



遊牧民の伝統を体験するポータルシステムの基礎検討

A Preliminary Study on Mirrored Culture: Real-Time Generative Cultural Interpretation Through Nomadic Life Experience

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概要: キルギス共和国の遊牧文化は国を代表する重要な観光資源であるが、他の国の人々が直接に遊牧文化の体験をすることは難しい。そこでデジタルツーリズムの考えに基づき、テクノロジーを用いた観光体験を創出することで、より多くの人にキルギスの遊牧文化を体験可能にし、広く周知することを目指す。本研究では画像生成 AI によってリアルタイムに体験者の映像を異なる文化スタイルへと変換する Mirrored Culture という体験を提案する。伝統的な移動式住居であるユルトの内部で、民族衣装に身を包んだ参加者自身の映像を視聴する事で、参加者をキルギスの遊牧生活に没入させることを狙う。複数の文化的側面を体験できるプロトタイプを実装し、体験者からのフィードバックを得ることで今後の開発の方向性を議論した。

キーワード: インタラクシオンデザイン, 文化交流, エンタテインメント, コミュニケーション

1. Introduction

With the progress of technology, people can visit and explore different cultures online or inside immersive spaces. However, developing countries like Kyrgyzstan do not always have an opportunity to represent a nomadic culture through advanced technological approaches. This aspect leads to the fact of limited representation of Kyrgyz culture abroad, which makes nomadic traditions disconnected from the developing modern cultural representation around the world.

This study aims to find a solution to create new interactions based on existing nomadic culture inside a Kyrgyz yurt through social connection and technology. The “connection with re-connection” and “alone together” [1] concepts as well as generative AI technology inspired the ideation process of the work-in-progress design. During the design process, the study examined the possibility of using generative AI projection with cultural aspects of Kyrgyzstan.

2. Literature Review

Spatial interactive experience [2] has been growing fast, especially after COVID-19. There are a variety of possibilities to explore different cultures or digital travel connection [3] through museums’ digitalization [4]. Such interactive [5] spaces where people can interact with objects or connect [6] with each other through digital hap-

tic devices have been providing engaging connection at a distance. Furthermore, with the current improving technologies, mirroring [7], portal [8] and digital windows [9][10] interactions established a new opportunity for immersive communication between people and communities.

Existing projects predominately focus on community or person-to-person connection through technology, but less on culture. Even though the mentioned cultural studies explore interaction with cultural heritage through digital interfaces, most of them primarily take place within museum environments. The goal of this study is to create an interactive yurt public space for people to experience Kyrgyz nomadic traditions through a mirrored digital lens.

3. Mirrored Culture Experience

3.1 Concept Design

Here we defined Mirrored Culture as an imaginary, portal-like experience that immerses users in the generative world of nomadic people in Kyrgyzstan. The Mirrored Culture experience is designed to provide a new perspective on the already existing nomadic culture through different characteristics.

The main idea aims to combine three different aspects: digital tourism, spatial interaction with body connection, and community building (Figure 1). To be specific, dig-

ital tourism represents a cultural aspect of a country, spatial interaction focuses on technical and body connection experiences, and community building represents social connection.



Figure 1: Conceptual Framework Based on 3 Connection : Technological, Social and Cultural

3.2 Yurt Portal System

The concept design is based on creating a portal-like experience in the form of a nomadic portable house - Yurt, allowing participants to transform themselves into Kyrgyz nomads (Figure 2). A first-person design experience inspires the current design. The room-scale yurt allows participants to experience a reflection of themselves as Kyrgyz nomadic people. To achieve the interaction and atmosphere, the study uses projection together with paper DIY accessories.

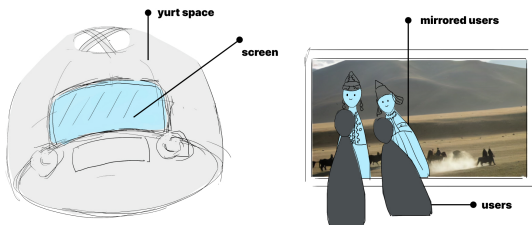


Figure 2: Yurt Portal System

4. Prototype

All interactions occur in real-time using Stream Diffusion within Touch Designer. Users can see themselves as generative Kyrgyz people wearing traditional clothes and visiting the Kyrgyz mountains. Four generative prompts help users to mirror themselves into the Kyrgyz culture.

The generative interaction is based on 4 prompts: “Art”, “Food”, “Games”, and “Clothes” (Figure 3). “Art” represents traditional handicrafts; “Food” illustrates nomadic food; “Games” show horse races in the mountains; and “Clothes” represent the possible look of nomadic traditional wearings.

The possible generative cultural representation focuses on showing traditional values and aims to present com-

CATEGORY	PROMPTS
GAMES	Kyrgyz nomadic games with horses in the mountains
ART	Kyrgyz nomadic handicrafts
FOOD	Kyrgyz people wearing traditional clothes eating food on the table in the mountains
CLOTHES	Kyrgyz nomadic clothes with ornaments

Figure 3: Prompts Used in The Yurt Prototype

munity and unity between people. In Figure 4, inputs such as “Art” and “Clothes” show only one person if only one user is using the camera. However, 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. This deliberate use of prompts is intended to demonstrate that nomadic people and the atmosphere they created provide specific cultural value and uniqueness.



Figure 4: Example Generative Cultural Representation

These 4 prompts are connected to the buttons in Touch Designer and create an option to choose between each of them (Figure 5).

The user can switch between each prompt with a portable keyboard and experience mirrored cultural representations. There is no limit to the prompts’ running time; the user can switch between generative images and interact with the experience without any time constraints.

For the prototype, a small yurt-like structure was created with a camera and a projector inside (Figure 6).

The Yurt prototype was made using fabric, four tripods, one camera, and one projector. The current space can host two people at the same time. However, for the study experiment, each user tried it not only in collaboration with others but alone.

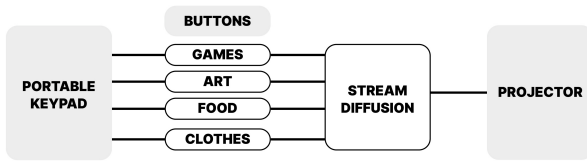


図 5: Program Structure in Touch Designer



図 6: Yurt Portal Prototype

5. Preliminary Experiment

For the examination of interactions inside the Yurt prototype, we conducted two experiments during the iterative design process through user feedback.

5.1 First Trial: Feedback for Generative Mirrored Culture with Predefined Prompt

During the first experiment, 6 participants were asked to try the prototype with only one predefined prompt, representing clothing and Kyrgyz nature in the background. After trying the interaction inside the yurt, participants were asked to answer the survey. Based on the results of the first trial experiment, participants found it interactive to see themselves mirrored as a different culture. However, most users expressed a desire to experience inputs related to food and art, believing these aspects would help them better understand new cultures.

5.2 Second Trial: Switching Prompts for Understanding New Culture

Therefore, the study added four prompts that users can choose from during the experience: “Food”, “Games”, “Art”, and “Clothes”. The study conducted a second experiment in which three participants could use a keypad to select prompts and see the corresponding visuals on the screen. According to the findings, different prompts made the experience more interactive and allowed users to compare their visuals using each input. Most participants spent more time exploring themselves using the “Clothes” prompt. This prompt mirrors the user in a stable position with a focus on the face, encouraging people

to spend time analyzing their mirrored facial features. In addition, users want to experience sound design along with changing visuals on the screen. For example, one user mentioned that sound would make it easier to understand the image. Another user commented that the projection makes them want to touch the handicrafts from the “Art” prompt.

6. Discussion

According to the current findings, people find yurt, mixed with generative images, interactive, but would love to have more prompts variations. For example, some users would be interested in experiencing traditional music. However, the four existing prompts and the possibility of switching between them help users get an idea of Kyrgyz culture through its mirroring. Furthermore, participants believe they could receive a better understanding of the prototype if the yurt looked more like an original yurt, as the current prototype does not represent a classic circular yurt design. Moreover, some users suggested having this experience inside airports to create an entertaining interaction with the culture before the flight.

There are some limitations in the generative images. Technical limitations in the system might occur social understanding problems. For example, sometimes it shows the opposite gender of the user or blends the background with the main visual, which creates a layering effect. Moreover, the Stream Diffusion does not always recreate Kyrgyz cultural representations accurately. For instance, some clothing variations or facial representations are not always accurate. It is also challenging to have more than two people at the same time inside the yurt because there is only one switching keypad.

For the future direction, we had unofficial communication with the Embassy of Kyrgyz Republic in Japan. According to the embassy, the cultural interpretation of Kyrgyz values is important in promoting traditions, as the Kyrgyz cultural presence appears rarely, especially within modern technologies. In addition, it might be a good social help once the study completes interactions and the Yurt prototype.

The current study might inspire other cultures to use a similar approach in promoting cultural heritage and values through modern interactive technologies.

7. Conclusion

In this paper, we mirrored nomadic Kyrgyz culture inside a Yurt Portal prototype to promote Kyrgyz cultural heritage through interactive reflection. To do so, the study used Stream Diffusion to generate cultural im-

ages based on 4 prompts and asked participants to interact with them. According to users' responses, the study found that the Mirrored Culture experience allows participants to playfully learn about Kyrgyz nomadic culture by analyzing their reflections on the screen and switching between the images they want to experience. Mirrored Culture interaction encourages users to spend time looking into the details of each image and ask questions about generative objects, leading them to wonder about cultural values. However, there are still some technical limitations as well as interaction improvements that the study expects to enhance in future research development.

The next step will focus on improving the prototype structure by recreating an actual circular form of the yurt. The study will improve and implement new interactions with more cameras attached to capture the surroundings of the participants from different angles. Furthermore, the study plans to collaborate with the Embassy of the Kyrgyz Republic in Japan to receive more support in cultural representation and interactive experience promotion.

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