



FUROSHIKI: Augmented Reality Media That Conveys Japanese Traditional Culture

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ABSTRACT

Furoshiki is a traditional culture of Japan which has prevailed in its everyday life and is widely used even today. In this paper, we propose a system through which users can be, while getting interested, exposed including to Japanese wrapping culture and attitude of dealing with things with care by augmenting an act to “wrap” with a piece of Japanese traditional furoshiki using the image-recognition technique and the motion-image projection technique.

CCS CONCEPTS

• Human-centered computing • Human computer interaction (HCI) • Interaction paradigms • Mixed / augmented reality

KEYWORDS

Culture, Interaction, Media art, Augmented reality

ACM Reference format:

Kei Kobayashi, Kazuma Nagata, Soh Masuko and Junichi Hoshino. 2019. FUROSHIKI: Augmented Reality Media That Conveys Japanese Traditional Culture. In *Proceedings of VRCAI '19: The 17th International Conference on Virtual-Reality Continuum and its Applications in Industry (VRCAI '19), November 14-16, 2019, Brisbane, QLD, Australia*. ACM, New York, NY, USA, 5 pages. <https://doi.org/10.1145/3359997.3365716>

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VRCAI '19, November 14-16, 2019, Brisbane, QLD, Australia

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ACM ISBN 978-1-4503-7002-8/19/11...\$15.00

<https://doi.org/10.1145/3359997.3365716>

1 Introduction

With the globalization in recent years, multicultural coexistence has been increasing its presence. This concept aims to create new relationships among people with different cultures through the acceptance of each other's cultural differences and values. However, people are not conscious of their own culture that much in their everyday life. Furoshiki is a traditional culture of Japan which has prevailed in its everyday life and is widely used even today. Furoshiki refers to a piece of Japanese traditional square cloth used for wrapping things to carry them around or store them. In recent years, furoshiki has been attracting people's attention in the context of environment issues as well because it has a wide range of applications such as being used as an eco-bag. In addition, furoshiki is capable of expressing the various combinations of colors, textures, patterns, etc., embodying Japanese “wrapping” culture, attitude of dealing with goods with care, seasonal aesthetic consciousness, and others.

In this paper, we propose augmented-reality (AR) media on which an act to “wrap” a thing with a piece of furoshiki is augmented through the image-recognition technique and the motion-image projection technique. Moving designs are realized in accordance with an act to wrap a thing using the projection on a piece of furoshiki. As a user wraps a thing with a piece of furoshiki following pictograms instructing him/her how to wrap it, goldfishes start reacting to such act, which then arouses his/her interests while causing his/her experimental behaviors. Through this process, we would like users to become aware that things can be protected by wrapping them and that a variety of things can be wrapped by varying how to tie and fold a piece of furoshiki.

2 Past Researches

2.1 Supplementation of Cultural Experience

Past efforts to preserve and hand down cultures include the computer graphics (CG) reproduction of art works and sculptures through the scanning of their 3D figures, textures, optical properties, etc. [TOPPAN PRINTING Co., Ltd, 2015] as well as the reproduction of the recorded human motions like dancing and those in festivals.

Not only the body movements of specialists and the events in particular regions but also tangible and intangible cultures penetrating into people's daily life have substantial impacts on their ideas and human relations in a community. Reacknowledging and reviewing the significance of such cultures and others is not thought to be easy since they blend in people's everyday life like clothing, foods and housing. Kobayashi has previously produced the works in which the motion-image projection via the recognition of body motions and objects is used together with scroll painting (emaki) for the purpose of transferring the worship culture in shrines [Kobayashi Hoshino, 2019]. In introducing an information technology to a traditional culture, he employed a design suitable for his work theme with paying attention to the compatibility with the space for its installation in order to make sure that his work would be accepted and experienced with interest by a wide range of generations.

2.2 Simulation Experience of Culture

Regarding the methods through which people can experience a culture, researches have been conducted where people virtually experience it using a head mount display and a tablet. Kakuta and other researches worked on the reproduction of the entire village area of ancient Asuka-kyo [Kakuta et al. 2008]. Using MR technology, they reproduced cultural assets on the display.

The virtual experience makes it easier to reproduce the buildings difficult to be reproduced in the real world and also enables people to see things from impossible viewpoints and the places that they are not usually allowed to see, making itself a method suitable for reproducing cultural assets occupying an extensive area. In this research, the actual - not virtual - experience of wrapping a thing with a piece of furoshiki functions as the input for changing the image.

3 System Configuration

In this work, we dealt with furoshiki as a thing with cultural histories which is still used in people's everyday life as a communication tool and others. Furoshiki can be fashionable with their seasonal colors, patterns, etc. and enjoys the features of a craft as well such as dyed products unique to the region. In addition, how to use furoshiki can be flexibly changed according to the circumstances represented by the fact that it is used as a regular bag or the like and folded in a sophisticated manner when being used for presenting a gift. Further, unlike paper bags and wrapping paper to be thrown away after being used just one time, furoshiki can be used again and again.

During such process of "wrapping" a thing with a piece of furoshiki, a new style of visual expression where the material of cloth and motion images are blended is realized by making use of the image recognition technique and the motion-image projection technique. Unlike learning how to fold a piece of furoshiki passively through motion images or at a workshop, the purpose of this work is to enable its users to have a proactive experience while getting interested because the act to touch a material and wrap a thing is associated with the images projected on a piece of furoshiki. Crape (chirimen) material was chosen as the fabric of a piece of furoshiki to be used and Hirazutsumi, a simple, widely-used way of wrapping, was adopted. With regard to the motion image, we selected goldfishes based on the thoughts that such kind of object was preferred as making people feeling coolness and the season of summer during which our work was to be exhibited and that a living object would be appropriate because the image is expected to react according to the motions of a user. Goldfishes are scooped at a festival and also a season word in Japan, associated with Japanese cultures. The motion image with the size of about 780×1,400 (mm) is projected on the desk (Figure 1). Three types of goldfishes, 9 to 11 of them respectively, are swimming on the desk. A type of goldfishes gathers at a piece of furoshiki in accordance with the respective steps for wrapping a thing with it and then stays within such piece of furoshiki once getting into it, forming a moving pattern coloring the piece of furoshiki (Figure 2). When completing all the steps for wrapping a thing, those goldfishes leave the piece of furoshiki and all types of them swim in a circle at the other side of it (Figure 3).



Figure 1: Goldfish image projected on the table

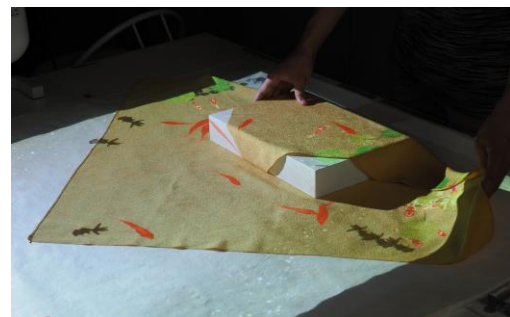


Figure 2: Goldfish gathering in a furoshiki



Figure 3: Goldfish swimming in a circle

Regarding the sounds, the sound of flowing water is always being reproduced to create a sense of the season and, in addition, the bussing of cicadas or the sound of a wind chime are reproduced interchangeably according to the status of a piece of furoshiki.

As for the projection plane, chalk and isinglass are kneaded with cement, mixed with water, and then painted on a sheet of Japanese paper with a unique texture, producing an original projection plane different from the screens for motion-image projection. Large particles of isinglass were used so that light can be easily reflected.

In regard to how to wrap a thing with a piece of furoshiki, its shape is gradually changing in accordance with the motions of a user. Pictograms were arranged step by step to make the wrapping process clearer (Figure 4).

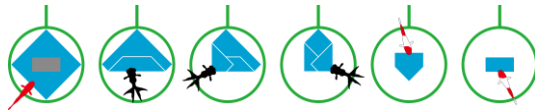


Figure 4: How to use a furoshiki

4 Implementation Method

The work is composed of a short focus projector, a camera and a PC. The projector was fixed with a clasp for desktop projection and the camera was installed to the light stand so that it can shoot from straight above (Figure 5). The contents part was produced with the use of Unity. The goldfishes in the work are controlled based on Boid algorithm [Reynolds, 1987] and change their movements according to a piece of furoshiki detected through the color images shot by the camera. Whether or not furoshiki was correctly folded to wrap a thing as suggested by the pictograms was judged from its shape and area.

5 Evaluation

The work was exhibited at the event space in a commercial facility during the period from August 8 to August 10, 2019. 23 people visited the space and we observed the behaviors of 14 of them under the age of 10 through to in their 70's and also requested them to answer a questionnaire. Moreover, we took notes of the feedbacks of those users who did not answer it.

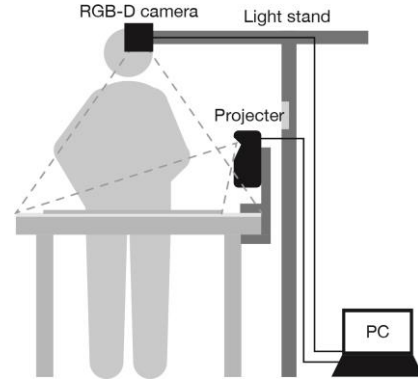


Figure 5: Equipment used

1) Motion Delivery Effect of Pictogram

We checked if the visitors could wrap a thing with a piece of furoshiki following pictograms. Two users did not notice the pictograms and two of them wrapped it in an unexpected manner. Both of the users who had not noticed the pictograms could wrap it in the right manner after being informed of their existence. Other ten users were able to wrap the thing correctly from the beginning.

Also, we requested them to make an evaluation on a scale of 1 to 5 with “hard to understand” as 1 and “easy to understand” as 5 and to describe its reasons regarding the question of “Were you able to understand the correct steps to wrap a thing with a piece of furoshiki as suggested by the pictograms?” Consequently, the half of them gave the score of 5 (Figure 6). Their reasons include “Because there are the pictograms at the edge (a male in his teen giving the score of 5)” and “The correspondence relation with how to deal with the edge of cloth and the pictograms (a female in her 60's giving the score of 4)”, indicating the high efficiency of the pictograms.

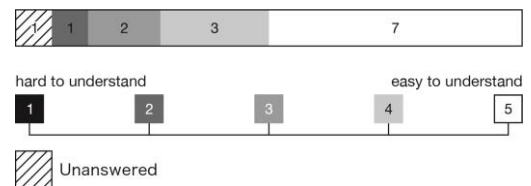


Figure 6: Questionnaire result 1

We also asked them a question of “Have you ever used furoshiki before?” in order to see if even those people who had not ever used furoshiki were able to understand how to use it clearly. Ten users answered “Yes”; three users did “No”; and one did not give any answer. Those who had not ever used furoshiki consisted of two users under the age of 10, one user in his/her teens and one user who did not give any answer, suggesting an assumption that the young adult segment tends not to use furoshiki. These four users did not have a problem in wrapping a thing with a piece of furoshiki with referring to the pictograms; Three of them gave the score of 5 while one of them did the score of 4 in evaluating how easy for them to understand the

wrapping steps, proving that such pictograms helped even those users who had not ever used furoshiki clearly understand how to use furoshiki.

2) Design Effect of Work

We requested the users to make an evaluation on a scale of 1 to 5 and to describe its reasons regarding the question of “Were you interested in the expression of the work?” in order to confirm if its visual expressions had caused appropriate effects on them and drawn expected reactions from them. As the result, the half or more of them gave the score of 5 (Figure 7). Their reasons included “Looking cool and cute (a boy under the age of 10)”; “I have thought this is new because there has not been anything like this before (a male in his teens)”; “Beautiful scene of Japanese pond (a female in her 30’s)”; and “Because those goldfishes were moving”, indicating that the visual expressions of the work were appropriate.

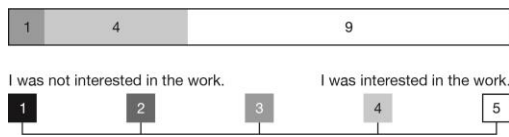


Figure 7: Questionnaire result 2

3) Transfer Effect of Culture

We calculated a net promoter score (NPS) for the purpose of knowing how people’s understanding of furoshiki had been deepened and of confirming if their understanding on Japanese “wrapping” culture as well as the diversity, convenience, etc. of furoshiki had been enhanced. We considered that employing the said method, although being the one originally used for commercial products and services, was significant in terms of the transfer of a culture because it enabled us to see if the users were ready to take their time to hand down the advantages of furoshiki. The result showed a positive number - 7.2. The users were also requested to specify the reasons for their evaluation.

They stated their reasons such as “I would like to respect Japanese cultures (a male in his teens)” and “I think this is a Japanese culture unique to it (a female above the age of 70)”. Meanwhile, a user categorized as a critic explained her reason for the evaluation by stating, “A friend of mine, appropriately for her age, go shopping always bringing a piece of furoshiki with her (a female in her 60’s)”, meaning that she was not making any critical comment but just saying that she did not need to recommend furoshiki to her friends or acquaintances.

Further, we requested the users to make an evaluation on a scale of 1 to 5 and to describe its reasons as to the question of “Did you think that you wanted to use furoshiki?” (Figure 8). One evaluator did not give any answer because, like the question for evaluating the clarity of the work, she had already used furoshiki on a daily basis. As the result, the half or more of them answered that they wanted to use furoshiki from then on. Their reasons included “Convenient (a male in his 40’s)”; “Because I think it would be useful (a male in his teens)”; and “I would like to use it on a various of occasions (a female in her 60’s)”. We also asked them a question regarding an act to wrap a thing: “How did you

feel about an act to wrap a thing?” Some of their answers were: “I feel an elegant taste (the guardian of a boy in his teens)”; “This is so Japanese (a male in his 40’s)”; “I felt something close to origami which I like (a male in his teens)”; “I got conscious about how to wrap a thing (a female in her 60’s)”; “You have to pay attention not to drop things (a boy under the age of 10)”; “Very lovely! (a female user above the age of 70)”; and “If we can use this cloth instead of paper to wrap things or present, it will help to decrease garbage and save the world (a female in her 30’s)”.

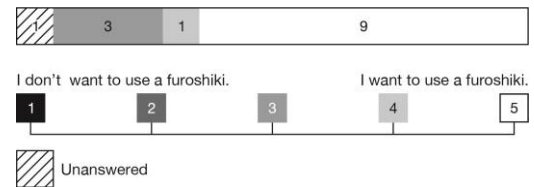


Figure 8: Questionnaire result 3

Lastly, we requested them to provide general feedbacks. Their feedbacks include the statements such as “I want this one to attract the attention of others and those from other countries because I think it is a good culture, enabling us to elegantly use 2D things more like as 3D ones (a female in her 60’s)”; “It made me feel cool and happy (a female in her 30’s)” and “I thought my getting able to learn other ways to fold it would give me more fun (a male in his teens)” as well as those feedbacks relating to the appreciation and encouragement toward the work. Regarding the reasons for their getting interested, there was a statement like “Looking cool and cute”, while those visitors not making any statement to the questionnaire left comments including “This one is good as it looks cool (a male user)” and “This is a timely, nice work (a female user)”, suggesting that they favorably accepted our approach to, under the concept of summer, incorporate such factors as water and a wind chime which brought coolness to people.

4) Effect of Work Assumed through Observation

Even after completing all the steps for wrapping a thing with a piece of furoshiki, almost all of the users engaged in an act to unfold the piece of furoshiki and then wrap it again while checking the reaction of goldfishes, indicating that this system has the effect of causing an act to wrap things with a piece of furoshiki.

6 Conclusion

While we intend to entertain with our work those who have already known about furoshiki too as a new experience, our work was found to be more effective for those who had not ever used furoshiki or those who had had an experience to use it on a non-daily basis.

As a future initiative, we are going to introduce into our work more than one way to wrap things since people can improve their understanding on the characteristics of furoshiki further by experiencing a variety of ways to wrap things with a piece of furoshiki. We need to advance such initiative while

checking whether or not we are able to provide clear instructions with the current method because the new ways to wrap things are expected to be more difficult than the one used this time and because the number of their respective steps are supposed to be increased.

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