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Development of Digilog-type Contents using Augmented Reality

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Abstract

Recently, the development of ICT technology and the spread of smart devices have been applied to various industries using real world and augmented reality technologies. Currently, smartphone photography programs are always using fixed content. Augmented reality technology was used to capture the new concept and real-time situational picture of the young generation. Photographing technology using such augmented reality can cope with various concepts and the position and pose of the user. This paper aims to develop photography contents using augmented reality.

In this paper, using augmented reality, combining past photographs with real world, and developing content that can be photographed are reviewed.

Keywords: *Smartphone; Photo shoot; augmented reality; Virtual Reality.*

1. Introduction

Currently, younger generations are taking various pictures using the photo programs provided by smart phones. By age, 91.7% of the elderly, 91.6% of the elderly, 96.6% of the 20th to 29th generations, 95.2% of the 30th to 39th generations, 91.8% of the 40th to 49th generations, 81.9% of the 50th to 59th generations, and 32.1% Became the most common personal media [1]. The trend research institute of Japan divides into mireniaru households between 20-28 years old, baby boomer households between 44-47 years old and bubble households between 49-53 years old by smart phone photography of mireiaru generation, the results were announced. Among the results of the survey, 89% answered questions about using smartphone cameras, 77% answered second baby boomers, and 79% answered bubble generations [4].

However, the photo-taking program provided by the smartphone currently being used does not fit the concept of the user and always uses fixed content. Younger generations want to develop photographic content that can cope with user's position and pose by utilizing augmented reality technology for new concept and contextual photography.

Recently, due to the development of ICT technology and the spread of smart devices, real world and augmented reality technologies have been used in many industrial areas [2]. Augmented reality is a technology that shows a mixture of real world and virtual world at the same time. If space is made up of virtual world and human is to be immersed, the augmented reality will have a higher immersion feeling to provide a sense of reality. These augmented reality technologies are applied to industry, medicine, science, entertainment, etc., and are used in museums to promote understanding and interest of viewers [3].

In this paper, the using Augmented Reality combines the actual situation and the historical picture develop

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content that can take a variety of pictures.

2. Augmented Reality

The goal of Augmented Reality (AR) is to provide additional information or meaning to objects or places actually observed. Unlike Virtual Reality, Augmented Reality does not provide perfect virtual space, it is a virtual reality technology in which some virtual objects are inserted into the space [2-3].

The content to be developed in this paper is conceptual photo taken together with great people by utilizing augmented reality technology and 3D reproduction model based on past photographs.

The contents to be developed in this paper are contents that can take concept pictures including current and past images by utilizing augmented reality technology and 3D reproduction models based on past photographs. In this converged technology, real-time camera tracking technology for acquiring real environment information for inserting virtual contents and interaction technology for seamless augmented reality braking are key. This technique is a convergent technology best suited for reproducing 'Digilog' applications. In the AR implementation, the role of the marker is the absolute coordinate of the object to be augmented on the screen, and each pattern is the object output Rendering. If you pattern space or recognize space with multiple patterns, you can reconfigure the space itself into various virtual objects and effects and arrange the various markers at the desired location since it can be placed in a desired space, it is possible to participate and pattern in a space to obtain various effects.

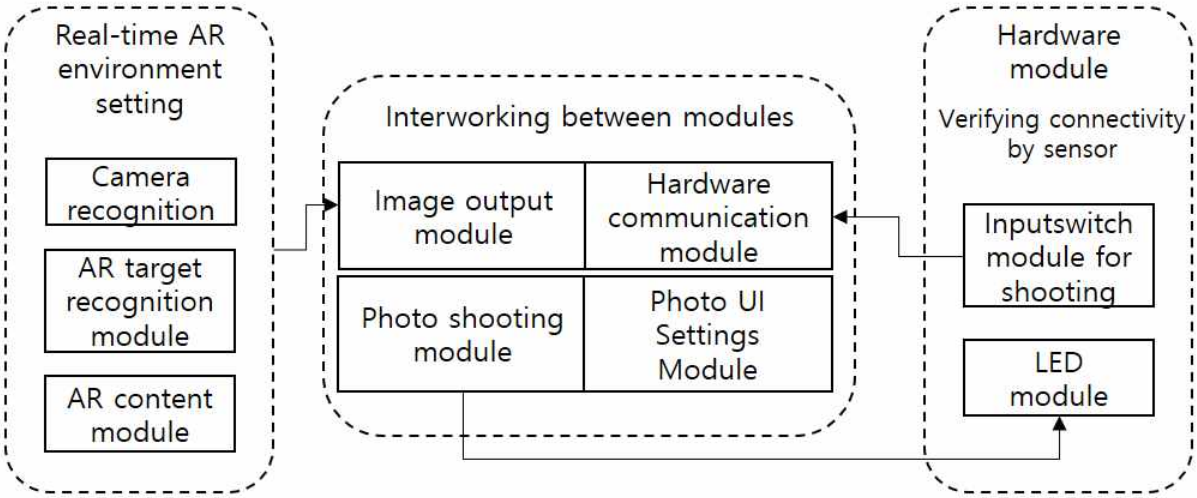

Figure 1. Augmented reality photography system

The concept of the augmented reality photographing content in fig. 1 is composed and designed as follows. After constructing the content platform using the 3D engine Unity, we implemented an effective photo shooting module by applying augmented reality, hardware device, and interlocking.

The model data of the past shape to be augmented in the 3D engine is prepared in advance and the reinforcement data can be used when the target is recognized.

2.1 Symptom real system design

In this process, the character model file to be augmented and the image file to be augmented are prepared so that the real-time enhancement can be performed.

As shown in fig. 2, after the content execution and loading of the required data is completed, processing is performed according to the presence or absence of the augmentation object data in real time.

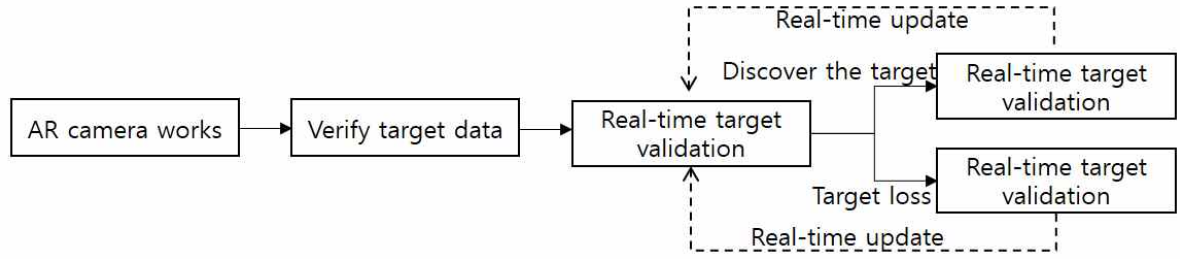

Figure 2. Augmented reality system design

2.2 Photo shooting system design

Figure 3 shows the process of interlocking hardware devices, storing images, and printing images for photographing. It stores the image after UI output according to the hardware operation to perform the shooting function, and outputs the stored image as a photograph.

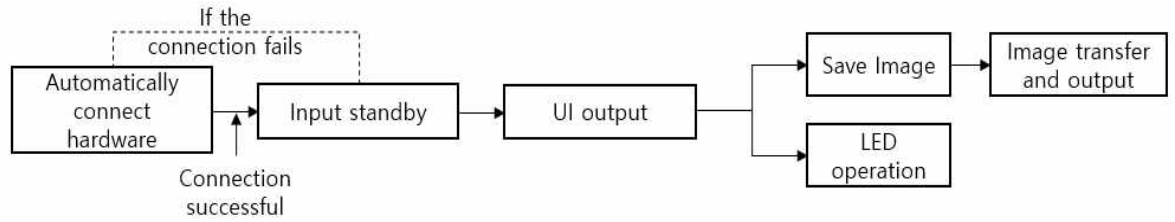

Figure 3. Photo shooting system design

3. System implementation

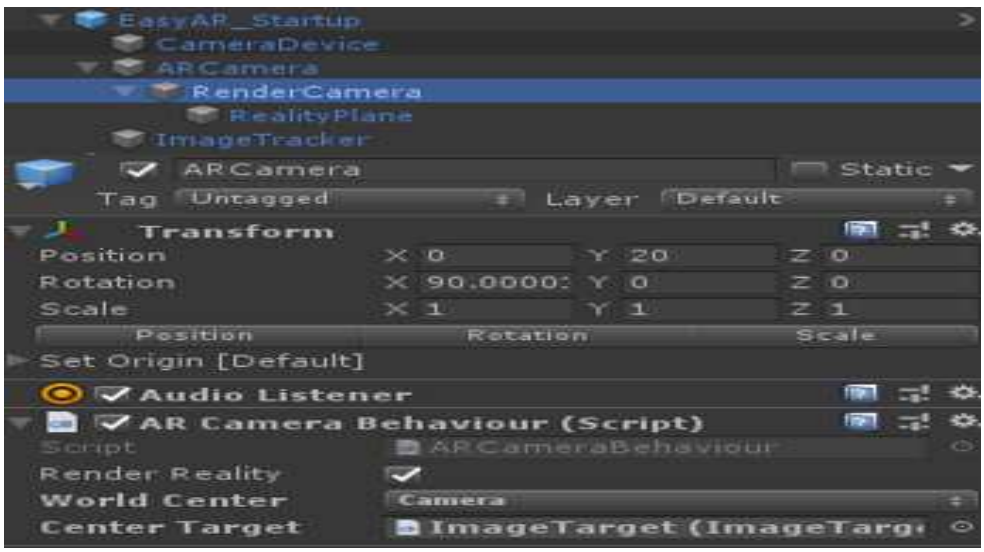

Figure 4. Augmented Reality Camera Assets

In order to realize the augmented reality system, the environment should be established first. Environment construction is the process of building an augmented reality environment using 3D engine Unity. To use the augmented reality technology, augmented reality camera set is used as shown in fig4. As shown in Figure 4, after the content and the camera are connected using the asset, the camera is ready to recognize the designated image file.

```
public class AwakeSetup : MonoBehaviour
{
    ImageTargetBehaviour imagetargetbehaviour;
    public string filename;
    string path;

    // Start is called before the first frame update
    void Awake()
    {
        imagetargetbehaviour = GetComponent<ImageTargetBehaviour>();
        path = Application.dataPath;
        //imagetargetbehaviour.Path = path.Trim() + "/" + filename;
        imagetargetbehaviour.Path = Application.dataPath + "/StreamingAssets/" + filename;
    }
}
```

Figure 5. Automatically designate augmented reality recognition target

After preparing the camera, the image to be recognized is prepared. As shown in Fig. 5, the image path is specified using a script so that it is automatically recognized when the content is executed. The image recognition object is subjected to a feature point extraction process to recognize the image of the camera. The process proceeds as shown in fig 6.

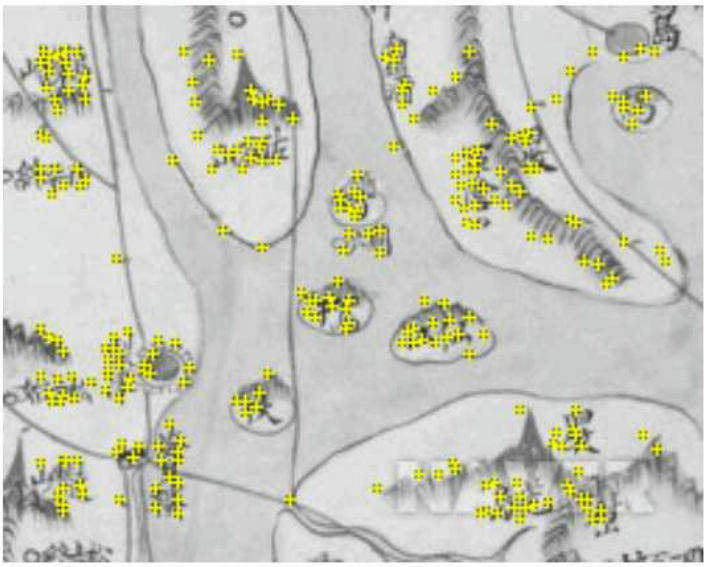

Figure 6. Augmented Reality Feature Extraction

In order to specify the content reinforcement position when recognizing an image that has been extracted as a feature point, an image target is used to create a base, and the content is placed on the base as shown in fig 7.

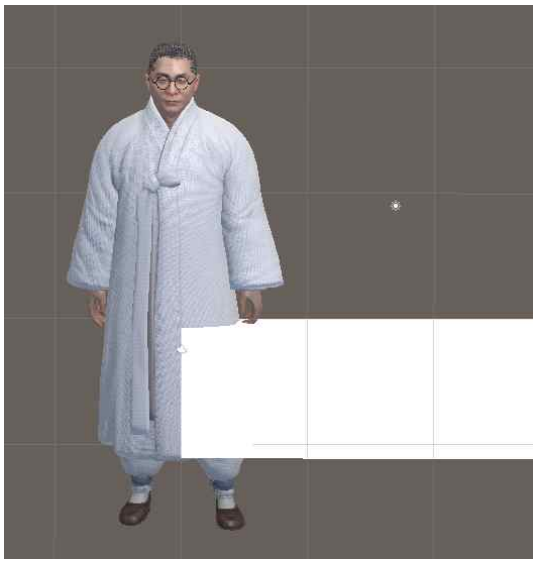

Figure 7. Position reinforcement content

3.1 Hardware design

Figure 8, 9 is a process that uses a keyboard or a mouse to manipulate content but develops a hardware device to enhance the concept and convenience of photography and enables it to be used after linking with the 3D engine Unity.

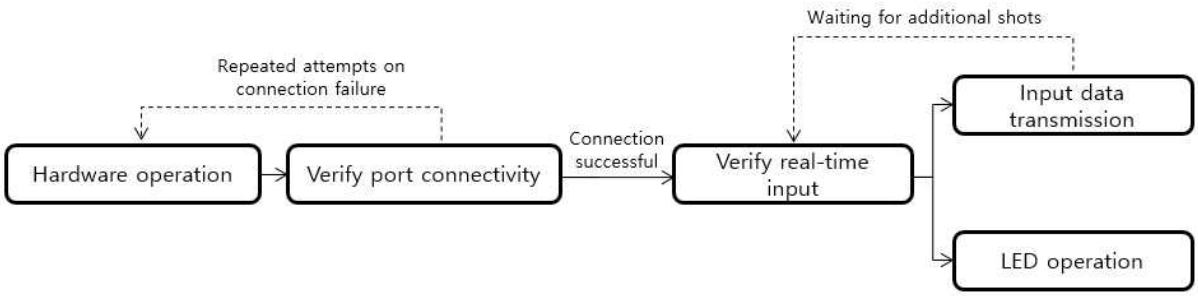

Figure 8. Hardware design for convenience

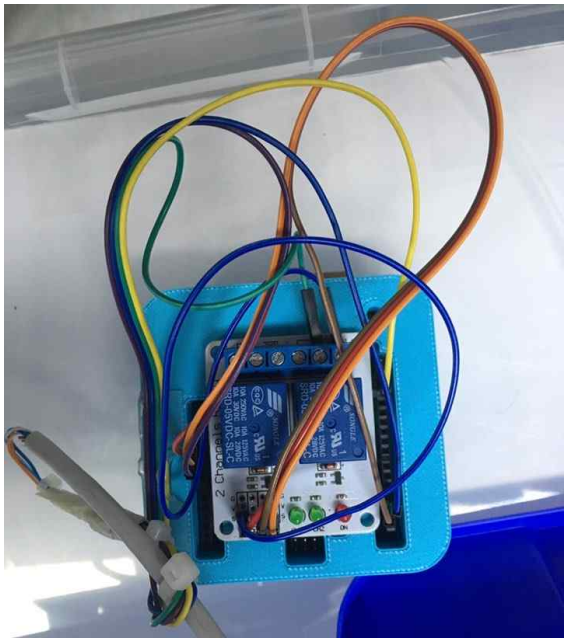

Figure 9. Hardware production

4. Development result

After all the settings are completed, the process of photographing and printing is performed in cooperation with the hardware and the 3D engine. After the hardware integration is completed, take the hardware input value from the 3D engine as shown in fig 10.

```
protected override void OnExecuted()
{
    if(OnWireInputChanged != null)
        OnWireInputChanged(Value);

    OnValueChanged.Invoke(Value);
    if (Value == true)
    {
        GameObject.Find("EasyAR_Startup").GetComponent<ScreenPrinter_>().GetSwitch();
    }
    //Screencap.GetSwitch();
}
```

Figure 10. Verify real-time input values

When the input value comes in, use the script in figure 11 to capture the image currently being augmented.

```
public void GetSwitch()
{
    if (Trigger == true)
        StartScript(); ; // ***** Start *****
    Trigger = false;
    Debug.Log("get Space and active 'StartScript()'");
}

public void StartScript() // **** Start ****
{
    //text.text = "사진을 촬영합니다";
    if (Screenshot_Delay - 4 > 0) Invoke("Counter3", Screenshot_Delay - 4);
    if (Screenshot_Delay - 3 > 0) Invoke("Counter2", Screenshot_Delay - 3);
    if (Screenshot_Delay - 2 > 0) Invoke("Counter1", Screenshot_Delay - 2);
    if (Screenshot_Delay - 1 > 0) Invoke("canvasOff", Screenshot_Delay - 1);
    Invoke("screenshot", Screenshot_Delay);
    Invoke("CounterReset", Screenshot_Delay + 1);
    Invoke("canvasOn", Screenshot_Delay + 1);
    Invoke("printing", Screenshot_Delay + Printing_Delay);
    Invoke("CounterReset", Screenshot_Delay + Printing_Delay +1);
}
```

Figure 11. Image capture script

After shooting, proceed to print after image capture as shown in fig 12.

Figure 12. Completed photo sample

As shown in figure 12, it is possible to shoot pictures in a natural way without graphic processing, and it can shoot in the background of historical background, historical events and figures in the local area.

5. Conclusion

Nowadays, younger generation enjoy photography in various environments. However, the photo-taking program provided by the currently available smartphone does not fit the user's concept and uses only fixed content. In this paper, young people use various concepts using augmented reality technology for new

concept and contextual photography, and developed photographic content that can cope with user's position and pose.

Generally, photographs, scenery photographs, and photographs taken in various places, such as when visiting a history memorial or a museum. When photographs are taken with the historical person or contents of the scene, it is thought that the value will be increased, and it can be used in many other places.

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