

Godzilla Meets ‘F’ Museum: Case Study of Hand-On Museum Event with Augmented Reality Technology

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Abstract. We planned and organized a museum exhibition and an experiential event with a related story, as a concrete example of an AR technology event. Specifically, an AR backyard tour “Godzilla meets ‘F’ museum” was conducted on August 2–6, 2016, as an event related to “Godzilla at the Museum: Creative Tracks of Daikaiju” exhibition in Fukuoka City Museum of Art, held from July 15 to August 31, 2016 [8]. In this paper, we describe the characteristics and implementation state of this event, using a questionnaire-based survey obtained from the event participants. From the results, we discuss the significance of holding AR technology-based art museum exhibitions and the novelty of related events.

Keywords: AR based museum backyard tour · AR contents · Actor act

1 Introduction

Museums do not only display various exhibits, they also have various undisclosed facilities in their backyard, such as building structures to keep, restore and preserve valuable artworks. Through backyard tours that introduce the facilities behind museum buildings, visitors can visit the normally inaccessible area and obtain understanding on the roles that art museums play, in addition to the individual artworks being displayed. In this paper, we describe the characteristics and implementation state of “Godzilla meets ‘F’ museum,” an event that expanded the conventional backyard tour by utilizing the highly entertaining AR technology, held by Fukuoka City Art Museum. This event was a part of an exhibition that summarizes the trajectory of the Godzilla series, which can be said to be the masterpieces of Japanese special effects, held from July 15 to August 31, 2016, using a questionnaire-based survey obtained from the event participants. From the results, we discuss the possibility of application of AR technology in events that link museum exhibitions to museum backyard tours.

2 Related Work

As a related work, we introduce several spatial mobile events and applications that utilize AR technology similar to this content, analyze common terms with examples, and propose the production of novel events that use AR technologies.

AR HOPE TOUR [2] will organize a demonstration experiment for disaster prevention, in which participants wearing smart glass (glasses-type wearable device) can experience AR images of areas affected by the Tohoku earthquake before and after the disaster, by actually moving round on their feet. Participants can view the state of the affected area at the time of the disaster, the height of the tsunami, and the surrounding changes from the time of the disaster to the present, superimposed on the actual place through the smart glass. The purpose of this tour is to show how the recovery and reconstruction of the disaster area proceeded, to show the reconstruction process that immersed the past and the present time of the disaster area by simulating the surroundings in AR images. This event will allow the participants to experience the damage caused by the earthquake in real space by experiencing the content where participants can feel walking around the actual disaster area on their own feet.

Next, as an example of existing popular contents such as animation and events that use AR technology, there is an AR digital stamp rally organized using the contents of Evangelion animation series [3]. As participants move through multiple check points, information on their positions are obtained from the GPS system in their smartphones and digital stamps are collected in the installed application. Unlike the traditional stamp rally, there is a function to receive a digital image of a specific character as a stamp-paid reward, giving the user a motivation to go around each stamp point. In addition, there are other AR-infused stamp rally events that are tied up with TV programs and movies, such as “Ultraman AR Stamp Rally” [6] and “Godzilla AR Stamp Rally” [7]. Furthermore, there is the Tomioka Silk Mill CG Video Guide Tour, which is a tour around the Tomioka Silkscreen, a historic tourist facility. Participants can experience CG images reproducing the conditions of silk screening in the Meiji era, displayed in smart glass [4].

In addition, there was the “AR Hyakki Yako,” an AR technology-infused event, funded by a cloud funding system in June 2016 [5]. Centered on the “Hyakki Yako” legend, in which demons gather and march in Kyoto, the event used AR technology to fill a town with Hyakki Yako motifs and transformed a shopping street into a demon street. The content was a tour-type event in which participants superimpose the demons shown by 3DCG through a simple head-mounted display using smartphones while watching the real landscape of the shopping street.

In the AR application created for educational purpose, Itamiya et al. described a disaster-assumption immersion experience application using smartphone and simple paper-based goggles [1]. This is an application that superimposes a flood environment in 3DCG onto actual landscapes by using simple VR google-mounted smartphones. The flood CG is set based on a hazard map, and

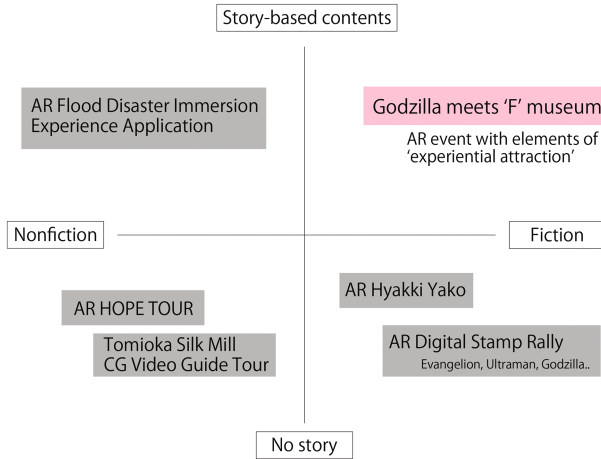


Fig. 1. Existing AR applications classification

it simulates how far water reaches the actual environment, which is aimed to emphasize the importance of evacuation at the time of a disaster.

Based on the above mobile collaborative AR applications, in this research, in order to examine what kind of new event production can be performed in the collaboration with the exhibition of fictional works on Godzilla movie series that was carried out in the museum, we classified the existing AR applications based on the viewpoint of whether there is a context in the content experience and whether the content subject is fiction or nonfiction as shown in Fig. 1.

The existing AR related events and research are arranged based on the following: in the lower right of the figure, there is no context in the order of experiencing the content and the content subject is fictional; in the upper left, there is a context in the order of experiencing the content and the content subject is non-fictional; and in the lower left there is no context in the order of experiencing the content and the content subject is non-fictional.

In the upper right corner of the figure was arranged for those with contexts in the order of experiencing the content and the content subject is fictional. However, there were no relevant events/projects in the existing examples that were examined. The event that the authors carried out involved having a group of people traveling through the museum with an order of places to visit, centered on a fictional subject of Godzilla. This event may be applied into the aforementioned upper left corner of the Fig. 1, suggesting that this is a novel AR content from the view point of context and the nature of subject. In planning this content, we thought of this as an AR event with elements of ‘experiential attraction’ that can be found in large theme park facilities.

Experience-type attractions found in large theme park facilities usually involve a group of participants that move as one of the characters or move on a mobile vehicle to simulate the world of the event. Participants can be

immersed into the attraction's surroundings by being guided by real-life or animated guides.

Therefore, in this research, authors propose an AR-infused event in a context with an order of contents that incorporates elements of the above experience-type attraction and contains a nonfiction subject.

Through a concrete realization of a fantasy world theme via AR contents superimposed with real-world space rendering using a tablet terminal, and by actually moving through the art museum space, we created an event tailored to bridge a bridge between the story and participant by adding an actor to act as a guide for the participants to gradually be immersed into the fantasy world perspective. In the case of a system in which participants move around the art museum and watch AR contents at each point, or if the guide is not a real person but is shown in a video or other means, we thought that experiencing with many people was difficult due to a positional shift or time lag in receiving the content as each participant has his/her own individual terminal. Furthermore, in an AR experiential event, since a story moves along a certain space, an accompanying story facilitator that act as a guide is necessary. For that reason, we decided to appoint a real actor as a guide for the whole event and to move with the event onward. This enabled us to give a lot of information to the participants, such as real voice, facial expression, and gesture, rather than presenting a guide assistant in the form of a video, and improve the concentration and immersion level of the participants naturally into the world of the story.

3 Godzilla Meets 'F' Museum

3.1 Contents

We produced an AR content set at a museum backyard tour using motif from a Godzilla movie. The story outline is as follows.

Participants of the museum backyard tour carrying an under-developed backyard tour support system (M-AR) encounter various events during the tour that caused a sign of Godzilla appearance, and head to the roof. After the backyard tour participants find Godzilla footprints on the roof, the tour is stopped and they and escape outside the museum. When they try to escape towards a park adjacent to the museum, from the reaction of the M-AR with a special Geiger counter that the developer brought, as they look to the direction of a pond, they saw a blue light that the blue Godzilla fires from behind, destroying a city at the end of the park. Looking back to the museum, they realize that the museum has been destroyed by Godzilla.

Based on this story, two actors play a role as a scientist and an assistant who develop the M-AR system Fig. 2, and the acting screenplay and backyard tour contents were created. In the backyard tour, we selected 8 places where it was easy to deploy the content related to Godzilla at the event part, in places that



Fig. 2. Two actors: scientist (left) and assistant (right)

cannot be seen through the back door from the permanent exhibition site of the museum. Also, as the participants were informed that the Fukuoka City Museum of Art will be closed for renewal for the 2 years following the exhibition, we devised to relate the content of the story to a real-world event by having a video that the museum will be renovated at the end of the content after being destroyed by Godzilla. The screen transition and the contents of the superposition system are shown in Fig. 3. The tablet iPad Air 2 combined with a cabinet made of MDF plywood, assuming a fictitious system called the Museum Archive Reader (M-AR) was used in the event. By displaying the reference image of the indoor-outdoor overlapping points on the tablet and superimposing it on the real image captured from the camera mounted on iPad Air 2, and when judging the feature point of the image and judging it as a recent point, we set up a mechanism in which a maximum of 30s of motion picture is played at each point.

3.2 Event Description

“Godzilla meets ‘F’ museum” was held at Fukuoka City Art Museum three times a day for 5 days from August 2 to 6 (a total of 14 times due to bad weather). Participation was accepted at the reception on the day, with 5 groups each time (up to 4 people in each group) and preschool children had to be accompanied by parents as one of the participation criteria. The time required for the execution of the main part of the back yard tour was about 35 min, and a total of 45 min, which include a waiting time in the waiting room and the time needed to answer a questionnaire, etc., was used as the event time. Figure 4 shows the condition of the event participants.

3.3 Result

We conducted a questionnaire-based survey for visitors of “Godzilla meets ‘F’ museum”. The survey items were designed to explore whether the respondents



Fig. 3. Screen transition and the contents of M-AR system

were able to immerse into a fantasy world perspective through AR production and experience-based attraction. Basically, for each group who used the M-AR system, one person was asked to become a respondent, and one person who participated as a chaperone was asked to be an additional respondent. The number of respondents was 107 out of 132 participants (Male 63 Female 43).

(1) **Age Group.** Figure 5 shows the distribution of age group of the participants. The youngest generation among the participants were younger than 10 years old (toddlers aged 3 and 4 years), and the oldest generation was in their 60s. Since elementary and junior high school students were in a summer vacation period, there were many families consisting of parents and children or groups of grandchildren and grandparents.

(2) **Why did you participate in the backyard tour?** Figure 6 shows the distribution of the reasons to participate the event. Most respondents answered “Because I heard about the event in advance”. This was probably a result of an



Fig. 4. Event participants

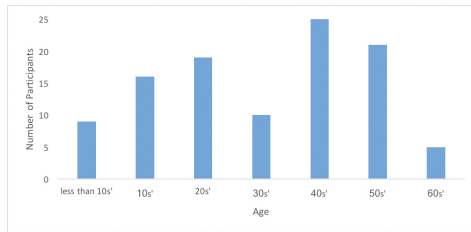


Fig. 5. Age group of participants.

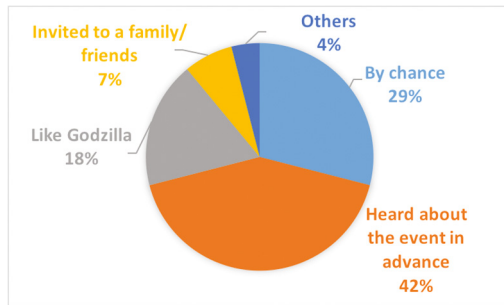


Fig. 6. Reasons participating the event.

announcement on the webpage of Godzilla exhibition. There were also people who answered “Because I read about it in the newspaper.” The next highest was those who answered “By chance,” they are considered to have obtained an information about this event on the day from the notice posted at the 1F lobby of the museum. For another reason, which is “Because I like Godzilla,” it seemed that there are many participants who happened to know about this event after browsing the Godzilla exhibition.

(3) Did you enjoy the event? (5 state evaluation (very boring (1) - very enjoyable (5))). Figure 7 shows the responses of the participants whether they enjoyed the event. We were able to obtain good evaluation from all generations. Evaluations from younger participants such as children, teenagers, and those in the twenties, were higher than those from the older generation. There was an impression that this event was “Good for children.” We think that because we applied the experiential attraction method, the target age of this event shifted toward the younger ones.

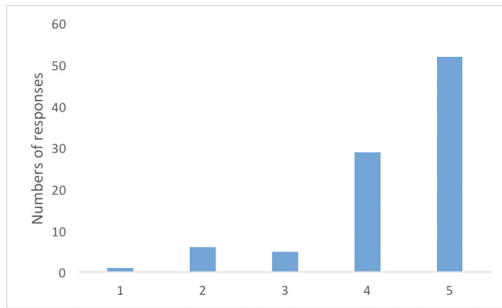


Fig. 7. Did you enjoy the event?

(4) Please write down the thing or event that left the strongest impression. (Free description). Sixty percent of the answer mentioned that the most impressive things were related to AR contents showing the “footsteps of Godzilla” and “scenes where Godzilla destroyed the museums”. Twenty nine-percent answered about parts of the backyard tour such as “the museum backside” and “museum rooftop”. Seven percent answered about the acting and directing of this event such as the “acting of actors” and “directing together with the renewal of art museum”.

(5) Was M-AR operation difficult? (Yes/no). A part of Fig. 8 shows the result of difficulty of the system. This is an item about the usability of M-AR system. To summarize the contents of item (3) “What point was difficult?”, there were two answers: “M-AR system superposition did not work well” and

“Tablet screen was hard to see due to sunshine”. In particular, many participants experienced difficulties because the recognition of superposed image could not be performed well outdoors.

(6) In this event, we planned a backyard tour in the form of a dramatic make-over of the current Godzilla exhibition. Did you feel the relationship between the tour and the Godzilla exhibition? (Yes/no)

A part of Fig. 8 shows the result. Participants in all age groups felt the relationship with the Godzilla exhibition. It seemed that we were able to convey Godzilla as the world perspective theme of the story through AR production.

(7) Do you think that the backyard tour became more fun by the actors’ performance? (Yes/no).

A part of Fig. 8 shows the result. We obtained high evaluation from all age groups. It seemed that we were able to increase the degree of immersion into the world perspective through the actors’ performance, which is the main element in an experience-type attraction. Excerpt from the impression column, “The tour directing was good. The setting of a scientist and assistant, and the flow to the rooftop created a lot of tense moments.” It seemed that the performance functioned well as a part of the directing.

(8) If you have an opportunity to join a similar backyard tours, would you like to participate in the future? (Yes/no). A part of Fig. 8 shows the result. We obtained high evaluation from all age groups.

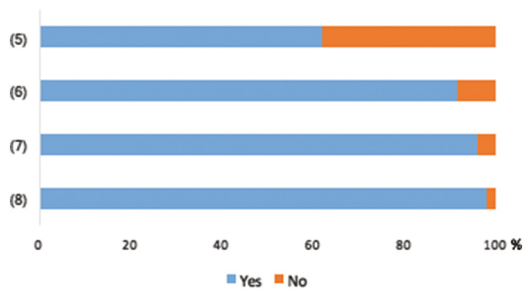


Fig. 8. Results of question (5) to (8)

(9) If this backyard tour was a paid event, how much would you consider paying for it? The satisfaction level of this event was measured by willingness to pay (WTP). We added a WTP item to the questionnaire at the middle of the event and we provided 4 options on how much a participant is willing to pay if this was a paid event (1. Less than 100 yen 2. 100–500 yen 3. 500–1,000 yen 4. 1,000 Yen or more). This question item was asked in the middle

of the event, so the effective number of responses was 37 people. The results are shown in Fig. 9. The largest number of responses was in the range of 100 to 500 yen (18 people), followed by 500–1,000 yen (14 people), suggesting that the participants felt a certain level of satisfaction.

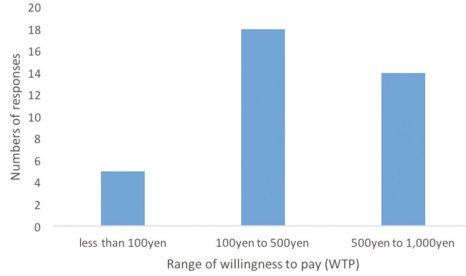


Fig. 9. Willingness to Pay

4 Discussion

In general, this event was well accepted by all participants. There was an impression that participants were able to obtain general perspective of the AR technology through this event, and to understand the characteristics and enjoyed the technology through the content. Particularly, AR production could be developed according to the story by the feature of this event, which was the acting technique that tailors the AR contents. Furthermore, through the actors' guidance, participants in lower age groups, who tend to be distracted easily, could concentrate on progress of the event without losing interest, enabling the participants to be immersed in the world perspective of the story. In addition, by setting two contrasting roles of the actors as a self-paced scientist and a gullible assistant, the scientist progressed steadily and curiously, while the assistant took the position as a participant and reprove the scientist, the participants could actively took part in the events without feeling alienated form the storyline.

If there was only one actor, the guide can be alienated from the participants and it would have been difficult for the participants to maintain the immersed feeling. It seemed that the story atmosphere was maintained through the interaction of the two actors, retaining the feeling of immersion in the story within the participants. While the real actors were responsible for the explanation and progress of the event, the AR contents played the role of presenting the theme of the world perspective with the theme of Godzilla and backyard tour to the participants. The AR content reference method of superimposing the reference images and viewing the images by combining the contents of the actors was also accepted by the participants as a natural action performed in the story rather than simply watching the information on the tablet.

For the challenge on the superimposition technology, especially in the case of overlaying outdoor environments, the matching accuracy with the reference image was likely to change due to the change in the illumination condition caused by the change in weather, causing superimposition did not go smoothly and there were opinions that it was difficult to operate the device. Challenges still remain for a widespread use as a general system.

5 Conclusion

In a story composition in line with the museum’s exhibition, we expanded conventional backyard tour by including AR technology and proposed an example of a new backyard tour content by making it entertaining, and organized it at Fukuoka City Art Museum. By creating a narrative composition tailored to the backyard of an art museum exhibition, the relationship between the event and space became stronger. In addition, by including actors as guides, participants could acquire the ability to operate the tablets and other equipments in the event more naturally, and while moving through the real space and observing the museum backyard, each participant could feel deeply immersed into the fictional story. In the free description item in the questionnaire, although the event and Godzilla were regarded as fiction, there were several participants who thought that the M-AR system could be put into practical use, meaning that the function of the system itself was considered as genuine. All of the above indicated that the boundary between fiction and non-fiction will continually be obscured through the incorporation of contents that are related to the art museum context at a site where the event is held. From this event, we were able to gain insights that in order to create contents that take advantage of AR technology characteristics that adds location-dependent information, it is important to truly understand the meaning of the place where the content is used in the content production process.

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References

1. Itamiya, T.: The virtual Tsunami disaster situation experience system using a Head-mounted display, Media and Communication for Disaster Risk Reduction. In: Showcasing Innovation, An initiative for the Third UN World Conference on Disaster Risk Reduction in Sendai, pp. 2–3 (2015)
2. AR HOPE TOUR in Sendai, AR HOPE TOUR in Tagajo. <http://www.dmp.co.jp/ar-hope-tour>
3. Evangellion AR Stamp rally (Japanese). <http://www.hakone.or.jp/eva/>

4. Tomioka Mill CG picture Guided Tour. http://www.tomioka-silk.jp.e.wv.hp.transer.com/tomioka-silk-mill/visit/group.html?_ga=1.124798410.1985905280.1488691668
5. AR Hyakki Yako Crowd Funding (Japanese). <https://a-port.asahi.com/projects/youkai/>
6. Ultraman AR Stamp Rally Event News Release 2016 (Japanese). <http://m-78.jp/news/n-3847/>
7. Godzilla AR Stamp Rally (Japanese). <http://www.godzilla-tokusatsu.com/stamprally/>
8. Godzilla at the museum: Creative Tracks of Daikaiju. <http://www.fukuoka-art-museum.jp/godzilla/english/>