

空間型 AR 技術を用いた古代遺跡の展示

Exhibition of Ancient Relics Using a Spatial Augmented Reality Technology

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Abstract: Current museums exhibit only objects, so it was difficult for visitors to feel atmosphere about ancient relics. We propose exhibition systems that use a spatial augmented reality technology to offer atmosphere about ancient relics. We created a test exhibit about a golden mask in Sican culture. We describe the scenario for the exhibit, and their effects.

Keywords: Spatial Augmented Reality, Exhibition, Digital Museum, Atmosphere Imparting System

1. Introduction

At the moment, museums exhibit only objects with explanatory descriptions or movies. Though visitors can know information on them, hardly feel atmosphere around them. To exhibit relics more effectively, we should make effort to impart atmosphere around them to visitors: atmosphere about the situation of excavated tomb where relics were located or atmosphere like bustle of town and lifestyles of people when relics were actually used.

We implemented some exhibition systems that impart atmosphere about the relics to visitors as a next generation museum style, called Digital Museums. In this paper we describe an exhibition system that can express the ancient atmosphere by mixing three dimensional computer graphics (3D CG) images and a real relic using a spatial augmented reality (AR) technology.

Spatial AR technologies [1] display 3D CG images at human scale or full size, so viewers can easily feel immersive sensation into the artificial AR world: a mixture of a virtual 3D world and real objects. In a museum exhibition, spatial AR technologies provide exhibitors new methods to impart atmosphere around relics to visitors easily. Real relics silently tell very important meanings to visitors through its existence, but it is not easy for all people to feel atmosphere about them. 3D images easily show visitors what exhibitors want to tell about relics, but 3D images are not real and lack existence. If these images are shown far away from the real relics or without them, it is very difficult for visitors to feel the atmosphere about those relics because people can start to imagine their backgrounds easily when there are genuine relics in front of their eyes. By mixing the real relics and 3D images, visitors can easily feel atmosphere about those relics.

We created a test exhibit that imparts atmosphere around a golden mask in Sican culture to visitors using a spatial AR system. Sican culture was introduced by the exhibition held at National Museum of Nature and Science from July to October in 2009. In the exhibition, a 3D movie was showed. The exhibitors created that movie by moving 3D objects using 3D CG technology. We used those 3D models to

produce our AR CG scenes. Sican exhibition movie's narrator spoke narration in our test exhibit.

Technical details of our spatial AR exhibition system were described in the former paper [2].

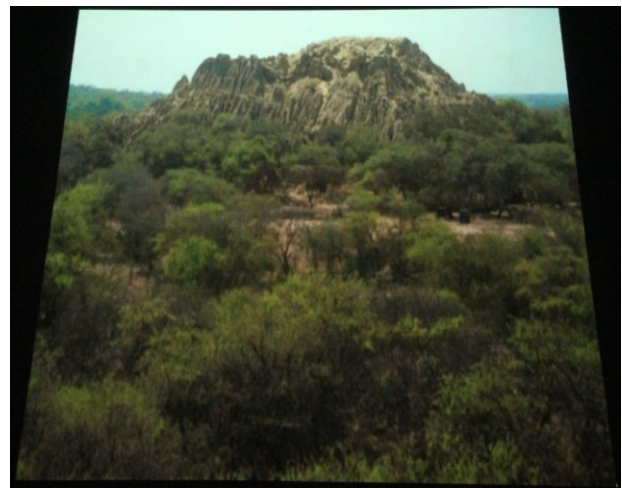


Figure 1. Our exhibit system started from a current Huaca Loro Tomb view.

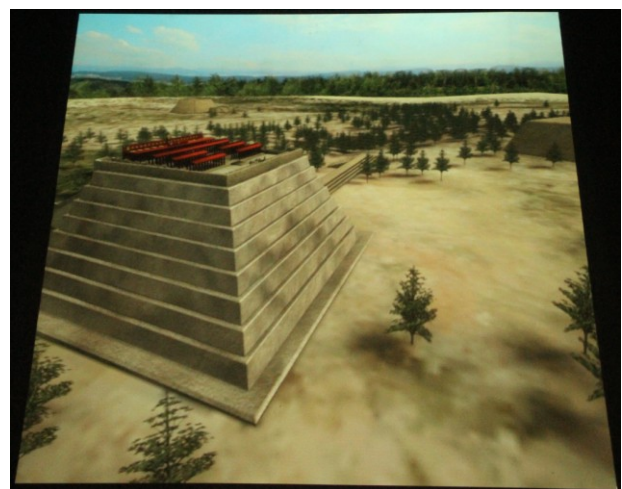


Figure 2. The system change CG image from the current view to the ancient view when the golden mask were buried.



Figure 3. The mask was placed on the principal personage's face. The system showed that situation via 3D CG images by walk around the mask. By this 3D CG camera work, visitor could easily realize the situation among the mask, the personage and surroundings.



Figure 4. Mixture of inside the East Tomb CG images and the real golden mask briefly told the situation where the mask was located. Visitors could easily realize the relationship between the situation and the mask which was located at the front of their eyes.

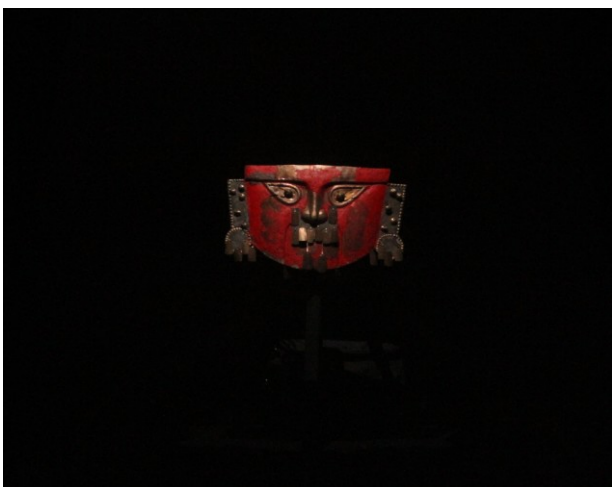


Figure 5. Visitors came back to the present day. Only the real mask was shown. They watched it with their own imaginations enhanced by previous 3D CG images.

2. Spatial AR Exhibition System

This exhibit was about a golden mask that was one of the most important relics representing Sican culture. The genuine golden mask was excavated from the East Tomb at Huaca Loro. To exhibit it effectively, it was necessary to express not only the history and the situation of Huaca Loro Tomb but also the situation inside the East Tomb and burials. The real object in this exhibit was its imitation because this development was an exhibition test. In this exhibit, we showed current Huaca Loro, its past and the East Tomb continuously to let visitors easily feel the situation where the genuine mask was located.

Visitors saw a current Huaca Loro photo at first and next the ancient view by 3D CG image (Figure 1 and 2). We express this time slip by changing from the current photo to the ancient CG image continuously using fade-in and fade-out techniques. Then visitors were virtually taken inside the East Tomb where the genuine mask was actually located (Figure 3). This scene change was also actualized by fade-out and fade-in effects. Visitors could look around situations of buried victims and burials. After they looked around inside the East Tomb, they saw the "real" mask where the "virtual" mask was (Figure 4). They would understand the relationship between the virtual tomb and the real mask. After that, they came back to the present day. The CG image was disappeared and they saw only the real mask in a dark space (Figure 5). They could appreciate the mask as they did at a usual museum. After this 1.5 minute short journey, they would watch the same relic but they would imagine about it much more than before.

3. Conclusion

In this paper, we proposed an exhibition system using a spatial AR technology. Creating this test exhibit convinced us that this technique enhancing visitors' experience. Exhibitors can impart ancient atmosphere like situations of excavation sites more directly using spatial AR technologies.

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