Fundamental Study on Tourism Support Using 3DCG

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Abstract

Three-dimensional computer graphics (3DCG) is a technique of generating an image having a stereoscopic effect by converting an object in a virtual three-dimensional space into two-dimensional information. It is also possible to generate images that can not be distinguished from genuine objects using 3DCG. 3DCG is expected to be applied to visual expression very much. Currently it is expected to be applied in tourism. While being a photorealist, we are aiming to make people interested by images from viewpoints that we can not normally see. In this thesis we will use 3DCG for sightseeing

Keywords: 3DCG, Blender, Unity

1. Introduction

The penetration rate of CG (computer graphics) in recent years has become remarkable. Currently, there are various examples of utilization such as movies and animation, various simulation and tourism projects, sales visuals and so on.
Also, as the Tokyo Olympic Games are held in 2020, the demand for tourism in Japan is getting bigger. Accordingly, we believe that efforts towards tourism support are necessary even in local government units.

Therefore, we considered fundamental research of this moment, considering whether we can PR such as we do not exist by using CG technology for the rich nature and sightseeing spot of Miyazaki prefecture where we live. In this research, we focused on "Takachiho-cho", which is known as a land with a connection to "Japanese mythology" among Miyazaki prefecture(Fig 1, 2).
As a goal, tourism support such as combining the created 3DCG model with real underwater images and aerial images, introducing rich nature as the main and historic tourist attractions.

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Takachiho-cho, however, has a problem of population decline due to the declining birthrate and aging population.

This line chart is the future population estimate of Takachiho-cho by the survey of the National Institute of Population and Social Security Research(Fig.3).

As you can see, the population tends to decline to the right every year.

Due to this population decline, it is presumed that there is great influence on the succession of traditional culture and tourism resources.
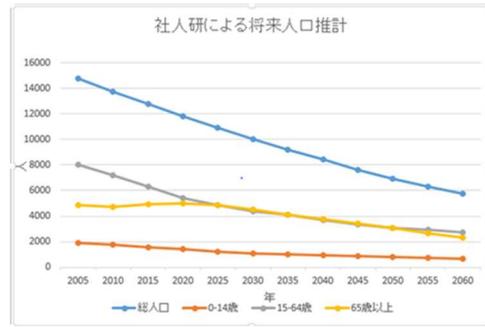

Fig.1: Amanoyasukawara

Fig.2: Takachihokyo

Fig.3: Population estimate

2.   Principle

In recent years, CG has become more popular as a tool for revitalizing tourism projects. It has been making it possible to provide visitors with the experience gained by using CG, such as the power and atmosphere that can only be experienced locally, and the reproduction of environment and buildings lost in the past.

In this research, I am considering attracting nature as the main among them. From a person's point of view only the scenery lower than the mountain can be seen, but birds and insects can look down Takachiho from the viewpoint higher than that. Likewise the same thing can be said for aquatic creatures. Things that can not be seen from the usual point of view can be noticed by the good point that we have not noticed by looking from a different point of view. By thinking as a hawk's point of view, we could imagine what kind of living things are usually living, and thinking that Takachiho could be promoted from a different viewpoint than before, we tried out.[1][2]

3.   Creation

This time I used Blender and Unity.

Blender creates animation models and animations.

Unity synthesized with the actual image using the model and animation created.

Both are software that can be operated sensuously, so we adopted it because it can be used easily and has high quality.

3.1. Modeling

First I will create a model of Hawk and a river fish at Blender. Figures 4 and 5 are created.
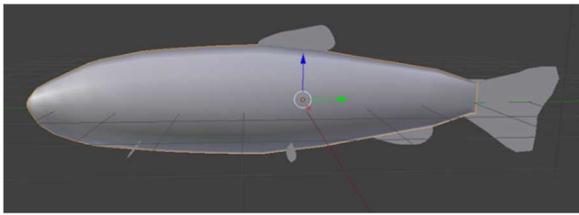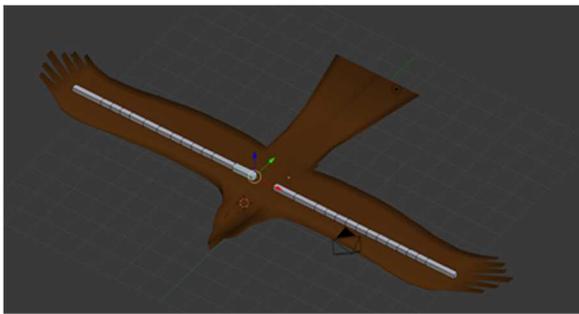
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Fig.4: River fish model

Fig.5: Hawk's model

3.2. Material setting

The material setting is done by mapping. This time UV mapping is executed. UV mapping is a part of texture mapping and texturing is stretched to a stereoscopically wrapped part without being stretched by applying a texture to the two-dimensional expanded view of the surface of the object. The result is shown in Figure 6.
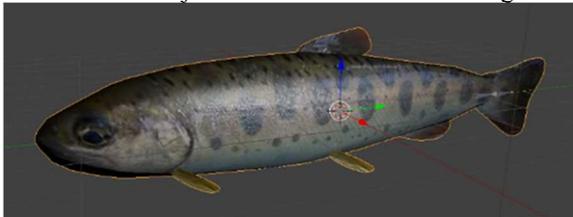

Fig.6: Fabrication of map by UV development

4. Result

The function implemented this time can move 3DCG (3 dimensional CG) model by user's keyboard operation. Although it is a function unsuitable for compositing with the picture taken beforehand, I thought that it would be interesting to have game properties instead of just flowing video, and I implemented it.
A part of the finally formed model and action is shown below (Fig. 7, 7).
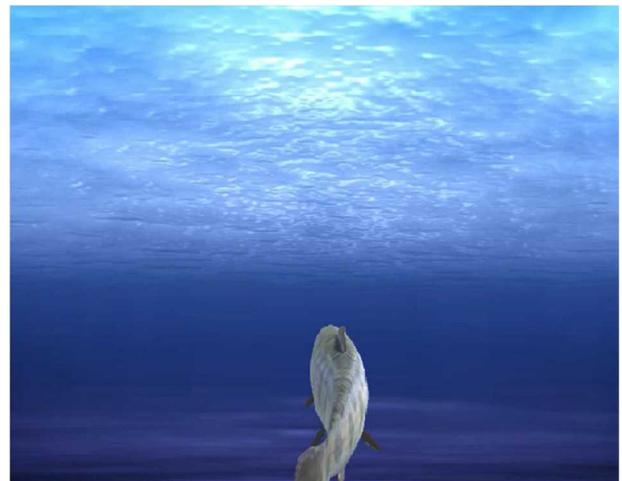

Fig.7: Hawk combined with video

Fig.8: Fish combined with video

5. Discussion

In this research, we made a blogger and Unity based on the intention of composing CG of the falcon dancing in the sky of Takachiho in the sky photographed in drone, and creating a CG animation to PR for Takachiho .

Although river fish could not prepare actual underwater video for synthesis, I think that we could expand the range of video production with the function that we can actually move on ourselves.

Ultimately, since the video shot in advance is used for the composition of the video, it is necessary to incorporate the movement according to the video to the right place in the right place. Also, delicate light

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adjustment must be considered. In addition, it is necessary to actually underwater and aerial photographs diversely, and investigate what type of photographing will be effective images.

6. Conclusion

In this research, from the viewpoint which is slightly different from the past, we have created images introducing the rich nature of Takachiho Town, historic sightseeing spots and people living there, and are investigating to link tourism support. In future, I think that it is possible to add "fun" to this tourism support by using Unity and incorporating game elements as one of the contents.

References

[1] Kai Yuki, *Fundamental study on the description of river fish using CG*, graduation thesis of Information Systems Engineering, Faculty of Engineering, Miyazaki University, 2017
[2] Yosuke Iriyama, *Approach on Tourism Support by Aerial Photography Using CG*, graduation thesis of Information Systems Engineering, Faculty of Engineering, Miyazaki University, 2017