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Content production method based on OLED film and dual layer display system

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Abstract

It is common practice to display high-quality video images on the large display among the methods of developing tourist attractions and culture in the region as experience contents differentiation is required.

This paper combines the local attractions with the OLED dual layer display system and the extended image implementation and augmented interaction technique to give the experiencer a realistic space, such as directing to new experiences and beautiful sights. In this paper, we added UI layer to additional layers of images to enable users to experience sightseeing information, weather, maps, accommodation, festivals and photo materials with images. It is implemented to add fun through interlocking. We also developed transparent OLED and dual layer panel and 3-channel multi-image playback technique.

Keywords: *OLED, Multi display system, AR, Dual-layer display system.*

1. Introduction

The study proposed in this study is to apply the new augmented image reproduction technique by mixing Organic Light Emitting Diode (OLED) with image and to apply touch panel this will increase immersion. Recent developments in ICT technology and the spread of smart devices deeply embedded in the lives around us. The augmented reality technology that is leading the ICT development has been widely used in the industrial field [1]. The augmented reality technology applied to industry, medicine, science, entertainment, and used in museums to promote understanding and interest of viewers [2]. The purpose of this augmented reality (AR) is to provide additional information or meaning to the objects or places actually observed. Unlike the virtual reality, the augmented reality does not provide a perfect virtual space virtual reality (VR) technology that inserts some virtual objects in real space [3].

The technique proposed in this study is to apply a new augmented image reproduction technique by mixing augmented reality and transparent OLED (Organic Light Emitting Diode) with the image and to increase the immersion feeling when using the touch panel there will be. The reason for using transparent OLED is because it is the most transparency of existing transparent display and it is self-luminous type which does not need backlight, and it is possible to display full color and it is becoming a device platform that is effective for development of augmented contents [4].

The methods of developing sightseeing and culture industry as experiential contents, which is being

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developed now, is the development of general experience contents to display high quality video images on a large display. This method cannot escape from the simple high-definition image displayed in the exhibition hall, and it is necessary to differentiate the active participation of the expedient and the visual experience of the tourist spot in other regions.

In this paper, we want to add additional image and UI layer to the image layer, and to be able to experience sightseeing information, weather, map, accommodation, festival, photo materials with images. In addition to the dual-layer system, we will add a multi-display system so that the experience can immersed and added to fun by interworking with other interfaces.

2. Research content

The contents production configuration uses dual layer display system and three-channel multi-monitor display system for interaction enhancement. The applied system is operated as an integrated computing system and a control program is applied to time synchronization of video and contents. The various enhancement information augmented in the transparent OLED is applied to the multi-enhancement interaction technique which appears or disappears to the left or right of the multi-monitor display system. The 3-channel multi-monitor display system technique has the effect of greatly enhancing the immersion feeling by expanding the viewer's view.

Experiences provide interfaces using transparent OLED panels and Tech Panel OLEDs (T-OLEDs), enabling real-time control of stereoscopic sound control, image color and effects (effects) of extended images, A multi-extended image implementation technique is applied which appears or disappears to the left or right of the multi-monitor display system. Further, if the user touches an object of interest in an image reproduced in the background display, additional information, images can enhanced, and experience information can expanded.

In this paper, the system uses transparent OLED and dual-layer panels and three-channel multi-image playback techniques to develop the local attractions without space constraints, as shown in Figure 1.

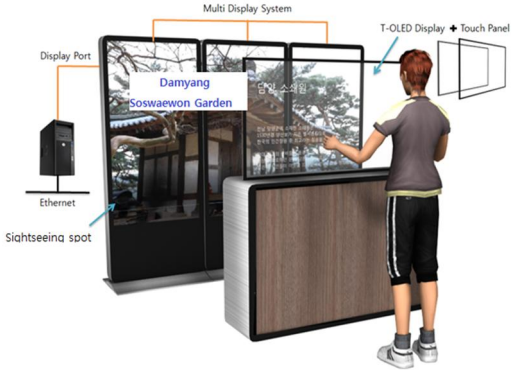

Figure 1. Development system of composition

The dual-layer display system used in this study can overlay transparent OLED panels and common display panels in the same sight to produce both video and augmented content, and the touch interface of the experience. Content that can be augmented by the transparent OLED, as shown in Figure 2, is a live-action video, 3d object, Rich Site Summary linkage information, and tourist information , weather, maps, lodging, festivals, photo materials, etc.

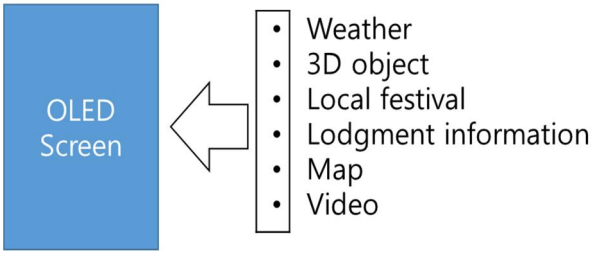

Figure 2. Content materials that can be augmented with transparent OLED

With the dual-layer display system, scalable image implementation and augmented interaction technique can added to the experience with a magnificent immersion and interface, and the experience waiter designs a way to share experiences and content.

3. Content development and design

Figure 3 shows the overall development flow of the contents to studied and produced in this paper.

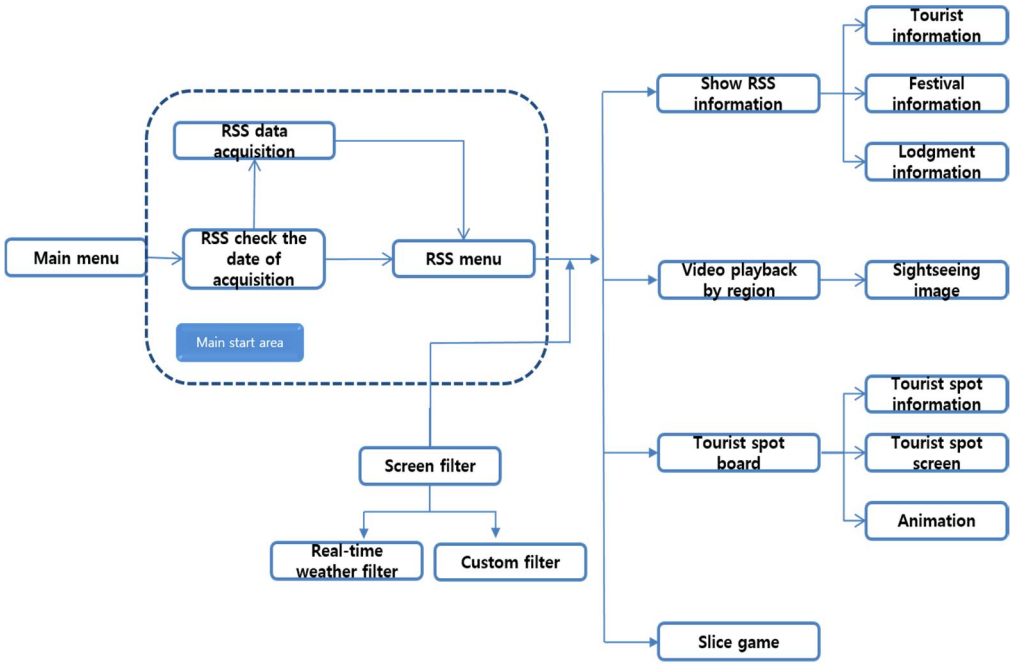

Figure 3. Content development flowchart

This paper added additional video or UI layers to the video layer, adding dual-layer systems and multi-display systems to experience the sights, weather, maps, accommodation, festivals, and photo materials and more, we make it possible to add fun to the experience with a magnificent immersion and interaction with other interfaces.

The fabrication technique consists of a three-channel multi-monitor display system and an integrated computing system for augmenting the interaction with a dual-layer display system. Control programs applied to synchronize video and content. The multi-monitor interaction system technique applied to display or disappear the left or right side of the multi-monitor display system. Three-channel multi-monitor display

system technique is effect.

In this study, we intend to create a beautiful sightseeing spot by combining transparent OLED dual layer system, expandable image implementation and augmentative interaction technique so that the experience can experience new experience and experience directly to the tourist attraction.

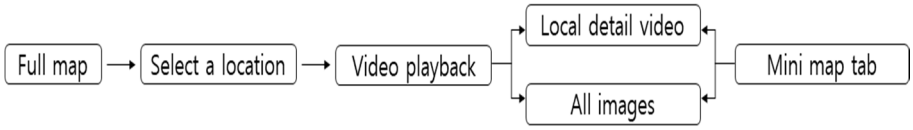

Figure 4. Development of composition

The S / W dedicated to the multi-display system is intended to implemented as an application program having three viewports in a full 3D application. In addition, we intend to work with the integrated control system so that the video, audio, 3D object, and 2D UI are rendered at 60Hz or higher, and the enhancement information output to the transparent OLED is touched by the multi display. Figure 4 shows the system development process.

3.1 Develop interactive system for experiential contents control

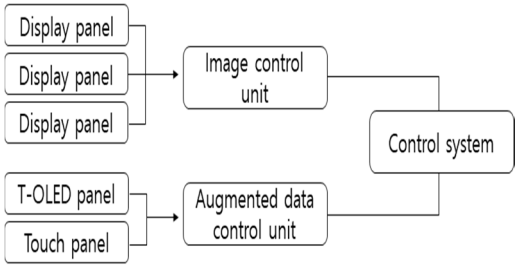

Figure 5. Experiential Interactive System Flowchart for Augmented Content Control

The dual layer display system includes a touch panel, and provides a robust touch interface to the user based on the touch panel. Experiential touch interface is realized through multi - monitor system and it is possible to control stereoscopic sound image, image color, effect, etc. Further, it is possible to execute operations such as execution, suspension, change, switching of the augmented data.

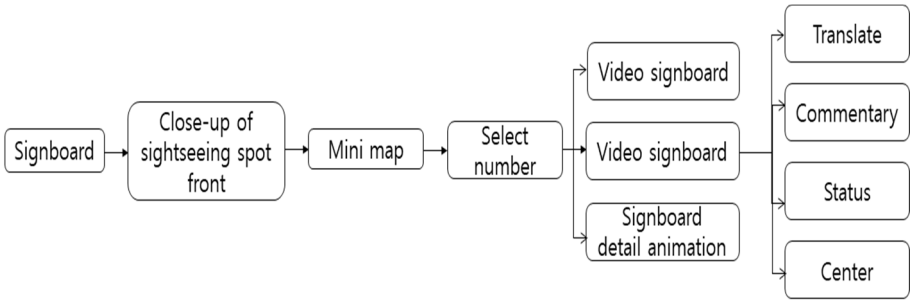

Figure 6. Flow chart of linked information to augmented and contents creation

4. System construction

4.1 Development of Software

The system development process shown in Figure 7. Video synchronized according to the region selection, and the video is played the number of regions. The source code shown in Figure. 6 shows the video synchronization source code, video control source code, and video progress time confirmation source code according to the region selection in the system development process.

```
# Image synchronization source code for region selection
public void VideoNumbering(int i)
     {_mediaPlayer.m_VideoPath = System.IO. Path.Combine(_folder, _videoFiles[i]);
   //_VideoIndex = (_VideoIndex+1) % (_videoFiles.Length);
_mediaPlayer.OpenVideoFromFile(MediaPlayer.FileLocation.RelativeToStreamingAssetsFolder,
_mediaPlayer.m_VideoPath, _AutoStartToggle.isOn); }
# Play the video by calling the number assigned to the regional image.
# Image control source code
public void OnPlayButton()
  {    if( _mediaPlayer )
   { _mediaPlayer.Control.Play(); }}
                        public void OnPauseButton()
            { if( _mediaPlayer )
                        {_mediaPlayer.Control.Pause(); }}
public void OnRewindButton()
            { if( _mediaPlayer )
                        {_mediaPlayer.Control.Rewind(); }}
# Check video progress time Source code
public void OnVideoSeekSlider()
{      if(_mediaPlayer      &&      _videoSeekSlider      &&      _videoSeekSlider.value      !=
_setVideoSeekSliderValue)
   {_mediaPlayer.Control.Seek(_videoSeekSlider.value                                          *
_mediaPlayer.Info.GetDurationMs());          }          nowvideotime          =
_mediaPlayer.Info.GetDurationMs(); }
```

Figure 7. Development of Source code for system

Figure 8. Apply weather related background image filter

Figure 8 shows the change of weather by applying filter. The background image is simply large and supports a variety of image filters that can change the atmosphere of the entire exhibition space as well as expanding the field of view.

Especially, it is possible to apply the effect according to the weather of the tourist spot through the weather information of RSS data. The experimenter can select the desired weather (sunny, rain, snow, cloudy, etc.) filter and apply it immediately using the touch screen.

4.2 Development of User control UI

UI buttons that can be controlled by the user at the time of driving are augmented in front of the background image. The screen touch position is recognized by using the infrared touch sensor and then the content is enhanced. The content is enhanced by the RSS data, the front panel data, the image control panel, and the like. Also, it is developed to hide or reveal the control UI by using the tab button around the menu.

Figure 9. User Control UI: An example of showing weather effects in augmented form

Figure 9 shows that the weather effect can be expressed in an enhanced form. The developed contents are firstly in two forms, and the RSS weather data of the relevant region is checked in real time to enhance the weather effect according to the local weather. Second, the UI operation of the user is utilized irrespective of the local weather to apply arbitrary weather effects.

The interworking and control of the dual layer system and the multi display system used in this study can be performed not only for simple control but also for additional information such as RSS enhancement data by touching an object at the time of reproduction at an image, of the information is enhanced according to the determined storytelling.

In addition, the implementation result of the image display and the interactive operation on the extended

display was implemented and produced in a way that indirect experience and the immersion feeling of the contents can be shared not only by the experience but also by the experience viewer.

5. Conclusion

Augmented reality technology is used in various industrial fields, and it is applied to industry, medicine, science, entertainment, etc. In museums, it is utilized to promote understanding and interest of viewers. Until now, it is changing from a simple exhibition using an augmented reality technique to a realistic experience type experience. Augmented Reality and Storytelling Techniques are developing techniques for attracting the viewer and maximizing the sensation.

In this paper, we applied the algorithm of tourism culture element extraction through metadata analysis. Such an algorithm can be applied to a derivative service model, and it is possible to provide a technique for recommending contents to be customized for cultural property / tourism / leisure contents recommendation service. In addition, it is possible to design a service model of new fusion contents by combining various tourism contents through 'development of a customized composite content service model'.

It is expected that the technologies applied in this paper will help to pioneer new paradigm of cultural properties, tourism, and leisure by developing a system that can provide customized fused image contents with augmented reality technology.

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