

New Experiment in Preparing a Goodbye Gift



Jun Inoue
Chief Producer

Production 2, Tohokushinsha Film Corporation

1. Introduction

Tohokushinsha Film Corporation exhibited a prototype of TRUE MEMORY, a space-recording service using an interactive 360° movie format at South by Southwest (SXSW) in Texas, U.S.A in March 2019 and at CONTENT TOKYO, Japan in May 2019. This service records cherished memories associated with the rooms of a house in the form of video, audio, and images and stores those memories in Virtual Reality (VR) space. More than just watching 360° video, you can click on objects in the room to view, for example, your mother's recipes on a kitchen shelf or your father's book collection, or listen to the music that you enjoyed listening to. In this way, you can experience an entire house and its memories at your fingertips.

This is an experiment in using today's digital technology to meet the demand for new forms of end-of-life planning in an aging society as more people come to concentrate in urban areas away from their parents' homes.

2. Overview

This space-recording service begins by capturing an overall view of home interiors such as the living room using omnidirectional cameras. Much like the movies of Yasujiro Ozu

(a renowned Japanese director known for his natural yet beautiful depiction of family scenes), everyday scenes unfold such as a mother preparing meals and a father enjoying those meals while engaging in casual conversation. These scenes are captured in 360° video, so the user can orient the view in the direction desired. In addition, the spaces shown include markers that can be clicked to view additional information. For example, clicking on a marker hovering above a kitchen shelf brings a New Year's recipe into view. Such markers can be seen at various locations within a room, coinciding, for example, with a shelf holding a DVD player or a framed picture or photo on a desk or wall.

The user can also move freely from one room to another. When moving, a point-of-view shot is inserted using normal video instead of a 360° view enabling the user to have a simulated experience of walking freely throughout the home.

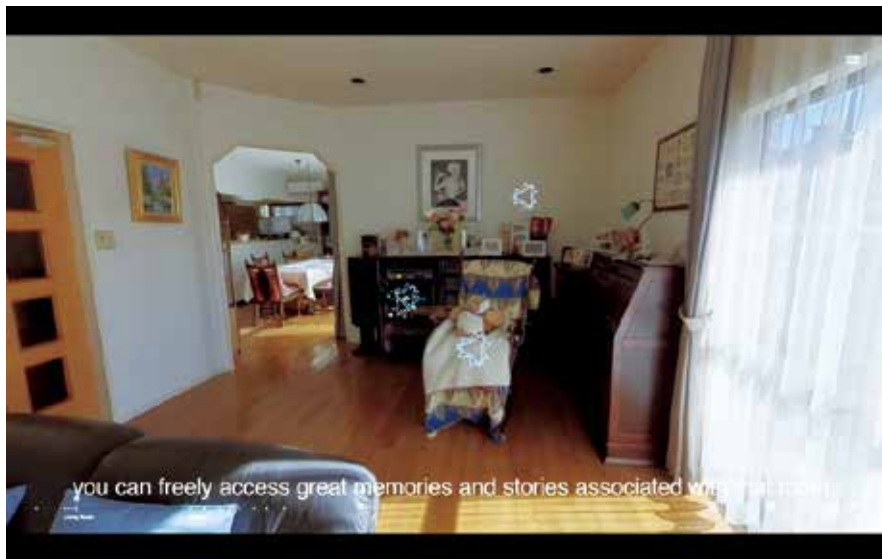
The end result is a picture book of memories in which all sorts of things become photos, audio, and video that can be selected at any time using the VR portion of a 360° view similar to a table of contents.

As for output, the VR video can be operated interactively. Moreover, to enable the entire family to experience these memories in the comfort of their living room, attention was given

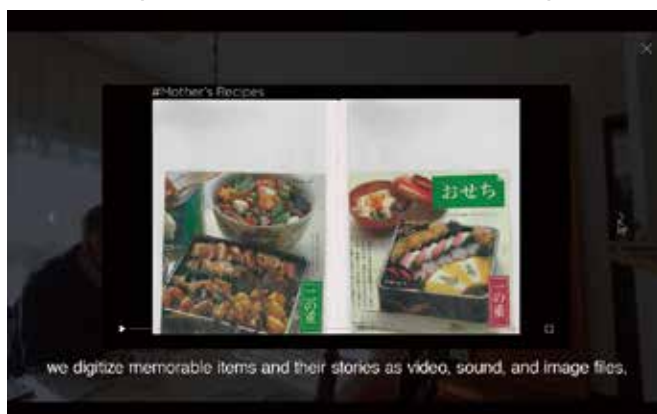
■ Figure 1: Expanded view of 360° video of living room



■ Figure 2: 360° video of living room (showing clickable blue markers)



■ Figure 3: Mother's recipes
(click on a shelf in the kitchen to view)



■ Figure 4: Usable devices



to enable viewing on a personal computer, television, smartphone, or tablet. In other words, the design of this service did not assume the use of head-mounted displays (although viewing by VR goggles is possible).

3. Shoot, Process, Implement

For this project, a 360° view of each room was captured by an Insta360 Pro 2 VR camera as 8K VR (7680 × 3840) video. In addition, a FUJIFILM X-T3 camera was used to capture all inserted video depicting movement between rooms and a Steadicam system was used to achieve smooth indoor movement.

Captured material consisted of video footage captured with six cameras that requires a stitching operation to achieve a 360° view.

However, if a smooth seam cannot be achieved despite this operation, the result is messy overlapping of individual camera footage making it difficult to achieve a sense of immersion when entering VR space. For this reason, we used Insta360 Pro Stitcher to perform base stitching in post-production and used software such as Cara VR plug-in for Nuke, Fusion from Blackmagic

Design, and Photoshop to make final stitch adjustments.

In addition to editing, post-shooting work included color correction and sound finishing by Ambisonics of 360° spatial audio. Ambisonics refers to 360° spatial acoustics in which a sound that can be heard from behind the listener is heard softly, but on facing forward, is heard as if it were localized in front of the listener.

Since the plan is to eventually implement this service on the web using a totally new system, the question arose as to what video and audio formats would be most appropriate. Finding the right ones required a trial-and-error process in collaboration with the web team.

Additionally, once all of the material was collected, the next step was to arrange it appropriately in the target home. At the stage three months prior to implementation work, Mr. Hiroshi Koike of IMG SRC Inc., a company excelling in interactive design, and Mr. Kazuma Harada of Huuman Inc., a company strong in creative production, joined our team. Mr. Koike of IMG SRC performed planning, management, and execution

in upstream processes and Mr. Harada of Huuman performed artwork, design, and production in on-site processes.

The technique used for implementation was to take 360° video broken down onto a surface and paste it onto a sphere prepared using Three.js software.

In the design scheme, Jun Inoue, Hiroki Mitsuyasu, Natsuki Takashima, and Yusuke Natsuka of Tohokushinsha Film Corporation reproduced the sensory values of the visual portion and interactive portion. Adjustments were made to reproduce high-resolution 360° video not envisioned by Three.js and data thinning was performed to facilitate handling of large-capacity video. To achieve smooth video connections, audio and video were read in separately so as not to apply an excessive load on memory, and time lag in reading video in excess of 100 GB was kept to 0.2 s or less. Takehiro Tokushige of OMNIBUS JAPAN INC., a Tohokushinsha company, together with Hiroaki Masuko, Yuuki Nagao, and Keisuke Tsukamoto of the same made it possible to adjust the sound and video environments in units of resolution and bit rate so as to concentrate more on video and keep interaction to a minimum.

Project Flow

(1) Design → (2) Build → (3) Implement → (4) Testing

(1) Design

Development design

Basic implementation design

Decided on a web-based development scheme that could reflect improvements in a relatively short time taking project progress and on-site debugging into account.

Various design work

Basic environment design

Performed environment design based on what kinds of users will be using the service in what kinds of environments. Made adjustments by holding discussions with the project group.

UX design

Performed environment and art design and selected/ devised the user experience (UX) starting with a basic configuration and user scenarios (US).

Unfortunately, there has been little progress in implementing 360° sound in web browsers, so this was exempted from the environment implementation requirements.

UI design

Studied and tested user interfaces in conjunction with UX. Made adjustments after deciding on a UI after finding in the test environment that goggles were not needed.

Development design

Designed rules governing key languages, framework, etc.

(2) Build

Design-scheme build

Decided on design direction based on Jun Inoue's production supervision.

Development build

Design direction was also based on language compliance and the future outlook for development

(3) Implementation

HTML implementation → material implementation → CSS implementation → JSON implementation → JS implementation

(4) Testing

Operation testing → language testing → art testing

Development support

Language versions

HTML: 5.1

CSS: 3.0

JS: Three.js R102

JSON: RFC 8259

SVG: 1.1

4. Usage Scenarios and Target Users

(1) The client is the family of the deceased that wishes to leave a record in addition to organizing articles of the deceased. This record can act as a family legacy and be made, for example, before a house that has been lived in for many years is torn down.

(2) The client is a person who is still alive and who wishes to leave a record that includes messages to one's children and grandchildren and other descendants as an ending note. Additionally, if the person is residing, for example, in a senior residence away from home, such a record could be used to awaken memories.

(3) The client is the group of children who will be left behind and who wish to provide such a record as a gift to their parents or grandparents.

Additionally, since the service consists of 360° video as opposed to 360° still images, it can be used to record a variety of events, such as a ceremony marking end-of-life planning, your grandchildren's participation in Japan's Seven-Five-Three Festival, visiting a shrine dressed in a traditional kimono, the celebration of your seventieth or eighty-eighth birthday (as is customary in Japan), or New Year's Day when the whole family gathers together.

As for 360° video, while people have been aware of the

technology (taken for granted in gaming, but here referring to live action that can be captured), they have not been aware of any opportunities to make actual use of it. However, as private recordings like the one's described above, 360° video can demonstrate this characteristic to the fullest.

5. Future Outlook: Memory Picture Book

We envision a function enabling the user to enter memories that come to mind for each of the diverse objects observed by TRUE MEMORY. This “memory recollection work” in which a user steadily enters memories for different objects helps to give importance and permanence to those memories. A TRUE MEMORY project completes when memories come to be entered for all sorts of objects. (However, TRUE MEMORY even on completion allows for updates to be made, since there are really no limits to the depth of one's memories. As long as the user has a desire to keep remembering, TRUE MEMORY can continue forever with even deeper memories). This function enables users for the first time to become proactively involved in creating a record, and in this sense, it can be seen as the core function of TRUE MEMORY. It is close to the idea of turning a certain time and space into a complete album.

Additionally, assuming multiple observations of a certain space over time, enabling video of those periods to be overlapped and viewed can highlight what has changed in that space from one generation to the next. If cleverly done, this can create a simulated experience of a spatial time leap. Assuming that this space-recording service can continue to progress and survive, we can envision people 1000 years from now watching these records to learn how people today (2020) worked, what they loved and how they lived, what they ate, and what they talked about. In short, the records produced by this service could be used as part of an anthropological archive.

Furthermore, on thinking about the business possibilities of this space-recording service, we of course envision its use by individuals, but we also consider that it could be an excellent technique for obtaining all kinds of primary information. For example, news stories or articles conveyed by newspapers, television, etc. attempt to provide a third-party objective view as much as possible, but when talked about by someone, they cannot help but be expressed in a subjective manner by that speaker. This space-recording service, in contrast, enables a person to examine a certain environment as if one was actually there as primary information while enabling additional information to be accessed via markers. These features have a high affinity with true journalism. In fact, applications in a wide range of fields can be considered, such as training videos for a restaurant chain that employs people speaking various languages such as in the United States, descriptions of complicated medical instruments in a hospital, preservation of an aging building as video content, introduction to a leisure resort, and portrayals of art museums,

and for that matter, an artist's atelier or a novelist's study. In other words, this service could be applied to anything that could be left as a legacy of the human race.

6. Conclusion

In the event that the head of a family suddenly passes away, sorting out the articles of the deceased can be a great hardship for the family left behind. For example, if the deceased had been a person with many hobbies and interests, the family can be overwhelmed with things that should be thrown out and those that should be kept such as records, books, cameras, and watches. Additionally, as children migrate to urban areas as the depopulation of regional areas progresses, there is also the question of whether to tear down the family house, a place that is full of family memories that no one wants to lose. Today, this is a common occurrence in Japan, a country with a declining population. As one gets older, one comes to notice the importance of childhood memories. Indeed, memories of a home where one passed one's childhood are likely to be warm and full of love. For children who have left the family home, that home is surely a place that they would like to return to at any time to awaken memories. What if a home full of memories could be left behind in its entirety? With this in mind, we created TRUE MEMORY.

Please use the URL below to watch a more detailed movie about TRUE MEMORY and other material.

■ Figure 5: Conceptual illustration of TRUE MEMORY

