the creation of smooth cross-cultural understanding and communication. The 2.1 section discussed the importance of nomadism in Kyrgyz culture and its change through the historical events that impacted the current representation of Kyrgyz culture in the world.

Section 2.2 introduced the concept and layers of cross-cultural understanding and the context of high and low cultures. It also focused on the importance of culture in tourism loyalty and promotion, which play a crucial part in this study.

As mentioned in section 2.3, style transfer, object recognition, and language model tools can be effectively used for communication design. However, most recent creations can be biased towards Western culture.

Section 2.4 introduced technological applications that foster cross-cultural understanding and inspired this research. However, after analyzing similar works, it was found that there are limited projects that focus on creating a cultural twin through the portal interface.

Chapter 3

Concept Design

This chapter will introduce the process of creating the Yurt Portal interactive experience and its design approach called “Mirrored Culture”, which was designed for cross-cultural communication through similarities and differences. The chapter discusses the Mirrored Culture concept strategy and the iterative design process of connecting Kyrgyz culture to Japanese through the Yurt Portal interactive experience.

3.1. Mirrored Culture as a Design Approach

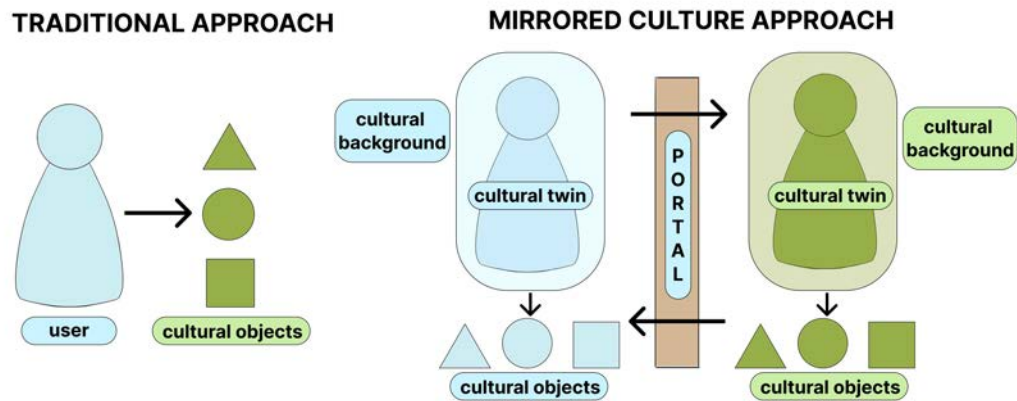


Figure 3.1 Paradigms for Cross-Cultural Understanding: (left) Traditional approach, and (right) *Mirrored Culture* approach that creates *Cultural Twin* that bridges two cultures based on similarities and differences through a *Portal* interface.

In this thesis, the Yurt Portal is based on the Mirrored Culture design approach,

which proposes a design guideline integrating physical and virtual portals to generate cultural twins, paired spatial compositions designed to foster cross-cultural communication and reflection. The process begins with selecting a culture different from the user's own, which becomes the focus of cultural engagement and allows users to see their cultural twin and discover new possible shared values or contrasts. As it was mentioned in the second chapter, the projection of a person's own culture onto another is important for clear cultural understanding. Nowadays, most cross-cultural exploration focuses on analyzing differences rather than drawing connections to one's own cultural background. To overcome this, the Mirrored Culture concept design has designed an interactive approach that emphasizes cultural similarity by reflecting users' own traditions onto those of another culture (Figure 3.1). The concept design is focusing on providing a physical cultural representation along with digital through generative cultural twins and a physical portal.

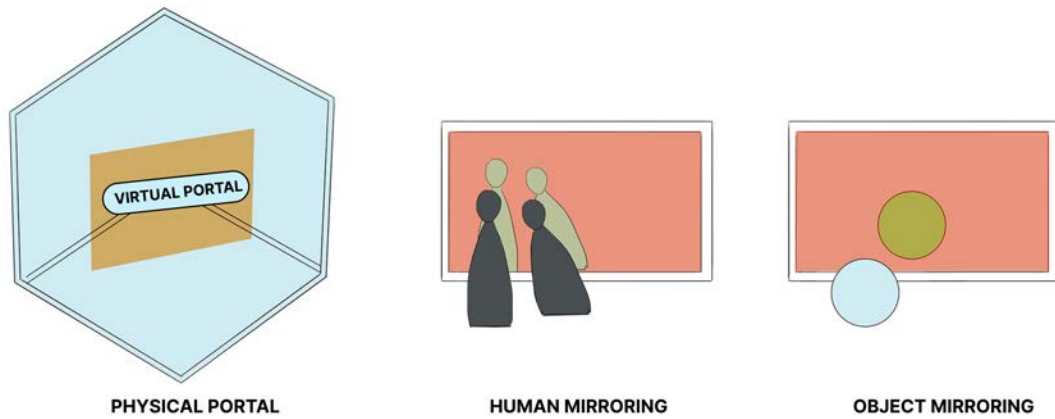


Figure 3.2 Design Space of Physical Portal: (left) the overview sketch of the physical and virtual portal for *Mirrored Culture* experience. (middle and right) *Human and Object Mirroring* that creates the overall Mirrored Culture concept

For the physical portal, users or designers begin by extracting the essence of a culturally meaningful space from their own environment. This can be expressed through abstract spatial design or by incorporating specific cultural objects. The physical space is needed to provide a sense of connection and immersion with a culture. This space can be created using any cultural representative materials,

such as portable houses, tangible traditional materials, decorative patterns, or architectural structure inspirations. Once the physical space is established, a display or screen, called a virtual portal, adapted to context and accessibility, is installed to serve as a window into the virtual counterpart. More specifically, the virtual portal can be adapted to align with the cultural context and physical environment in which it is placed. Depending on the setting, it may take the form of a large screen, a projection, or a small tablet, allowing designers to thoughtfully integrate it into the surrounding space through spatial arrangement, material choices, or culturally relevant aesthetics.

The virtual portal is created using Mirrored Culture’s open-source user interface. Users feed the system with visual inputs (such as objects, patterns, or spatial elements) and compose textual prompts to guide the AI in generating the virtual environment. These prompts may cover diverse cultural categories, including food, clothing, games, art, or rituals, allowing users to tailor the virtual twin according to specific aspects of cultural expression.

To enable interactive engagement, the system requires a webcam or camera, which captures the user’s presence and motion to activate or modulate the virtual environment. This creates a dynamic, responsive interaction between the user and the cultural twin, enhancing the sense of immersion and presence. Once both portals are in place, users can experience a mirrored interaction across cultures, an exchange grounded in spatial design, sensory abstraction, and interpretive meaning-making rather than literal simulation.

The Mirrored Culture design approach focuses on creating a tool that effortlessly mirrors one culture to another, enabling users to gain insights into both cultures simultaneously. The application features two interactions that allow users to reflect on themselves and nearby objects within a different cultural context. The design is based on flexible spaces or surfaces that can be easily adapted by any culture to align with its cultural heritage, and a virtual portal that can be installed inside the chosen cultural space for the creation of cultural twins through mirroring interactions (Figure 3.2).

3.1.1 Portal Design

The Portal design is grounded in culturally significant spaces, surfaces, and environments that serve as key representations of identity across different cultures. Through the Mirrored Culture experience, each country can leverage its own culturally embedded spatial or surface elements to enhance immersion and foster deeper engagement in interactive environments. The portal design consists of two interconnected dimensions: a physical portal and a virtual portal. Together, they aim to connect users with a culture not only through digital interaction but also through a more reflective, emotional, and potentially spiritual engagement. This dual structure enables users to experience cultural narratives in both tangible and intangible ways, fostering deeper connection and meaning. The physical portal is designed to represent a specific cultural space, serving as a tangible gateway to a chosen country or community. Its purpose is to immerse users in cultural traditions and evoke a sense of presence, similar to the experience of travel. To achieve this, the physical environment should incorporate visual elements such as traditional patterns, architectural features, and culturally significant materials or crafts. The Mirrored Culture approach suggests creating a walk-in cultural space that helps users feel connected and present, almost like stepping into another world. While it encourages an immersive setup, the design is also flexible and can be adapted to different cultural settings, making it suitable for a variety of contexts. Once this physical context is established, the virtual portal can be integrated to create a “cultural twin”, a digital layer that deepens the connection to cultural narratives, practices, and lived experiences through interactive and generative mirroring features. Therefore, the portal design is considered an area or a surface that should be used to add a layer of cultural twin interactions to create a real Mirrored Culture concept.

3.1.2 Cultural Twin

A cultural twin concept is the main interaction inside the virtual portal, which creates avatars of the opposite culture and enables the mirroring interaction. To create the cultural twin concept, this approach focuses on humans and objects (cultural and physical environments) that can be transferred to another culture.

The mirroring effect is based on real-time generative AI software with pre-written prompts and an object recognition tool.

To achieve human mirroring, four prompts were added inside a real-time generative AI tool. The prompts should be written based on the preferences of cultural reflections that need to be mirrored. This research divided these prompts into four categories: Art, Clothes, Games, and Food. All four prompts were selected based on user feedback about the areas they were most interested in when learning about the culture. Each prompt focuses on a specific theme that helps users better understand a culture's background. These themes also support the creation of detailed content and highlight unique features of a representative culture. The selected prompts can generate different cultural datasets, which other countries can adapt based on what aspects they want to emphasize for users. However, the Mirrored Culture design concept recommends including at least four generative prompts, reflecting on traditional food, clothing, crafts, or games. These prompts can be expanded with additional categories, all of which can be represented through the digital cultural twin.

The object mirroring system uses a machine learning system that scans and trains a computer to recognize objects that reflect the cultural twin. In this research, the objects were selected based on the same categories as the prompts used in the human mirroring interaction. The purpose of the object mirroring interaction is to create a tangible connection to culture by including as many traditional items as possible. Each country can adapt its own cultural objects to contribute to the creation of the digital twin. In this study, similar objects were paired based on shared meaning, usability, size, and color, as well as similarities in how they are made or, in the case of food, their taste and appearance.

These two types of interaction, human mirroring and object mirroring, form the foundation of the cultural twin system within the virtual portal. Together, they enable users to engage with both intangible cultural values and tangible cultural elements. This system can be seamlessly integrated into any physical cultural space, supporting the recreation of the Mirrored Culture concept in diverse settings. Its flexible design allows institutions, exhibitions, or educational environments to tailor the experience to reflect specific cultural narratives and local traditions.

3.2. Yurt Portal: Connecting Kyrgyzstan and Japan

The study designed the Mirrored Culture approach to foster cross-cultural understanding and promote Kyrgyz nomadic culture through mirroring it to Japanese culture. Besides the motivation to promote the nomadic spirit of Kyrgyz people, there are several reasons why the concept design, combining both cultures, is featured in this study. Kyrgyz nomads' seasonal migrations shaped rich traditions in storytelling, textiles, and horsemanship. With modernization, practices such as yurt making became less present in a living [53], even still vital to Kyrgyz identity [11]. Therefore, this study created the spatiality of a yurt in this research called the Yurt Portal. Since the Yurt Portal was exhibited in Japan, the cultural mirroring happened between Kyrgyzstan and Japan. The study designed the interactions for cultural knowledge transmission through mirroring between Kyrgyzstan and Japan. Even though both countries are located in Asia, Kyrgyz's nomadic culture contrasts [54] that Japan's historical trajectory has been firmly rooted in a sedentary lifestyle, with its cultural and societal structures evolving around permanent settlements and agricultural practices, setting it apart from nomadic cultures [55, 56]. On the other hand, both cultures value traditional clothing, pottery, and location-specific cuisine. Moreover, Japanese cultural and tourism promotion has combined historical treasures and local craftsmanship since the Edo period [18], which provides an opportunity for developing countries, like Kyrgyzstan, to learn and grow. These aspects provided rich culture-mirroring conditions for this project.

The study wanted to highlight the nomadic features of Kyrgyzstan; therefore, the Yurt space symbolizes the nomadic spirit of moving from one place to another. The yurt is a great spatial medium to highlight the idea of being a modern nomad and traveling around the world. It aims to foster cultural exchange through the "Mirrored Culture" experience and promote understanding between Kyrgyzstan and Japan. It applies the proposed culture-mirroring method through two components: human mirroring, which takes the visitor's image and reflects it as a Kyrgyz nomad, and object mirroring, where the system displays the Japanese equivalent of a cultural element shown by the visitor.

3.2.1 Yurt Design Space

The portal design for Kyrgyz nomadic culture involves creating a portal-like experience as a nomadic, portable house or yurt, allowing participants to transform themselves into Kyrgyz nomads. Yurt is designed as an abstraction of the original yurt, and some significant forms and colors are applied to this abstraction.

3.2.2 Interaction Design



Figure 3.3 Mirrored Culture applied to Kyrgyz-Japanese cultural scenario: Physical features of Yurt structure are abstracted and applied into physical portal and virtual portal inside the yurt (left), virtual portal interactions (right): human mirroring mode from Japanese to Kyrgyz nomad cultural twin, object mirroring mode from Japanese object to Kyrgyz object

The Yurt Portal has two features: *human mirroring* and *object mirroring*, as shown in the right half of Figure 3.3. The system design is based on TouchDesigner [57], Stream Diffusion [58], and a Google Teachable Machine [59]. The “Mirrored Culture” experience requires users to enter the yurt space and choose one of two interactions (Figure 3.4).

Human Mirroring

Human mirroring starts when the visitor chooses one of the four generative prompts on the keypad: Art, Food, Culture, and Games. All prompts have a pre-written

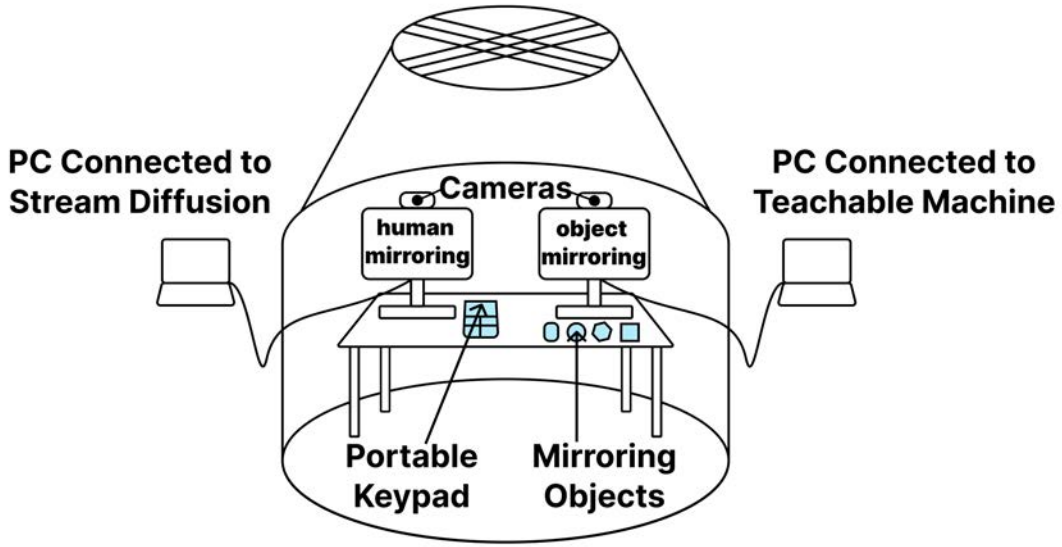


Figure 3.4 System configuration of the Yurt Portal

text that helps to create a specific environment and appearance that are listed in Table 3.1.

These four prompts are applied to the system, which works in real-time (Figure 3.5 (top)). The camera then detects the visitor and mirrors the image onto the chosen Kyrgyz reflection (Figure 3.5 (bottom)). For example, when the chosen prompt is “Culture”, the system will mirror the visitor’s image into a Kyrgyz nomadic person with traditional clothes. With the visitor’s movement, the system starts to show a new mirrored image of the visitor seamlessly within the chosen prompt. However, the image doesn’t represent the exact features of the participants and doesn’t accurately display traditional clothing.

The human mirroring interaction matches the user’s movements if participants turn their heads or bodies. The system detects human presence rather than recording faces. This design choice aligns with interaction design principles, emphasizing human-to-human interaction and enabling individuals to see their reflections in Kyrgyz people. All visitors can change the chosen prompt anytime, and the system will start immediately. With the “Art” prompt, users can see themselves doing pottery art; the “Food” prompt allows users to watch themselves eating

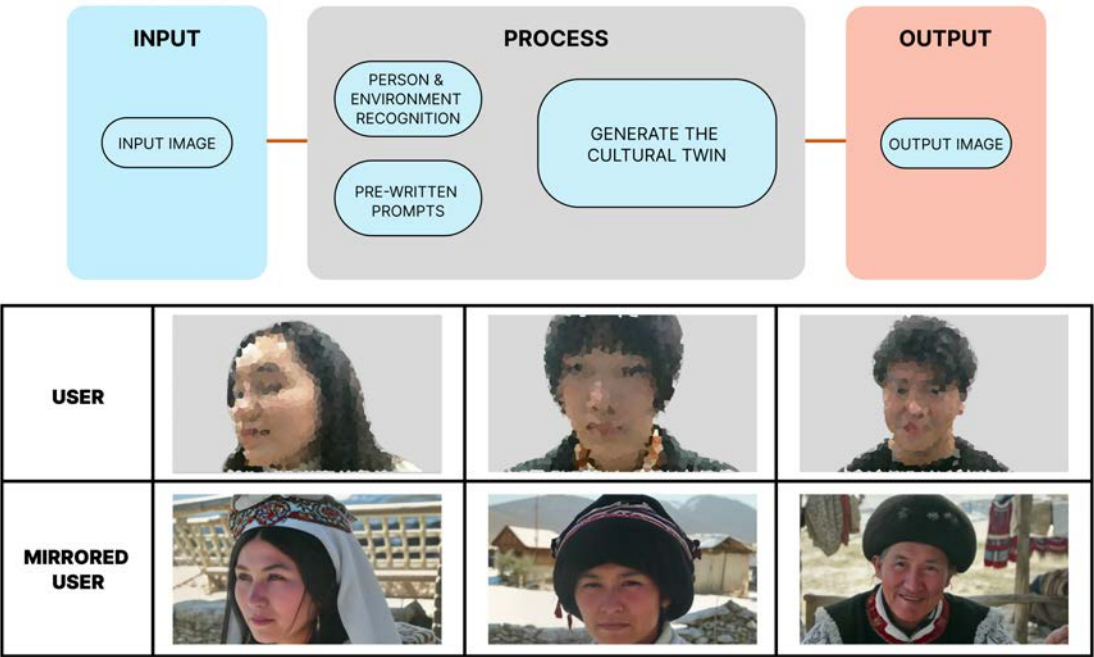


Figure 3.5 *Human mirroring* (top) system architecture. (bottom) examples: human users are visually interpreted into cultural correspondences as “mirrored user” in different culture. This interaction stimulates a user’s imagination of possible life in a different culture.

Table 3.1 Prompts Category

Category	Prompts
Art	Kyrgyz nomadic handicrafts
Clothes	Kyrgyz nomadic clothes with ornaments
Games	Kyrgyz games with horses in the mountains
Food	Kyrgyz people wearing traditional clothes eating food on the table in the mountains

food with other nomads; the “Games” prompt shows users a horse game. Inputs such as “Games” and “Food” show the user, regardless of whether there is one participant or two, along with other people in the background to represent the united nomadic community.

Object Mirroring



Figure 3.6 *Object mirroring* Interaction: Daily objects are visually converted into cultural counterparts. (left) We used four different categories of cultural correspondence, including food, clothes, games, and arts. (right) object mirroring in the use

The object mirroring system uses a Google Teachable Machine [59] within TouchDesigner [57] as shown in the system architecture (Figure 3.7). When the

visitor picks up one of the objects on the table and shows it to a camera attached to the display, the system mirrors that Kyrgyz object into a similar Japanese object. Participants can select from four Kyrgyz objects divided into four categories: Food, Clothes, Horse Games, and Pottery Art (Figure 3.6). If users select a popular fried noodle dish called “Boso Lagman,” widely enjoyed in Kyrgyzstan, from the “Food” category, they will be shown a similar Japanese dish, Yakisoba. The “Clothes” category is attached to a doll in traditional Kyrgyz clothes, which changes to a Japanese doll in a kimono while mirroring. By interacting with a wool horse with a Kyrgyz nomad on top, representing the nomadic horse game Kok-Boru, participants will see the mirrored version of the horse game in Japan, called Yabusame. The “Pottery Art” section shows the same possible Japanese pottery plate when the Kyrgyz plate is shown to the camera. For the current pottery section experience, similar plates have been selected based on their size and the simplicity of the pattern to reflect the minimalist design of both objects.

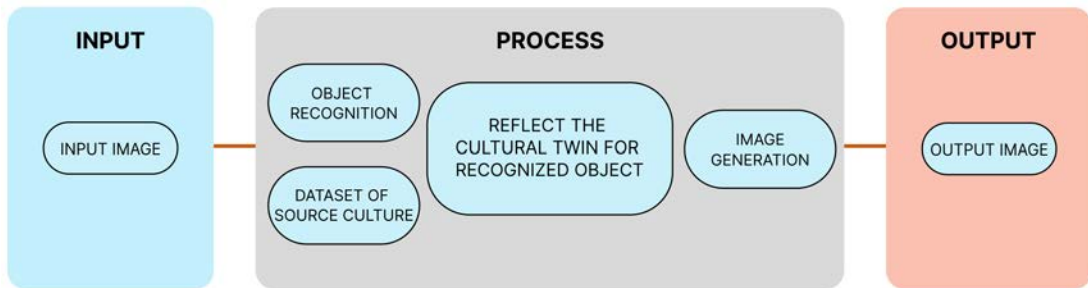


Figure 3.7 *Object mirroring* system architecture

3.3. Design Iterations

This section will explain the process of building the Yurt Portal prototype, conducting a preliminary study with user feedback, and creating the second and third iterations, which were exhibited at four events to collect visitor data. The development timeline is outlined in Figure 3.8.

The Yurt Portal design focuses on the first-person experience, and the yurt is built for a single visitor. The size is 1.5 meters in diameter. The first version of

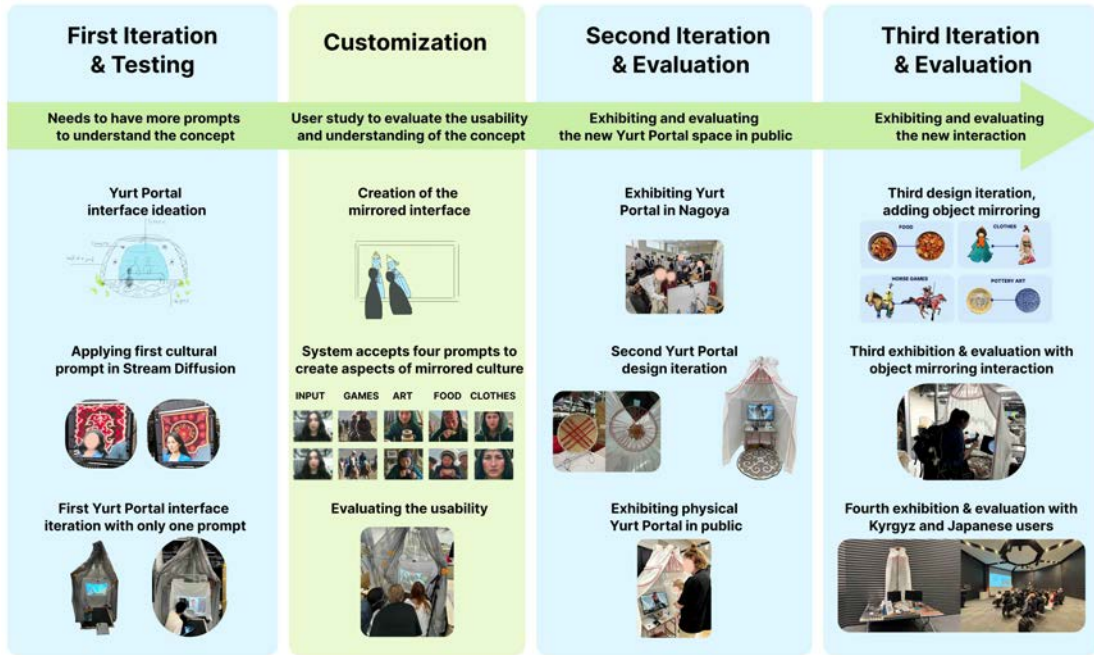


Figure 3.8 Timeline of the development of the Mirrored Culture design in Kyrgyz-Japanese setting inside the Yurt Portal

the Yurt Portal is a tent built with a textile, and a projection screen is placed inside the yurt. In this version, visitors sit on the floor (Figure 3.9).

In the second version, the Yurt structure abstracted the roof shape of the original yurt and used bamboo circular sticks to recreate it. Also, the red knitting details were applied and inspired by the original yurt (Figure 3.9 right). This version was exhibited with a Kyrgyz carpet on the floor, a table with a display with a web camera, a keyboard, and the four Kyrgyz objects (Figure 3.15 left) on the table for choosing one of the four prompt themes (art, clothes, games, and food) for the first event (Figure 3.15 left).

For the third iteration, an object mirroring system was added, allowing users to mirror Kyrgyz objects to similar objects in Japan. To present human and object mirroring simultaneously, for the third and fourth exhibition, there were two displays placed with web cameras to detect the images (Figure 3.15 right side), and the other items inside the pavilion are identical to the second version.



Figure 3.9 First prototype of the Yurt Portal (left) and Yurt Portal's decoration with traditional red knitting (right)

Since the main focus is promoting Kyrgyz culture through Japanese, the study aimed to use Japanese and Kyrgyz objects.

3.3.1 In-Lab User Study for Testing Human Mirroring Interaction

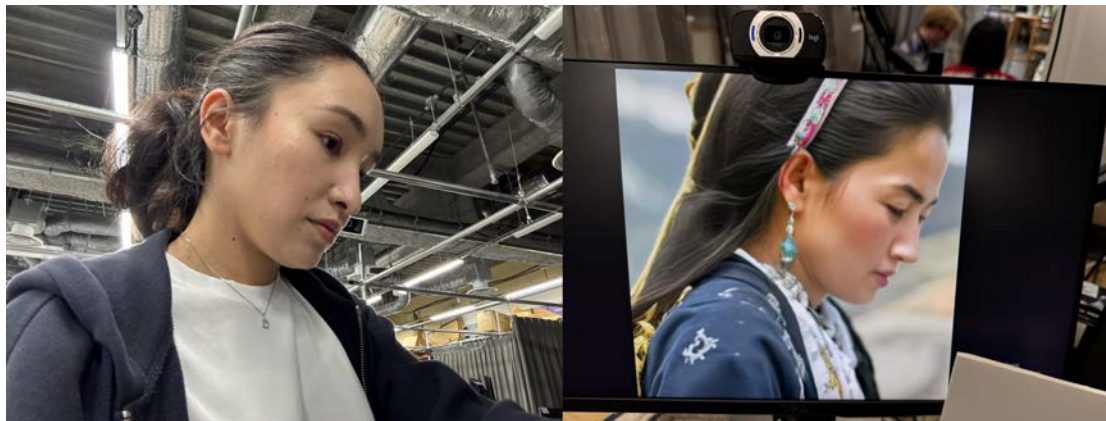


Figure 3.10 Application of first cultural prompt to the Human Mirroring interaction

For the first iteration, the study focused on representing the core idea of the Mirrored Culture and its interface. To achieve that, the system applied and tested one prompt in Stream Diffusion, which showed what a user would look like as a Kyrgyz person, wearing traditional clothes (Figure 3.10). This was the beginning of designing the human mirroring interaction. Along with the one cultural prompt, the study built the first tent-like structure to represent the idea of the Yurt Portal (Figure 3.9 (left)). After creating the first variation of the space, the trial questionnaire was created to test the system and the environment. During the initial prototype in-lab testing, six participants tried the human mirroring interaction with a single prompt representing Kyrgyz clothing. While users found it engaging to see themselves in another culture, one prompt was insufficient to fully grasp the “Mirrored Culture” concept. The Yurt Portal experience received feedback from some of the participants:

I understand it is a very simple version of a yurt, but I think if the yurt is more well made it will definitely be more immersive.

If I can see myself become a Kyrgyz person, and see the Kyrgyzstan version of me grow up from kid to senior, it might be interesting.

Maybe make the yurt darker inside will make a better in person experience.

I want to experience this in the boarding lounge for a flight to Kyrgyzstan. My interest in Kyrgyzstan has significantly increased. I feel that this could be an excellent device for cultural exchange at the airport. Since 360-degree panoramas can be created using Stable Diffusion, I would love to experience it within the space.

Great proof-of-concept prototype! I loved that all the basic elements of your experience were there: spatial (the yurt), tactile (the soft rug), visual (AI window to a Kyrgyz world) . My advice, instead of trying to avoid the difficult points raised by the use of AI (like portraying biases etc) try to think of a way to embrace and use the ambiguity and abstraction of StableDiffusion and its aesthetic. It seems to me

that your idea will shine if you treat it as more impressionistic than representational. It's more about recreating the feeling or memory of being there, than making an accurate representation of it.

For the feedback collection, participants were asked to fill out a questionnaire and share their opinions about the experience for further improvements. The survey collected about users' prior knowledge about Kyrgyzstan, their experience with the yurt, as well as their perception of AI. Based on the first survey, it was found that one prompt is not enough to understand the concept, and people wanted more interaction options, leading this study to add four prompts during the customization and interface improvement point. The survey helped identify cultural areas that participants wanted to experience to understand the new culture better (Table 3.2). Therefore, based on their replies, it was decided to add pre-written prompts such as "Art", "Food", "Clothes" and "Games".

Table 3.2 Preferred Cultural Experiences in Kyrgyz Culture

Responses	Category
3	Traditional food
2	Art
1	Nomadic locations

These categories were listed by people in the survey as the most helpful and interesting areas that assist them in learning about new cultures while traveling. For the ability to change between prompts, four cultural prompts were connected to a portable keypad that allowed users to switch from one option to another. After adding four prompts, this research conducted another preliminary in-lab study, asking three users to share their experiences. The participants answered almost the same questionnaire that was provided during the first in-lab testing, but with incorporated questions about new prompts. The Figure 3.11 shows the answers to these questions:

A: Which prompt, in your opinion, helped you the most to feel the cultural mirroring?

B: What aspect of Kyrgyz culture would you like to experience the most?

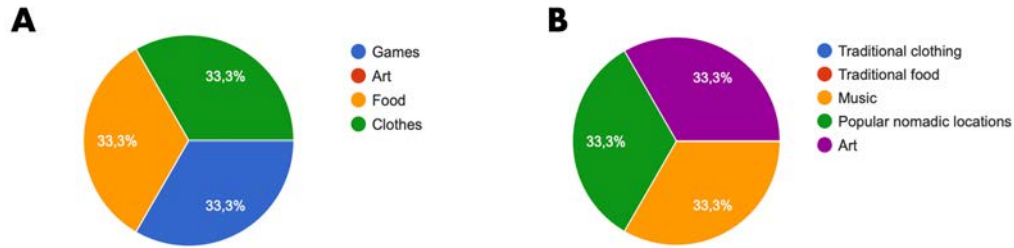


Figure 3.11 Second in-lab testing results from three users trying four prompts in *Human Mirroring* system

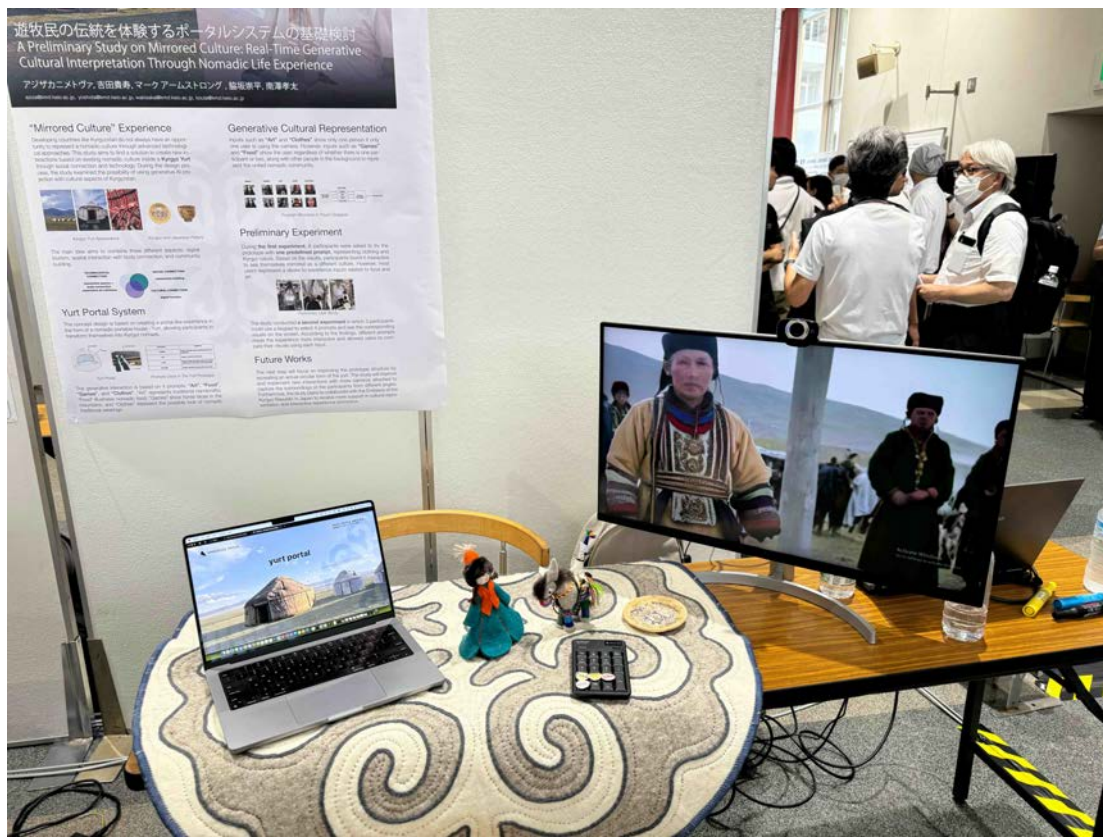
Second, in-lab testing helped to understand how users interact with different prompts. Findings and observations also showed that people believe the “Mirrored Culture” concept helps them understand Kyrgyzstan, and the ability to select prompts keeps users in the Yurt Portal longer. However, they still want more immersive experiences and an accurate Yurt Portal structure to have a better understanding of the physical cultural features that the original yurt provides.

Based on the initial iteration, it was found that using an AI generative model in the Mirrored Culture to represent lesser-known countries and traditions benefits from incorporating a diverse range of cultural sections. This approach enhances system training and provides users with more interaction options.

3.3.2 Testing Yurt Portal in Public Exhibitions

After analyzing feedback from the in-lab testing and evaluation, the study had an opportunity to exhibit Yurt Portal with the implemented cultural prompts in public for the first time. However, for this public installation, the prototype didn’t have a portal space; the Yurt Portal experience was established only with one screen on the table, a keypad, a poster, and a decorative carpet (Figure 3.12). The exhibition was held in Nagoya as part of the Virtual Reality Society of Japan conference.

For this exhibition, most of the interactions with users were verbal due to the conference design and a time limit of 45 minutes. The Yurt Portal was presenting



(Source: Photo by author)

Figure 3.12 Yurt Portal set up at Virtual Reality Society of Japan conference in Nagoya

a poster of the ongoing findings, as well as an installation for users to try. Overall, the installation had 15 visitors based on the observation, who tried the experience and shared their feedback:

Once I realized it was my twin, it became easy to understand the concept. It's such an easy way to learn about different culture.

I would like to have some sounds or haptic effects in the future.

Participant feedback revealed that it was difficult for users to recognize themselves on the screen, as the images changed too quickly. Participants also sug-



(Source: Photo by author)

Figure 3.13 Yurt Portal displayed at Virtual Reality
Society of Japan conference in Nagoya

gested that incorporating sound or haptic feedback could enhance their understanding and strengthen their sense of connection with the virtual cultural twin.

After evaluating comments from the first public installation, the study created a second Yurt Portal prototype - an abstract version closer to the Yurt's original form to enhance the immersive experience (Figure 3.15). The new Yurt Portal was exhibited in Tokyo during the Keio Media Design Forum with the updated mirroring system, where users were able to choose prompts using a portable keypad inside the Yurt Portal space. The study also provided a questionnaire for participants to use and give their comments. During the exhibition, the research collected data through observation and a post-experience survey. These types of

questions were provided during the exhibition:

To what point did you understand Kyrgyzstan through the concept of Mirrored Culture?

Which interaction helped you find differences and similarities within the cultures better?

Which prompt, in your opinion, was helpful to understand the concept? What kind of prompts would you like to have inside the interactive yurt to understand a different culture better?

What would you suggest to improve the interactive features?

In what situations or exhibitions do you think [Mirrored Culture] can be presented? Let us know your ideas if any.

In total, nine users responded to the questionnaire, and sixteen people stopped by the booth to try the prototype and provide feedback. According to the survey responses, five participants found it easy to understand the concept of Mirrored Culture, giving it a score of four out of five. Two participants felt that the concept still needed some improvements or clearer direction in order to be fully understood, while the remaining two reported no difficulties in comprehension, awarding it the highest score. Users also highlighted potential future activities and venues where the Yurt Portal could contribute to fostering cultural understanding. Below, the study shows some of the written comments from the survey:

It would be useful in tourism fairs and cultural exchange events.

If I see that overseas, traditional booth inside of modern architecture,
I think that's really outstanding.

Based on the findings, participants believe that the concept of the Mirrored Culture inside the Yurt Portal provides a tool for digital tourism and education for cultural communication. The results from the users particularly highlighted

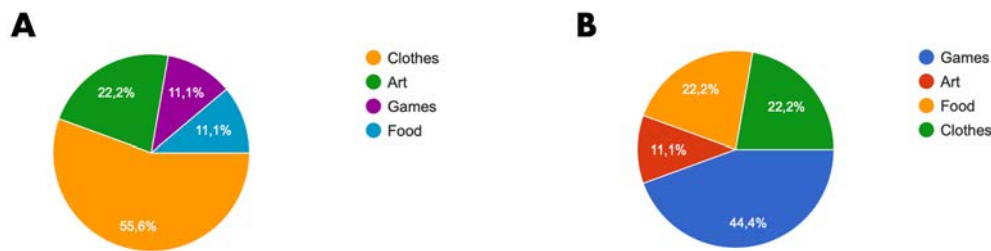


Figure 3.14 Feedback from Nine Participants on Interactions and Prompts Supporting Cultural Comparison: (A)prompt that helped to find differences and similariteis; (B)prompt that helped to understand the concept

a prompt that showed cultural clothes on their digital twin (Figure 3.14 (A)); they believed that it makes them feel more connected to the culture. Participants also believed that prompts about traditional games and food helped them to understand the concept of Mirrored Culture (Figure 3.14 (B)). However, the Yurt Portal experience also received comments asking to add a physical object to the interaction. In the survey, users mentioned their interest in seeing the real space itself, new objects, and cultural interactions, possibly to experience cultural events like weddings and other celebrations. Participants felt that integrating traditional physical items or cultural events into the interactive Yurt space would help them learn more about different cultures. Some people also mentioned in the survey that it was hard for them to understand that they see themselves on the screen, and it took some time to play with the keypad and change from one prompt to another to get the idea of the Mirrored Culture.

The second iteration process highlighted several key insights for the Mirrored Culture design approach inside the Yurt Portal space. The fast-changing images in the initial public installation proved challenging for users to recognize themselves as the digital twin, suggesting the need for slower image transitions or clearer cues to improve understanding. The findings also underscore the importance of incorporating multi-sensory feedback, offering personalized cultural experiences, and integrating tangible cultural artifacts to improve user engagement and understanding.



Figure 3.15 Second prototype of the Yurt Portal with functional interactions of (left) *human mirroring* and (right) *object mirroring* at an exhibition to get a feedback from visitors

3.3.3 Adding and Testing Object Mirroring Interaction

The feedback from the public installations led the study to enhance the system with a feature that mirrors four Kyrgyz objects into their Japanese counterparts, aiming to add tangible interaction to the Yurt Portal. The objects were chosen based on the same prompt categories that the system has in human mirroring. Three objects, which represent cultural clothes, nomadic games and pottery art, were bought in Kyrgyzstan. The object that represents food was printed out and handmade for the third prototype. After implementing the new interaction and adding physical elements, the study exhibited the third version of the Yurt Portal with the added object mirroring system in Tokyo (Figure 3.16) during EM:EX exhibition. This exhibition was a part of SIGGRAPH Asia 2024, welcoming guests to the Embodied Media Lab. The Yurt Portal space stayed the same from the second iteration. During the showcase, users engaged with both physical objects and the interactive system, creating twins for themselves and presented objects. The goal of this iteration was to observe how people understand Kyrgyz culture through two interactions at the same time. Many noted that the “Mirrored Culture” experience inspired them to explore new traditions and immerse themselves



Figure 3.16 Third prototype of the Yurt Portal exhibited with fully functional interactions of *human mirroring* and *object mirroring*

in different cultures. Participants familiar with Japanese culture found it easier to understand the cultural significance of Kyrgyz objects when presented in a Japanese context. Based on the observation, thirteen participants tried the prototype and shared their thoughts. The demographic background of all participants includes Japan, China, Europe, Australia, and America, with mixed genders and from the age of 18 to 65. Although due to the environment of the showcase, it was not very convenient for people to go through the survey, a lot of participants were willing to talk about their nationality and culture after trying the experience. Some participants knew about Kyrgyzstan before trying the experience, but didn't expect it to be mirrored to Japanese culture. It was also noticed that even though not everyone knew Kyrgyzstan in particular, most participants were familiar with Central Asia or Kyrgyzstan's neighboring country, Kazakhstan. Referring to the comments from the users, the study believes that the Yurt Portal experience helps to learn about new countries as well as influence cultural learning.

The third iteration of the Yurt Portal demonstrates the broader potential of cultural mirroring as an interactive method for fostering cross-cultural engagement and learning. The addition of physical elements enhanced the experience, show-

ing that a hybrid interaction - combining tangible artifacts with digital content - can create a more immersive and memorable encounter. Importantly, users found value in the comparative aspect of the experience, which allowed them to draw connections between cultural references they recognized and those they were newly introduced to. The system also encouraged informal dialogue and personal storytelling, indicating its potential to support intercultural communication beyond the immediate interaction. These findings highlight that Mirrored Culture, as a design approach, is valued for its ability to personalize cultural experiences, make abstract traditions more relatable, and create space for exploration, empathy, and conversation through interactive media.

3.3.4 Summary

To develop the mirroring system, the Yurt Portal was initially tested in a controlled laboratory setting. In the first phase, six participants were invited to engage with a single cultural prompt within the space and provide feedback on their experience. Drawing on their insights, the study introduced four additional interactive prompts to enrich the interaction. A second round of in-lab testing was then conducted with three new participants to further refine the system based on user input. Following these iterative evaluations, the first functional prototype of the Yurt Portal - featuring the Mirrored Culture design approach within the immersive yurt environment - was prepared for public exhibition and broader testing.

The Yurt space has been presented and evaluated in three versions at different events in Japan. The first version was exhibited in Nagoya, where 15 visitors experienced it. The second iteration, updated based on collected data and visitor feedback, was showcased in Tokyo and attracted 25 visitors. The final version was displayed in Tokyo as well, welcoming 13 visitors and observing their behaviour with two interactions: human and object mirroring. Feedback and data collected from these exhibitions were analyzed to guide the findings of the concept. While visitor impressions were largely positive, they highlighted a need for improvement, particularly addressing the one-sided nature of cultural mirroring (from Kyrgyz to Japan, but not vice versa). Overall, the Mirrored Culture experience within the Yurt Portal effectively introduced visitors to elements of Kyrgyz nomadic culture

and its traditional objects. Through interactive prompts and immersive design, it provided an accessible entry point into cultural practices, aesthetics, and values. The experience sparked curiosity about the ways cultural knowledge is shared and preserved, prompting reflection among visitors. Many expressed their interest in learning more about Kyrgyz traditions, demonstrating the potential of the system to inspire deeper engagement with underrepresented cultures.

Chapter 4

Proof of Concept

4.1. Overview

To prove the effectiveness of the Yurt Portal interactive space and Mirrored Culture design approach, it was important for this research to connect Kyrgyz and Japanese people to experience the interaction. However, there are relatively few Kyrgyz people residing in Japan or living permanently in Tokyo, which makes it challenging to bring Japanese and Kyrgyz participants together in one place. Therefore, one of the key solutions was to establish a connection with the Embassy of the Kyrgyz Republic in Japan, which frequently organizes events aimed at fostering cultural exchange between Kyrgyzstan and Japan. This project made it possible, and the Yurt Portal was successfully introduced to the ambassador and the public. The main goal of this collaboration was to receive comments from experts, ambassadors, and the general public about the cross-cultural understanding between Japan and Kyrgyzstan through the Yurt Portal.

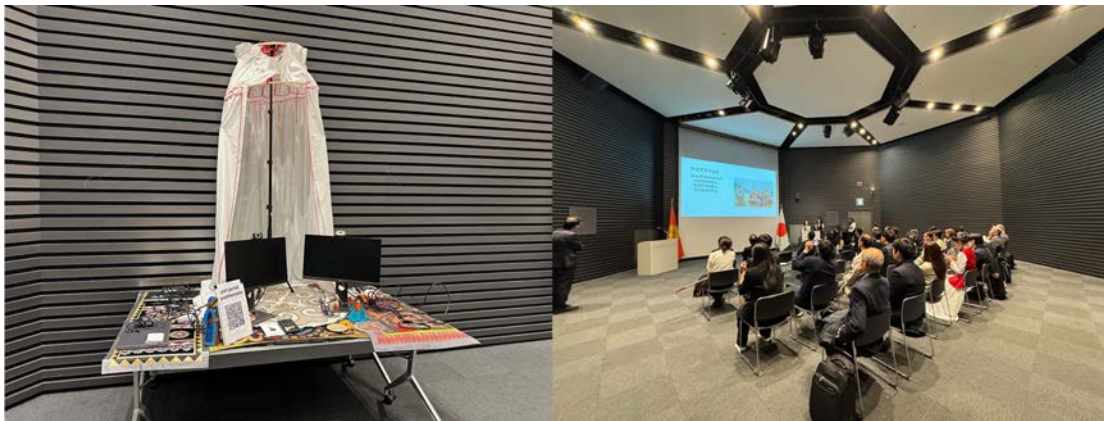
4.2. Preparation

The preparation for the real exhibition in collaboration with the Kyrgyz and Japanese officials started with the opening of the first Association of Kyrgyz Students in Japan under the support of the Embassy of the Kyrgyz Republic in Japan and Japan Student Services Organization (JASSO) [60]. Together with the representatives of the association and embassy, around three months were spent on creating a brand, program and goals of the association. Embassy of the Kyrgyz Republic wanted to make it official and together with the support of JASSO, it was possible to organize an official opening ceremony of the association and invite

professors from several Japanese universities, students from language schools who learn Japanese as well as Japanese students who are interested in Kyrgyz culture. The Yurt Portal was approved to be a part of the opening ceremony and was introduced to JASSO representatives during the preparation time.

There were some difficulties with managing the yurt structure correctly. At first, it was expected to have a standing yurt; however, the venue, provided by JASSO, didn't have a proper ceiling to hang the structure. Therefore, the Yurt Portal was placed on the table, covered with traditional carpets and some handicrafts for decoration (Figure 4.1 (left)). Although the Yurt didn't have an opportunity for people to step inside the space, the most important part was to try the system and prove its workability with the target audience.

4.3. Embassy Exhibition



(Source: Photo by author)

Figure 4.1 Yurt Portal exhibited during the collaboration event with the Embassy of the Kyrgyz Republic in Japan

In March 2025, the Yurt Portal officially collaborated with the Embassy of the Kyrgyz Republic in Japan as part of the opening ceremony of the Association of Kyrgyz Students in Japan, where the “Mirrored Culture” experience was exhibited. The event welcomed approximately seventy people, according to the

registration form. Some participants joined online from Kyrgyzstan, Hokkaido, Kobe, and Kyushu prefectures. Most of them were representatives of language schools or professors who contribute to the promotion of Kyrgyz culture in Japan. Therefore, before introducing the Yurt Portal to in-person visitors, an online presentation was held to explain the concept of the Mirrored Culture and the Yurt Portal interactive experience (Figure 4.2). During the oral presentation, the study highlighted the main goals, contributions, and the overall purpose of enhancing the visibility of Kyrgyz culture.



(Source: Photo by author)

Figure 4.2 Yurt Portal concept and goals presented by the author for online participants of the event

During the official event, Japanese and Kyrgyz people were asked to experience the Yurt Portal (Figure 4.1) and give their feedback. As a result, representatives of

both cultures, about 20 people overall, find the Mirrored Culture design approach informative and helpful for cultural understanding. At first, the study aimed to ask users to answer the survey to compare their knowledge about the cultural objects before and after the experience. However, since the event was specifically designed for Japanese and Kyrgyz participants, all attendees were already familiar with the Kyrgyz culture and objects selected for the mirroring process. Additionally, before the experiment, they had not considered the conceptual pairing of each cultural element with its counterpart, which created a possibility to learn more about each other. During the observation process, participants were at first attracted to the structure and the two screens on the table. However, after providing and explaining the rules for each user, they became engaged and interested in the experiment. Several attendees highlighted that the Yurt Portal brings them the new perspective on the both cultures:

I thought that Kyrgyz and Japanese people look alike, but I've never imagined that we can connect through almost all cultural representations.

It creates such an easy way to understand the opposite culture. I wish I had this media when I just started learning about Kyrgyz culture.

The most important feedback was received from the ambassador of the Kyrgyz Republic's embassy. He approved the use of technology in the direction of tourism and cultural promotion; however, he would like to promote not only nomadic culture, but also the modern lifestyle of Kyrgyzstan.

I'm so glad to see that our students working on promoting Kyrgyz culture, but I think we used to think about Kyrgyzstan only as a nomadic culture, but we also a developing modern country. I want you to show Kyrgyzstan from the modern perspective of view too. We have so much more than just mountains and interesting culture.

He believes that a lot of people can assume that the Kyrgyz Republic is not advanced, due to the already existing problem of visibility and stereotypes. Therefore, he encouraged the Mirrored Culture design approach and the Yurt Portal space to create an experience of modern and nomadic Kyrgyzstan.

After the event successfully welcomed Kyrgyz and Japanese representatives, the Yurt Portal experience was featured on the official Instagram channel of the Kyrgyz Embassy (Figure 4.3). The post highlighted the main goal of the event and mentioned the Yurt Portal as an interactive installation that enhanced the official opening ceremony of the Association of Kyrgyz Students in Japan.



Figure 4.3 Yurt Portal published on the official Instagram page of the Kyrgyz Embassy

(Source: Instagram page of Embassy of Kyrgyz Republic in Japan [61])

Although some participants were initially introduced to the Yurt Portal through online presence, it is a significant milestone for this study to have the opportunity to present the project at a governmental level within a cross-cultural context. This recognition not only highlights the cultural and technological relevance of the Yurt Portal but also demonstrates its potential to serve as a bridge for diplo-

matic and intercultural engagement between Kyrgyzstan and Japan. By gaining visibility at an institutional scale, the project moves beyond academic or artistic boundaries and makes a step to the realm of policy influence and international cultural dialogue, thereby reinforcing its value as a tool for representing Kyrgyz nomadic identity in global discussions on digital heritage and immersive tourism.

4.4. Summary

The purpose of this proof of concept was to initiate a collaboration with the Embassy of the Kyrgyz Republic in Japan and to gather insights from both the ambassador and the general public regarding the interactive experience and cross-cultural understanding between Kyrgyzstan and Japan facilitated by the Yurt Portal. The joint exhibition, held in cooperation with the Embassy and the Japan Student Services Organization (JASSO), offered a tangible demonstration of how the Mirrored Culture design framework can foster cross-cultural understanding. By enabling participants to perceive cultural similarities and differences in an embodied and reflective manner, the Yurt Portal revealed its potential as an effective medium for intercultural engagement. Findings from the exhibition indicated that the Mirrored Culture approach introduces an element of novelty and personal relevance to cultural learning - even when the featured culture is already partially familiar to the user. Moreover, the opportunity to showcase the Yurt Portal during the opening ceremony of the Association of Kyrgyz Students in Japan significantly enhanced the project's visibility. This marked the first occasion on which the Yurt Portal received mention in the media, further extending its public reach. Feedback collected from attendees, including the ambassador, provided critical reflections that deepened the conceptual understanding of Mirrored Culture and encouraged the continued development of the Yurt Portal as a platform for promoting both traditional and contemporary aspects of Kyrgyz nomadic identity within a global, digital tourism context.

Chapter 5

Discussion

In this chapter, I will talk about my thoughts on the study, findings, and discoveries about the “Mirrored Culture” concept through the Kyrgyz-Japanese scenario that I created throughout this research. This chapter also covers the limitations of this work and future steps that can be applied to improve the concept.

5.1. Discussion

The “Mirrored Culture” experience allows users to explore new cultures through a human, object, and environment mirroring system, highlighting similarities and differences between two different cultures and traditions. Interacting with the system often encourages users to reflect on connections between their own culture and the twinning culture. The study believes that immersing users in lesser-explored cultures fosters new perspectives on cultural differences. The contribution of this study is to suggest a cross-cultural design concept through the integration of real-time AI images and cultural reflections, and its applicability to any cultural communication that can be expanded and applied in many applications.

5.1.1 Cultural Pairing

Many portable designs and interactive tools aim to enhance cultural understanding, mobility, and responsiveness within spatial interactions [21, 46, 52, 62–64]. However, Mirrored Cultural pair, space or interface provides an additional cultural representation and traditions of two chosen cultures, which helps to enhance cultural visibility using technology by creating a physical cultural and virtual portals that can be represented in different settings.

The portal interface based on the Mirrored Culture concept can be easily applied

to various exhibition formats, from pop-up displays to museum settings. The physical elements can be easily expanded or reduced while maintaining the digital elements at the same or a larger scale. The flexibility and generality of the portal allow for different ways of constructing the cultural space - it can be a traditional house or an abstracted surface.

5.1.2 Understanding a Culture Through Human Mirroring

The use of human mirroring interaction has already been used by other authors to enhance communication between people as well as for spatial interaction [34, 65, 66]. The incorporation of AI is also suggested to be used to promote different cultures for increasing tourist loyalty [24, 25, 67]. In the current system, users can not only explore a new culture through AI and face-mirroring but also create a cultural twin, learning about differences in facial features and clothing within the prism of a mirrored culture. The use of AI can be expanded and displayed on a bigger screen during the next interactions, and provide a better immersive experience.

Before fostering cultural understanding, the initial focus was on establishing familiarity. Since facial recognition plays a crucial role in human cognition, it serves as a fundamental aspect of developing familiarity as well as a sense of continuity [68, 69].

5.1.3 Understanding a Culture Through Object Mirroring

The object interaction system was inspired by existing projects that focus on style-transfer, embodied interaction, and cultural exchange [41, 45, 70, 71] that allow users to see the “other side of the mirror” or the environment of others. However, in addition to this, “Mirrored Culture” provides an opportunity to interact with physical objects by discovering different shapes and colors in cultural objects of two different yet similar cultures.

5.2. Design Implication

The Mirrored Culture design approach through the Yurt Portal interactive experience can be applicable to other cultures for creating a better cultural understanding. The current design can serve as a tool for promoting digital tourism and creating an interactive educational tool for cross-cultural learning. This concept can help to promote lesser-known cultures through the creation of a cultural twin with well-known cultures.

5.2.1 Rooted for Digital Tourism

This project provides an exciting opportunity to digitally bring Kyrgyz nomadic culture into new spaces, addressing an important gap in cultural representation in digital tourism, especially for lesser-known cultures like Kyrgyzstan. The results and feedback for the public showed that the concept of using generative AI to create a mirrored experience for cultural exchange is highly innovative. First, it challenges traditional, passive modes of cultural display by enabling embodied interaction, allowing users to explore cultural narratives through the creation of a cultural twin. This fosters active engagement and emotional resonance, which are key to deepening intercultural understanding. Second, the portal creates a symbolic common space where mutual presence is simulated and cultural differences and commonalities can be experienced at the level of relationships rather than observation. Moreover, the study believes that the concept of the Mirrored Cultures in the Yurt Portal space can become a powerful media and contribute to the digital tourism sphere by providing new perspectives and less-known cultures to highly popular countries, which feel overcrowded with tourists. Through cross-cultural exchange facilitated by this concept, a new opportunity emerges to create employment for small countries like Kyrgyzstan within the tourism sector. For example, as discussed in Chapter Two, this study highlights the issue that there are currently few professionals responsible for tourism development in Kyrgyzstan. The proposed design has the potential to attract more tourists from frequently visited countries and thereby contribute to job creation in the region. As such, the Yurt Portal represents a shift from performance-driven tourism to participatory culture co-presence, redefining how people travel, connect, and learn

through digital media.

5.2.2 Mirrored Culture with AI

After the iterative design and testing of the Mirrored Culture concept, the study believes that it opens up several rich and forward-looking future applications. With the fast growth of AI technology, Mirrored Culture can generate mirrored stories or experiences from another culture, a different time, fostering curiosity through relatable storytelling. For example, with the cross-cultural twinning system, it can recreate a day of a person from the same timeline, but a different culture by using AI generative software that can provide a real-time video or image storytelling. Furthermore, AI opens up transformative implications for both user experience and cultural communication in digital tourism. AI enables personalized cultural narratives in real time, dynamically adapting visual, auditory, and textual content based on the user's biographies, language, gestures, or emotional responses. This contributes to a more inclusive and responsive environment, making cultural experiences more relevant to a diverse audience. Moreover, AI-powered speech recognition and natural language processing can facilitate multilingual dialogue and interactive storytelling, allowing users from different regions to engage in meaningful cultural exchange without language barriers. Through computer vision and body tracking, the Yurt Portal can interpret user movement and intention, making the space truly embodied and intuitive. On a larger scale, AI can analyze user interaction data to uncover patterns in cultural perception, enabling data-informed curation of content and enhancing the design of future heritage-based experiences.

Mirrored Culture design approach explores the potential role of Gen AI dialogue in the system's architecture and user experience design. It has the potential to collect biometric or behavioral data for a cultural-identity model to create avatars that are not replicas, but culturally stylized interpretive reflections. The concept design can provide an AI-powered media with sensitive communication, allowing users to learn about another culture through taken perspective of others. The design can be evaluated by perspective-taking data collection, which involves capturing how individuals interpret, respond to, and reflect on cultural narratives or experiences different from their own. Such data serves as an indicator of the sys-

tem’s potential to foster intercultural understanding. Framing evaluation through the lens of perspective-taking enables a more nuanced assessment of both user experience and the broader socio-cultural impact of the design. Such media design creates a technically grounded but human-centered approach to diplomacy, remote collaboration, education, and tourism. A generative AI-based dialogue inside the Mirrored Culture concept design has the potential to foster more inclusive and meaningful cross-cultural communication by promoting increased cultural empathy, enabling perspective shifting, and encouraging deeper self-reflection.

Besides the generative cultural data sets, it is also important to have tangible interactions when creating a cross-cultural understanding tool. Through the iteration process, it was discovered that touching or manipulating something physically can increase emotional engagement with the cultural meaning. Sound and haptic effects enhance user immersion in a specific cultural atmosphere, particularly when these effects are contextually linked to relevant objects. Referring to it, the object mirroring in the Mirrored Culture design approach and Yurt Portal interactive experience can later let users arrange physical objects on a tangible interface or projection table. As they place objects, the system can create parallel narratives - mirrored stories from both cultures involving those items. Users can also interact with 3D-printed or handcrafted replicas of cultural artifacts that are tracked and mirrored digitally. Overall, AI transforms the Yurt Portal from a static display into an intelligent, adaptive cultural mediator, positioning it as a powerful tool for ethical, creative and immersive digital tourism tool.

5.2.3 Portal Design Variations

Mirrored Culture can incorporate portal-based interfaces - both physical and virtual - that allow users to “step into” a mirrored cultural space. The portal design can be a big physical installation (e.g., in museums, airports, or city centers) with large interactive screens or projections that serve as real-time or pre-curated “portals” into a mirrored culture. It can also become a bidirectional portal where two locations could host synced portals, allowing people to “meet” and explore mirrored traditions side by side in real time. The portal design can be presented on a small surface as well. It can be a browser-based experience where users choose their culture, and the system creates a personalized cultural mirror of another re-

gion, allowing exploration of mirrored objects and human roles side-by-side. This design provides an opportunity to improve cultural learning and understanding through education, digital tourism, and many other spheres. Moreover, these design variations can be informed by AI data derived from user interaction data, allowing for adaptive design evolution based on real interaction patterns. In an educational, museum or tourism context, this modularity opens up possibilities for themed installations, temporary exhibitions or even community co-design processes, expanding the role of the portal as a living, interactive cultural interface rather than a fixed artefact.

5.3. Limitations

This research has several limitations that will be discussed in this section. To begin with, the generative AI in the human mirroring system doesn't represent Kyrgyz clothes and appearance accurately due to limited information about Kyrgyz culture. Most of the images include Mongolian or a combination of closed cultures, to Kyrgyz cultural objects or decorations. However, even though this aspect is playing an important part in cultural understanding, it helped to answer the research question to a certain level. When focusing on cross-cultural understanding, the lack of knowledge in the AI cultural sets can lead to the creation of stereotypes about traditions and values. As it was mentioned by the Embassy Ambassador of the Kyrgyz Republic, some people might see Kyrgyzstan and its lifestyle as nomadic only with no modernism. This comment helped this research recognize that, when facilitating learning about a different culture, it is important to incorporate both historical and contemporary cultural practices. Introducing the past alongside the present provides a more holistic and contextualized understanding, allowing users to see cultural continuity and transformation. The connection of past and present moments can also help to reduce stereotypes, which usually affect users' assumptions about the culture. For instance, because Kyrgyzstan was once part of the Soviet Union, Kyrgyz people were required to learn Russian, which continues to fuel unnecessary stereotypes about the Kyrgyz Republic. Additionally, due to a lack of facial recognition in the current human mirroring system, participants sometimes fail to recognize themselves on the screen, which can some-

times lead to more assumptions about the culture. While user feedback is essential for further development, this study faced a limitation in obtaining constructive criticism after introducing the object mirroring system. However, the exhibitions highlighted the importance of emotional and personal connections in interactive experiences, which current design doesn't have in a broad way, where users can share their objects or stories with the system. Currently, the Yurt Portal offers a one-time experience, which doesn't foster deep emotional engagement as it lacks personal sharing or reflection. Since the main focus of this research is to create a medium for cross-cultural understanding, the frequency of visiting or trying the tool is important for cultural learning. As it was mentioned in the literature review, tourism loyalty comes from the creation of an emotional connection with a tourist and a place, which encourages people to revisit the country. If the system could facilitate such connections, the impact on cultural understanding would be more significant. While the feedback from participants is generally positive, it would be valuable to provide a more in-depth analysis of the mixed reactions regarding the one-sided cultural mirroring (from Kyrgyz to Japan). For example, what were the emotional and cognitive responses from visitors to this design? It would be insightful to consider how the one-way mirroring might reflect power dynamics or even reinforce cultural stereotypes. Moreover, the current Yurt Portal doesn't have the original structure of the Kyrgyz yurt, which might lead to a lesser immersive experience.

5.4. Future Works

The future possible goals of this study are to enhance spatial storytelling within the Portal system and establish a culture-mirroring framework for researchers and designers who aim to communicate through it. The study seeks to achieve personalized object storytelling and create an immersive experience that fosters cross-cultural understanding. For example, in the future "Mirrored Culture" experience, visitors can place personal items inside the portal space, and the mirrored reflection reveals cultural stories connected to the shapes or materials of the objects. For this thesis, the study uses an algorithm based on a deep learning diffusion model. Integrating recent progress in generative AI technology, the research expects that

further implications could extend the experience in the near future. Potential example includes real-time, interactive, realistic mutual mirroring to create a more diverse experience. Another example could be achieving a personal storytelling experience, where users can mirror all objects around them and find a cultural twin. The Yurt Portal system, through the Mirrored Culture design approach, can introduce a separate interaction modality, environment mirroring, which will function independently of human mirroring and not merely as a background element. This study also has an opportunity to connect educational institutions, museums, and more cultural representatives to promote Kyrgyz and Japanese cultures, as well as create a room for other countries, researchers, and designers to use this approach for cultural communication. Moreover, the study provides a design system for incorporating new perspectives into the digital tourism area and helps with cultural promotion. Overall, the future work plan has a solid foundation to create a new media design for digital opportunities and cross-cultural understanding between different countries.

Chapter 6

Conclusion

This thesis focuses on promoting Kyrgyz nomadic culture, which plays an important role in Kyrgyz history, by mirroring it to Japanese culture. With the connection of similar yet different Asian cultures, the study aims to contribute to the creation of a new digital tourism tool for cross-cultural understanding.

The research presented the Yurt Portal interactive experience through the Mirrored Culture, an interactive design approach that fosters cross-cultural understanding by emphasizing similarities between cultures through the concept of mirroring. Rather than focusing on differences, the system reflects users' own cultural experiences onto those of another, encouraging engagement and empathy in finding similarities by exploring a cultural twin. This approach incorporates two layers of mirroring - human and object, to create a first-person view design and relatable cultural interactions. The design space of Mirrored Culture focuses on its accessibility, adaptability, and potential to be applied across diverse cultural contexts. Three iterations and official collaboration with the Embassy of the Kyrgyz Republic were conducted to answer the following research question:

Research Question: *How can the Mirrored Culture experience, facilitated by the Yurt Portal interactive space, enhance cultural understanding between Kyrgyz and Japanese communities?*

To answer the question and achieve the goal of sharing Kyrgyz culture, the study created the “Mirrored Culture” experience in a Kyrgyz-Japanese scenario, which mirrors Kyrgyz nomadic culture within the Yurt Portal space - a portable nomadic house - to promote Kyrgyz heritage through interactive reflection on Japanese culture. The concept is focused on developing a human and object mirroring system using Stream Diffusion and a Teachable Machine in TouchDesigner.

Human mirroring allows users to see themselves in the figure of a Kyrgyz nomad by creating a cultural twin; environment mirroring presents background scenes featuring Kyrgyz landscapes, while object mirroring transforms Kyrgyz objects into Japanese equivalents. These interactions help users learn about different cultures and create a digital cultural twin.

The research involved three iterative processes in building the Yurt Portal experience. The first iteration was part of an in-lab user study where six participants tested one prompt that enabled a human mirroring interaction. The users completed a questionnaire, based on which the prototype updated the human mirroring interaction with four categories that could generate a Kyrgyz cultural twin of the user. Afterward, the study invited three more users to test the updated version, which helped define improvements and identify limitations.

The second iteration incorporated feedback from the preliminary study and presented the Yurt Portal interactive system to the public for the first time in Nagoya during the Virtual Reality Society of Japan conference. It received positive responses from fifteen participants regarding the potential of the Mirrored Culture design approach, along with comments on improving the system and incorporating new spatial design. The public installation in Nagoya contributed to improving the physical structure of the yurt space by creating an abstract variation of the yurt, which was later exhibited in Tokyo and collected new data from twenty-five participants. The human mirroring interaction inside the redesigned yurt structure helped users better understand the culture, particularly through the visualization of themselves wearing Kyrgyz traditional clothing. However, the prototype still required additional interactions to enhance immersion and cultural comprehension. A key outcome from the Tokyo exhibition was the recognition of the importance of adding physical objects to cultural learning to provide a tangible, hands-on experience.

As a result, the third iteration of the Yurt Portal introduced a second main interaction - object mirroring - and offered users the opportunity to mirror four Kyrgyz cultural objects with similar Japanese counterparts. The Yurt Portal, now featuring both interaction types, was exhibited once again in Tokyo, where participants' feedback was collected through observation. This final iteration attracted thirteen guests and demonstrated the potential for cultural connection through

the dual-interaction system. Users responded positively and were encouraged to reflect on and compare their own cultures with those of Kyrgyzstan and Japan.

After testing and refining all interactions, the Yurt Portal was prepared to be introduced to the target audience: Japanese and Kyrgyz people. To facilitate this, the study officially partnered with the Embassy of the Kyrgyz Republic in Japan and presented the Yurt Portal as part of the collaboration. The main goal of this collaboration was to connect Kyrgyz and Japanese people and to gather feedback from both government representatives and the general public. The exhibition took place during the official opening ceremony of the Association of Kyrgyz Students in Japan, supported by JASSO. The Yurt Portal was formally experienced by the ambassador of the Kyrgyz Republic, as well as Japanese and Kyrgyz students. The main feedback indicated that the interactive Yurt Portal experience helps users understand cultural differences in a smooth and engaging way. Participants, already familiar with the traditions of both cultures, found the experience helpful for communication and connection. The ambassador highlighted the importance of integrating contemporary Kyrgyz culture alongside nomadic traditions in future experiences. This collaboration helped the research reach its primary objective.

Returning to the research question of this study, from iterative design to proof of concept, it can be concluded that the Yurt Portal interactive experience - through the Mirrored Culture approach - inspires users to explore unfamiliar traditions while reflecting on their own. The study successfully connected Kyrgyz and Japanese individuals and introduced a new perspective on cross-cultural engagement and digital tourism opportunities. Additionally, it allowed representatives of other cultures to reflect on their traditions through the lens of Kyrgyz nomadism and consider new applications of the Mirrored Culture concept.

The Yurt Portal became a novel form of media that promoted Kyrgyz culture in Japan throughout all stages of the iterative process, making nomadic traditions visible on both local and international levels. Moreover, the design of the portal adapts seamlessly to various exhibition formats, creating a unique, replicable media experience. Its scalable design allows for flexible integration of physical and digital elements, supporting both traditional and abstract spatial expressions. The Yurt Portal now serves as a model, inviting other cultures to adapt their own traditions, environments, and digital components to express unique cultural

narratives.

While the study received positive responses, certain system limitations remain, which are discussed in the following section. Future improvements could involve personalizing the experience for individual users to enhance spatial interaction and cultural storytelling, allowing people from diverse backgrounds to explore the Mirrored Culture experience more deeply through the Yurt Portal.

Beyond promoting Kyrgyz nomadic culture and fostering cross-cultural understanding through the Japanese context, this thesis also contributed to the broader visibility of often-overlooked cultures. It aims to spark curiosity and engagement with underrepresented regions. By supporting intercultural dialogue and encouraging interest in lesser-known destinations, the research offers an alternative model of tourism - one that counters oversaturation by redirecting attention to culturally rich yet underexplored areas.

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Appendices

A. Detailed Architecture of the System Interactions

System architecture of the Object Mirroring inside TouchDesigner.

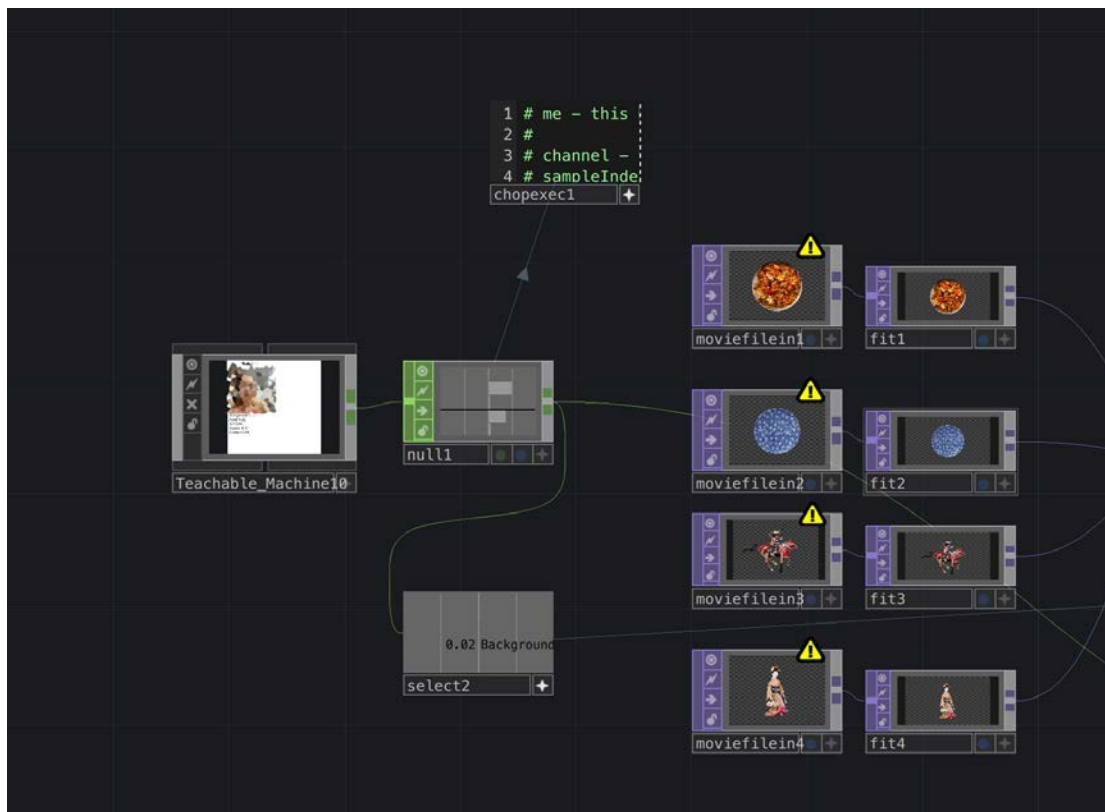


Figure A.1 Object Mirroring system configuration inside TouchDesigner, connected to Teachable machine and four mirroring images

System architecture of the Human Mirrorig inside TouchDesigner.

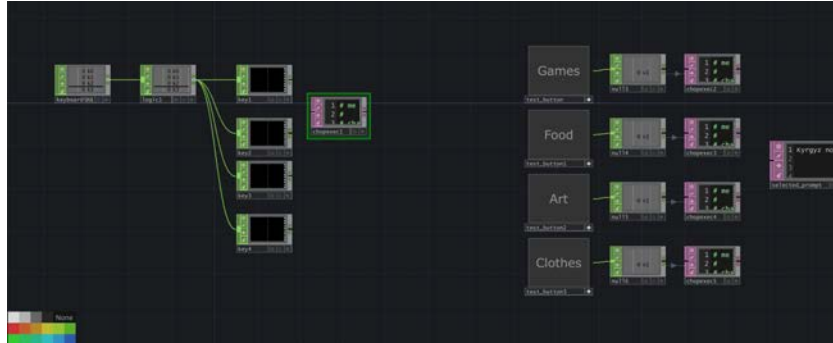


Figure A.2 Human Mirroring system configuration inside TouchDesigner;
connecting four prompts to portable keypad

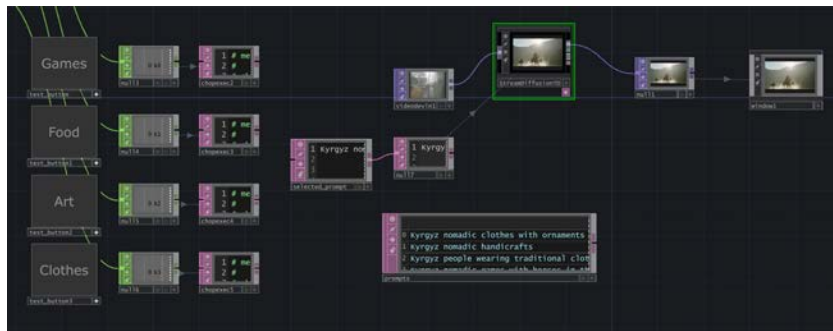


Figure A.3 Human Mirroring system configuration inside TouchDesigner, connected to Stream Diffusion and four prompts

B. Yurt Portal Showcases

This section presents images of the Yurt Portal showcased at international venues and during in-lab demonstrations.

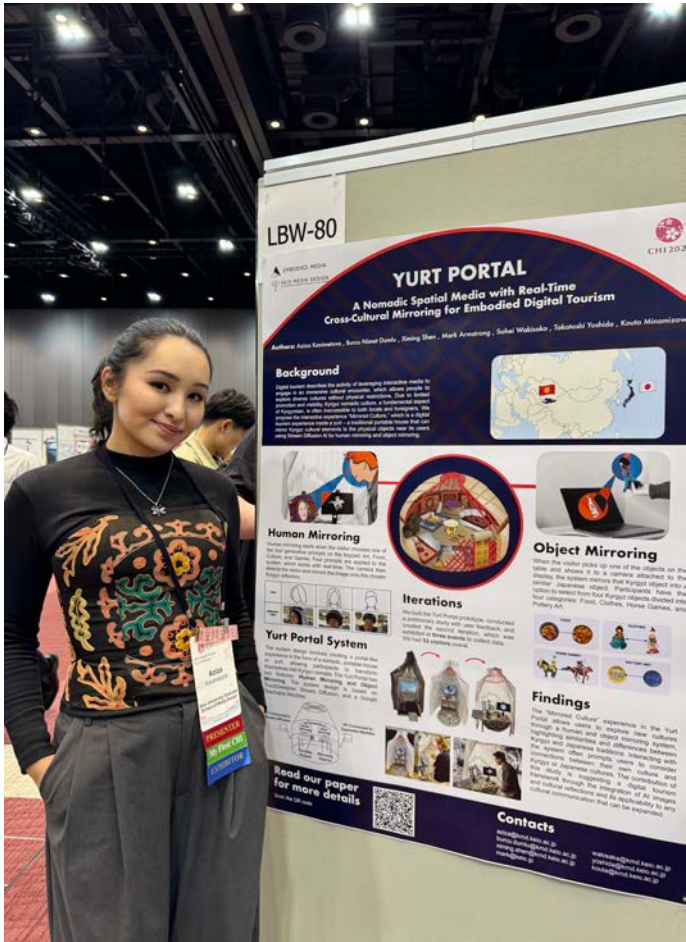


Figure B.1 Yurt Portal Late-Breaking Work poster at CHI 2025



Figure B.2 Yurt Portal interactive experience exhibited for special guest from Dubai visiting Embodied Media Lab



Figure B.3 Yurt Portal interactive experience exhibited for special guest from Canadian Embassy visiting Embodied Media Lab