

## The response of nature tourism visitor using virtual reality application in cilacap regency of Indonesia

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### Abstract

*Cilacap is a regency in Central Java Province of Indonesia. It has a very rich and diverse nature tourism potential such as beaches, forests, reservoirs, rivers, and waterfall. They managed both privately and public through the Department of Youth, Sports, and Tourism (DISPOPAN). Nature Tourism potential needs to be continuously developed and published massively. New technologies such as virtual reality (VR) presents opportunities for interactive experiences, and provide interesting information that can support nature tourists in Cilacap. This paper successfully presents the development of a virtual reality tourism application in Cilacap. Furthermore, this research has obtained the visitor responses by using it. The results of this study have provided new insights into the experience of virtual reality in exploring nature tourism. The visitor responses showed that they strongly agree for getting new experiences in exploring nature with virtual tours which the average is 84,10%. Utilization of VR technology can support for tourism managers to provide more interesting information. Moreover, it can increase involvement with the new material and enable visitors to more easily identify the unique information. Finally, this research could be influence significantly for increasing the number of tourists in Cilacap regency of Indonesia.*

### Keywords

*tourist responses, virtual reality, nature tourism, interactive experiences, new technologies*

### 1. Introduction

The increased economic activity of a nation has consequences for its people, routines cause a level of boredom to increase, time and period. That continues to move forward, becoming an important factor regarding the shifting nature of life, success, and comfort of life. They are no longer seen from wealth, successful achievements of work, but have there is a shifting need to explore and discover aspects. Likewise, lifestyles, which developed as a result of changing times which can be observed from the increasing need for recreation and exploring new things. They obtained from the tourism sector; this is what makes tourism increasingly get a strategic place in modern human life.

Cilacap is a regency in Central Java Province of Indonesia. It has a very rich and diverse natural tourism potential such as beaches, forests, reservoirs, rivers, and waterfalls. Tourism potential needs to be continuously developed and published massively.

Data collected from the Department of Youth, Sports and Tourism (DISPOPAN) of Cilacap Regency. Figure 1, shows that the number of visitors is unstable every year, sometimes up and down. Therefore, one of solution for solving this problem is necessary to use technology for media promotion. Furthermore, to provide more experience for visitor to nature tourism in Cilacap, so that it can have a positive impact on the development of tourist numbers visiting.

In its journey, various new breakthroughs in ensuring the

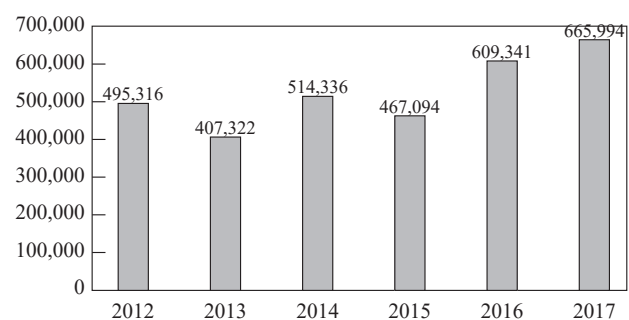


Figure 1: Domestic and foreign tourists visiting in tourism attraction of cilacap

movement of the tourism sector continue to be developed in order to ensure the tangible economic benefits of tourism for improving people's welfare, as one of the latest visions for Indonesian tourism, narrative acculturation of two different aspects namely digitalization and tourism, has been developed namely tourism 4.0, in response to the dynamism of the times, digitalization contains great potential associated with the publication of Indonesian beauty.

The tourism approach through the schemes and aspects of digitization produces a unique experience for travellers. Besides being more personal, the process of digitization makes tourism passion more widespread. Destination information, ticket prices, and travel packages (guideline tourism) are automatically at hand. This kind of phenomenon produces a new style in the order of fulfilling entertainment, namely full control of and over consumers (experience tourism) [Sugiarto, 2019].

Technology can provide opportunities in the delivery of information in more interesting and targeted ways. The selection

and proper use also gives an interactive and tangible impression on attractions and provides special experiences for tourists to get complete information including tourism locations [Tahyudin and Saputra, 2017]. New technologies such as virtual reality (VR) present opportunities for interactive experiences that can support tourists [Potter *et al.*, 2016].

Virtual reality (VR) is a technology with computer vision [Mahardika and Saputra, 2017] that allows users to interact with an environment that is simulated by a computer, an actual environment that is emulated or really an environment that only exists in the imagination and then displayed [Pribadi *et al.*, 2019]. Reality technology based computer vision [Indartono *et al.*, 2017] is at least divided into several types, namely Augmented Reality, Virtual Reality, and Mixed Reality. Reality technology has been proven to have a positive impact in the delivery of information and as a tool in various sectors such as Education [Eko Saputro and Saputra, 2015], Newspaper [Saputra *et al.*, 2015], Industry and Simulation [Hermawan *et al.*, 2019], to use as marketing aids [Pradeep *et al.*, 2013] and various other sectors.

The current virtual reality environment generally presents a visual experience, which is displayed on a computer screen or via a stereoscopic viewer, but some simulations include additional sensory information, such as sound through speakers or headphones [Sihite *et al.*, 2013]. The advantages of VR in describing a situation or an object that is visualization displayed in all angles in the form of 3 dimensions or 360-degree video [Mouratidis and Hassan, 2020]. This is one of reason why is the virtual reality is interesting and important to implement in this case.

In this paper, we present the process of developing VR. After that, presented the visitor responses of the development of a virtual reality application of natural tourism in Cilacap. It provides information, unique experiences and hopes to increase the number of tourist visits.

## 2. Virtual reality technology for tourism

VR technology continues to evolve, not only displaying visualizations in 3D (three dimensional) and video but also can provide stimulation to the five senses of its users, such as hand gestures, voice commands, to the touch [Guttentag, 2010]. From the systematic literature review, that VR has great potential in various sub-sectors, including tourism. This technology offers a new and interactive way to spread information that was previously impossible [Yung and Khoo-Lattimore, 2019]. The use of tourism VR provides an experience for its users, in its application, it can be presented in a tourist booth at the time of the exhibition such as a travel agent, travel agency and tourist information centre [Tavakoli and Mura, 2015]. VR connects users with information technology, engineering, and psychology so that it will provide valuable insights [Hine, 2000].

### 2.1 Virtual reality architecture system

VR displays 3D objects, stereoscopic head-tracer displays

[Gigante, 1993], movement tracking, gesture, and sounds up to human multi-senses [Cipresso *et al.*, 2018]. VR refers to an immersive, interactive, multi-sensory, viewer-centered, 3D environment, and a combination of technologies needed by a building environment [Cruz-Neira, 1993].

VR architecture must be a useful reference framework for designing and implementing VR applications for Exploring Nature Tourism. The virtual environment supports interaction between tourists and attractions simultaneously to access 3D (three dimensional) environments that are built graphically and 360-degrees video. This architecture is designed to fulfil the following objectives.

First, the proposed architecture has the ability to be applied to every type of natural attraction in Cilacap. Second, the advantage of VR is the potential interaction of users can be used in a virtual environment as a representation of tourist visits to tourist objects in a virtual way so that it brings up a unique and unforgettable experience.

Figure 2 shows the proposed architecture, identify some important components of system architecture for education using virtual reality for Exploring Nature Tourism which are: real world, user, application (VR System), and representative projection.

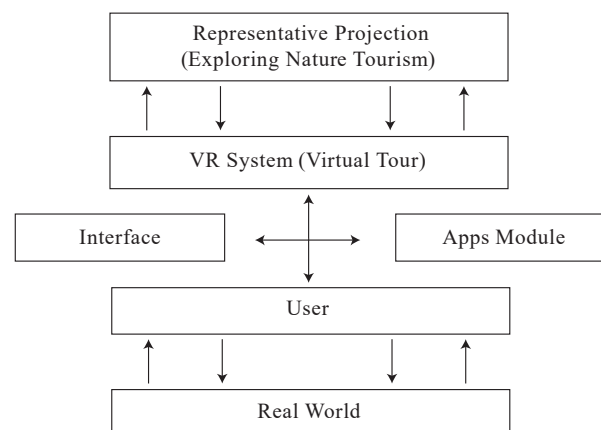


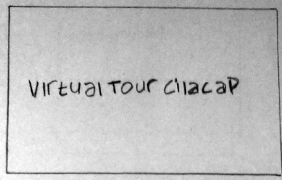
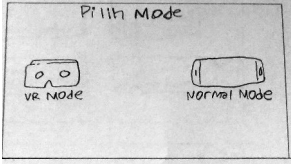
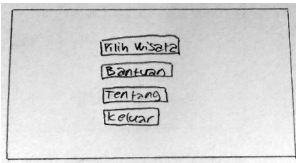
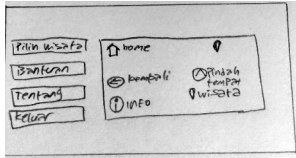
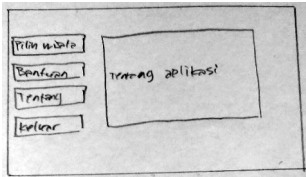
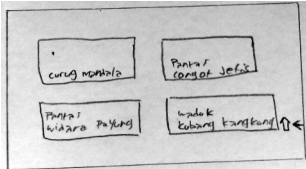
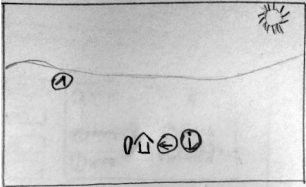
Figure 2: Virtual Reality Architecture System for Exploring Nature Tourism

### 2.2 Design

Designing a virtual tour application requires designing an interface design for the user interface of the application display to be created. The design is done by making sequential images for each scene or commonly called storyboard and continued with the application navigation structure. A storyboard is a design illustration in the form of sequential images that describe each scene, scene information, and audio guide [Handani and Nafianti, 2017]. The following is a storyboard Table 1 of the virtual tour application created.

Table 1 reveals the preparation process before developing app. The apps divided in to 8 scenes. The first scene showed the opening screen. After that, user should choose one of two modes. In

Table 1: Storyboard Apps

No.	Figure	Explanation	Audio
1		Scene 1 splash screen or the initial appearance of the application	Instrument
2		Scene 2 scene display to select a mode	Instrument
3		Scene 3 is the main menu display of the application	Instrument
4		Scene 3 main menu when the user selects app help	Instrument
5		Scene 3 main menu when the user chooses about the application	Instrument
5		Scene 4 is a tour list scene when the user Select Travel button	Instrument
6		Scene 5,6,7,8 is a tourist attraction scene. There is a back button, home, tourist list, tourist information and place to move	Audio guide adjusted to the tourist attraction

the third scenes presented the main menu of app. The last story board showed one of the natural tourisms in Cilacap using VR. After that, user could choose the menu for observing other tourism abject or back to main menu and exit. This story board could be the programmer guidance for constructing the apps.

### 2.3 Navigation structure VR for exploring nature tourism

In the application of Cilacap virtual tour, contain several

menus which are created to assist the user to the desired travel page. The design of the navigation structure looks like Figure 3.

This figure presented that in the first term visitors can select two modes, VR mode or normal mode. After that, they able to explore some of tourist attraction in Cilacap regency. Such as Widarapayung beach, jetiscongog beach, Mandala waterfall, Cipari hot spring, and etc.

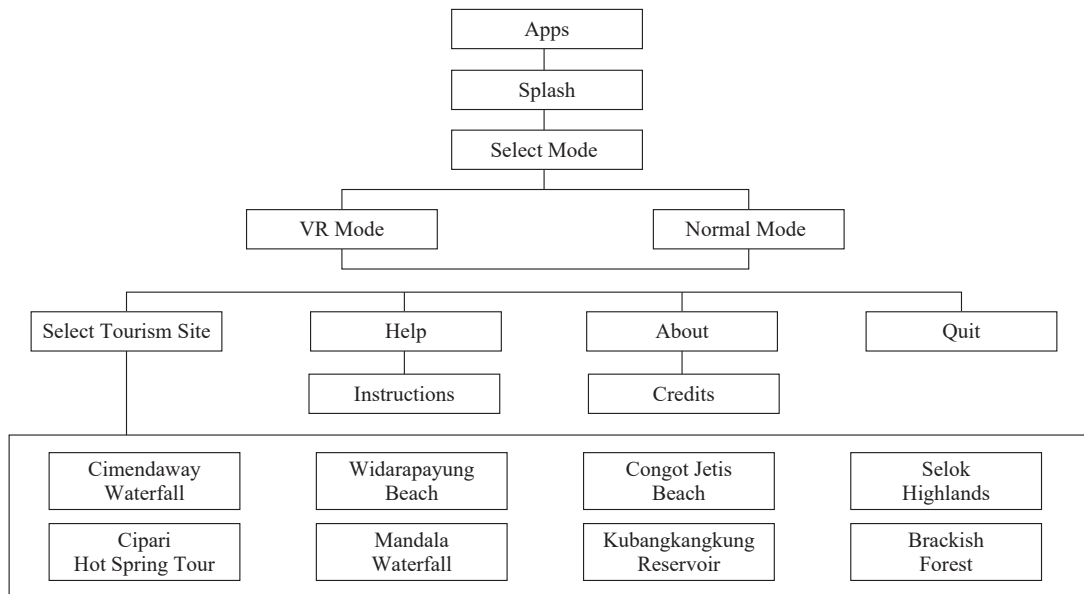


Figure 3: Application navigation structure

### 3. Result and discussion

#### 3.1 Visual VR

Visual VR is made as a 360-degree video reproduction for each Cilacap tour. 360-degree video is a video with technology that allows us to see clearly, as shown in Figure 4. In the figure 4 presented some of tourism objects in Cilacap regency. They are Widarapayung beach, jetiscongot beach, Mandala waterfall, Cipari hot spring, cimendaway waterfall, kubangkangkung

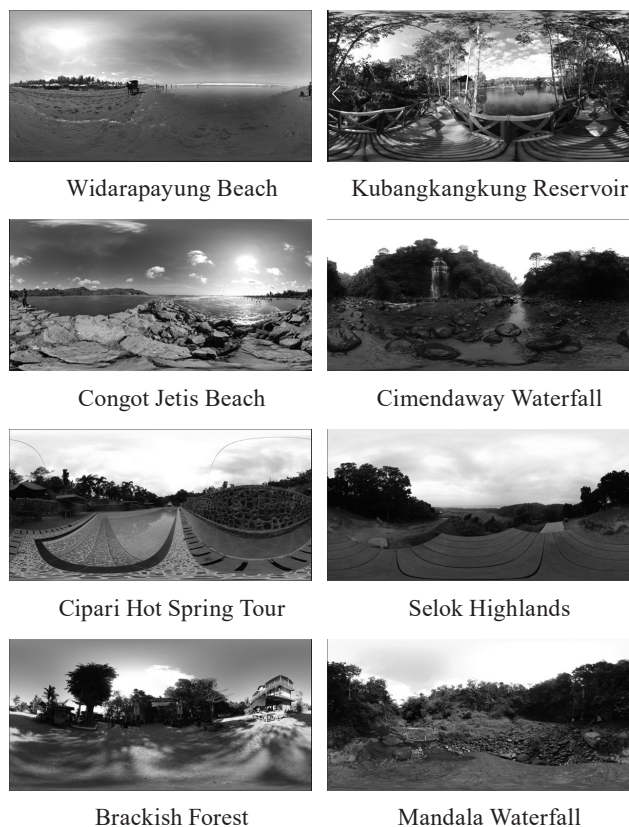


Figure 4: Cilacap nature tourism

reservoir, selok highland, and brackish forest.

The video is captured in a 360-degree display with a resolution of  $3840 \times 1920$  pixels at 29.97 fps, video encoding at high resolution. Adapun setting pada video terdiri atas MP4 video file format; AAC-LC audio codec, with Stereo or Stereo Channel + 5.1; The sampling frequency is 96 kHz or 48 kHz; Video codec: H.264; The frame rate must be encoded and uploaded in the same frame rate as the video being recorded. Video bitrate, with high frame rate. Resolution and height ratio, Standard width height ratio for 16: 9.

#### 3.2 Testing

The purpose of testing is to find out if an error has occurred from the program that was created. If the application still has an error it will be fixed immediately. In the testing phase will go through two testing methods, namely Alpha testing and Beta testing.

Alpha testing performs by Table 2 is testing functions that exist in the application with the aim that the system developed is protected from defects or failure of use.

Beta testing will be carried out forgiven to 30 end-users with a questionnaire method foresee the quality of applications that have been made.

Table 2 shows the number of responses from 30 users. The highest rating is strongly parameter. The average users choose three parameters which are strongly agree, strongly, and normal. Table 3 shows the final results of testing which the average index formula as follows:

$$(85.33 \% + 82.66 \% + 83.33 \% + 86.66 \% + 86.00 \% + 80.66 \%) / 6 = 84.10 \% \quad (1)$$

Therefore, the average index formula of respondents is 84.10 %, included in the category of strongly agreeing to the satisfac-

Table 2: Alpha testing


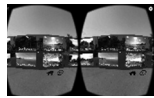




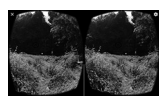


No.	Testing	Details	Be Expected	Screenshot	Result
Main Menu					
1		Select the select travel button	Display Scene Select Travel		Fit
		Select the help button	Display application help		Fit
Tourism Scene					
2		Select the info button	Display tourist information		Fit
		Select the travel List button	Display the Travel List		Fit
		Selecting the move place button	Moving places on attractions		Fit
Headset VR					
3		Installing a smartphone on a VR headset	Smartphone attached and display into one view		Fit

Table 3. Number of response points

Aspect to	Number of Ratings					Number of Respondents
	SS	S	N	D	SD	
1	9	20	1	0	0	30
2	6	22	2	0	0	30
3	8	19	3	0	0	30
4	13	16	1	0	0	30
5	10	19	1	0	0	30
6	6	19	5	0	0	30

Note: Strongly Agree (SA), Strongly (S), Neutral (N), Disagree (D), Strongly Disagree (SD).

tion of the application made, which means this application can be accepted by the user.

This VR exhibition will bring visitors to the experience of traveling in Cilacap. Using VR, visitors can see various information and depictions about the tour through the smartphone screen. To enjoy this VR experience, visitors only use smartphones and VR headsets. That is how virtual reality (VR) is applied as an exhibition in Cilacap Nature Tourism. The use of this technology further adds to the hi-tech impression of tourism services in Cilacap. Therefore, VR Apps Nature Tourism Cilacap always plays an important role in the promotion of tourism and travel, can bring promotion to a higher level.

VR tourism invites tourists to enter the video of the trip

Table 4: Final test results

Aspect to	Index	Category
1	85.33 %	Strongly Agree
2	82.66 %	Strongly Agree
3	83.33 %	Strongly Agree
4	86.66 %	Strongly Agree
5	86.00 %	Strongly Agree
6	80.66 %	Strongly Agree

being shown. They are made as if they are in the same dimensions as the travel video. Coupled with a supportive virtual environment, ranging from sensory simulations such as sight, sound, and even touch will certainly make tourists feel a different experience. If you see the prospect of the benefits of VR, then it is likely that this promotion strategy will be more able to convince potential foreign tourists to visit Cilacap, Central Java, Indonesia.

This VR is a new style of media marketing, which allows users to be more able to experience the experience of traveling through video, very suitable for the tourism world. Basically, this VR tourism experience is very helpful for tour operators. Because what is presented is an intangible product, so that with this VR technology, consumers or travellers are presented with experiences like visiting a destination.

#### 4. Conclusion

This research has provided new empirical insights into the Virtual Reality Experience in Exploring Nature Tourism. It showing that users expressly agree to get new experiences that are unique in exploring nature tours virtually.

Utilization of VR technology can provide opportunities for tourism managers to provide more and interesting information to visitors and can increase engagement with the material and enable visitors to more easily identify unique information. The visitor's response after using this application that they strongly agree by using it can explore the tourist resort interesting and obtain some important information. The future, it will provide added value activities through interesting provisions and interactive experiences, entertainment, and games during parts of the trip to and from tourist destinations. It is very possible to continue to be developed following the technological trends and interactivity.

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