

# VIRTUAL REALITY TO PROMOTE TOURISM IN INDONESIA

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**Abstract**— Tourism is an important source of income for many countries, especially in Indonesia. Indonesia is famous for its archipelago and tropic climate islands. Many tourists have visited Indonesia for leisure, business, and other purposes. To attract and increase potential tourists to travel to Indonesia, a promoting activities need to be done. However, these activities can only be done through a conventional flat display of a television, computer, or a smartphone. The information perceived from this kind of display only brings that much. The potential tourist can only “see” the advertisement, without feeling any interest in it. With the help of Virtual Reality Technology, an immersive advertisement about tourism can be created. Using the Oculus Rift DK2, this paper will explain how to integrate the promoting activities of tourism with the Virtual Reality Technology to create an immersive virtual world of Tourism to attract a potential tourist to visit Wonderful Indonesia.

**Index Terms**— Virtual Reality, Tourism, Virtual World, Oculus Rift, Immersive

## I. INTRODUCTION

Tourism is an important, even vital, source of income for many countries. Its importance was recognized in the Manila Declaration on World Tourism of 1980 as "an activity essential to the life of nations because of its direct effects on the social, cultural, educational, and economic sectors of national societies and their international relations." [2][3]

The Republic of Indonesia is the largest archipelago in the world comprising 13,466 large and small tropical islands fringed with white sandy beaches, many uninhabited and some even still unnamed. Straddling the equator, situated between the continents of Asia and Australia and between the Pacific and the Indian Oceans, it is as wide as the United States from San Francisco to New York, equaling the distance between London and Moscow. Indonesia has a total population of more than 215 million people from more than 200 ethnic groups. The national language is Bahasa Indonesia. [10]

Tourism, especially in Indonesia has become a strategic sector for increasing the economic growth. A strategic plan needed to encourage domestic and international tourist to travel to tourist destination in Indonesia, such as increasing the activities of promoting tourism. With the advancement of technology, promoting tourism can become more convincing.

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Virtual Reality stands for the field of computing which has the objective of creating a virtual world, having one immerse into it and giving one the capability of interacting with this world while using specific devices to simulate an environment and stimulate one by feedback to make the experience as real as possible. [1]

With that in mind, we can develop an application for promoting tourism via VR Device such as Oculus Rift. Where the potential tourists can experience the virtual view of the scenery and feel as if them already at the tourist destination without any expense. With the hope that after using this application, the potential tourists would be encouraged to visit the Wonderful of Indonesia.

## II. TOURISM

Tourism is travel for recreation, leisure, religious, family or business purposes, usually for a limited duration. Tourism is commonly associate with international travel, but may also refer to travel to another place within the same country. The World Tourism Organization defines tourists as people "traveling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business, and other purposes". [2]

Tourism brings in large amounts of income into a local economy in the form of payment for goods and services needed by tourists, accounting for 30% of the world's trade of services, and 6% of overall exports of goods and services. [4] It also creates opportunities for employment in the service sector of the economy associated with tourism. [5]

Indonesia high attainment targets of tourism sector throughout the year 2013 further reaffirmed that the prospect of growing tourism in 2014. In 2013, the tourism sector earned 8,802,129 tourists visit, or grew 9.42 percent, with foreign exchange earnings amounted to 10.054 billion US dollars. This attainment makes the foreign exchange from tourism ranked fourth whereas the first is oil and gas (32 633), then second is coal (24 501), ranked third is crude palm oil (15 839), after this the fourth is tourism has 10 054. [11]



Fig. 1 Tagline and logo to promote tourism in Indonesia: Wonderful Indonesia.

## III. TECHNOLOGY

We perceive the universe through our senses. These senses, sight and hearing among them, are brought into play as soon as we interact with our surroundings. Our sensory organs send signals to the brain, which constructs an interpretation of this interaction. The process of communication, of sending messages from one person to another, is dependent on our understanding of the senses. In general, the more information perceived by the receiver, the more likely it is that effective communication will take place. [6]

With the current technology a couple of human senses can be exploited, sight and hearing. Where digital media can only communicate their information through a display, might it be a television, personal computer, laptop, or even a smartphone. The flat display of these devices can only be perceived that much. But with the recent advancement of technology, the concept of virtual reality has been implemented in the form of head-mounted display. With this device, people can feel the immersion of the world of virtual reality.

Oculus Rift is one of these devices that implemented the virtual reality technology. It delivers the experience through a stereoscopic display mounted on the head of the user. With this device, the user can perceive more information using the sense of sight on interacting with the digital media. The user can feel the immersion of the virtual reality world through the oculus rift as if they are the part of that world.



Fig. 2 Oculus Rift Development Kit 2

The second iteration of Oculus VR is Oculus Rift Development Kit 2 (DK2). The DK2 when compared to its predecessor Oculus Rift Development Kit 1 (DK1), although the weight is heavier the DK 2 features a higher resolution, higher refresh rate, low persistence to remove motion blur, and positional tracking for low latency and precise movements (see Table 1).

Oculus Rift DK1		Oculus Rift DK2	
<b>Display</b>		<b>Display</b>	
Resolution	640 x 800 per eye	Resolution	960 x 1080 per eye
Refresh Rate	60 Hz	Refresh Rate	75 Hz, 72 Hz, 60 Hz
Persistence	~3 ms	Persistence	2 ms, 3 ms, full
<b>Viewing Optics</b>		<b>Viewing Optics</b>	

Viewing Optics	110° Field of View (nominal)	Viewing Optics	100° Field of View (nominal)
<b>Interfaces</b>		<b>Interfaces</b>	
Cable	10'	Cable	10' (detachable)
HDMI included	Yes	HDMI	Yes
USB Device Included	Yes	USB Device	Yes
USB Host	USB 2.0 (Requires DC Power Adapter)	USB Host	USB 2.0 (Requires DC Power Adapter)
Positional Tracker USB	USB 2.0	Positional Tracker USB	USB 2.0
<b>Internal Tracking</b>		<b>Internal Tracking</b>	
Sensors	gyroscope, accelerometer, and magnetometer	Sensors	Gyroscope, Accelerometer, Magnetometer
Update Rate	1000 Hz	Update Rate	1000 Hz
<b>Positional Tracking</b>		<b>Positional Tracking</b>	
Sensors	CMOS Sensor	Sensors	Near Infrared CMOS Sensor
Refresh Rate	60 Hz	Update Rate	60 Hz
<b>Weight</b>		<b>Weight</b>	
Weight	380 grams	Weight	440 grams (without cable)
<b>Included Accessories</b>		<b>Included Accessories</b>	
Included Accessories	HDMI to DVI Adapter DC Power Adapter International Power Plugs Nearsighted lens cups Lens cleaning cloth	Included Accessories	HDMI to DVI Adapter DC Power Adapter International Power Plugs Nearsighted lens cups Lens cleaning cloth

Table 1. Comparison of Oculus Rift DK1 Versus Oculus Rift DK2 [9]

Oculus Rift has integrated support for Unity 5, Unreal Engine 4, the Unreal Development Kit and Cry Engine 3 to make development and integration for the Oculus Rift as simple as possible. This paper will explain how to integrate the game engine technology Unity with the Oculus Rift DK 2 to create a virtual world of tourism. Where the potential tourist can visit their travel destination virtually and then encouraged actually to travel to that destination. [8]

#### IV. IMPLEMENTATION

Video games are a media that can be used to advertising an industry product. With the same process, this media can also be used to advertising or to promote the tourism industry in Indonesia.

Unity is a flexible and powerful development platform for creating multiplatform 3D and 2D games and interactive experiences. It's a complete ecosystem for anyone who aims to build a business on creating high-end content and connecting to their most loyal and enthusiastic players and customers. [7]

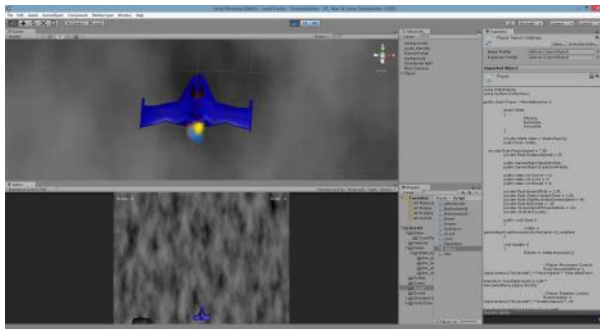


Fig. 3 Unity 5 Game Engine Environment

Using the Unity 5 game engine, an open world simulation game will be developed. In this simulation game, the environments will be modelled based on the actual tourist location, where the user can interact directly with it.

The integration of Oculus Rift DK2 in the development process of this simulation game of tourism will create a major effect of how the user will interact with the environment. The immersion given by the virtual reality will be deeper. Because of this, the information perceives by the user will be better.

#### A. User Interface

The best approach to give a good level of immersion is to create a first person view simulation games. Furthermore, with the oculus rift DK2 integration, first person view is a must. It is because the displays provided by the Oculus Rift are stereoscopic, where each display positioned exactly at the front of each of the user's eyes.

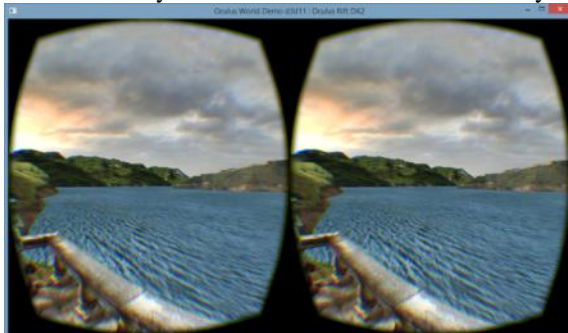


Fig. 4 Stereoscopic Display of Oculus Rift DK2

Oculus Rift has a built-in tracker, which can track the movement and position of the user's head. This feature gives a realistic feedback to the user when they are exploring the virtual reality world. The low persistence of DK2 is also helping the user to interact with the virtual world by minimizing the motion blur when the user is moving their head.

On exploring the virtual world of tourism, the user needs a joystick or controller. So the user can freely move

around the virtual world wherever they want, the vastness of the virtual world are their limit.

#### B. System Development

The development of this application consists of several phases. The first phase is to create the 3D model of the tourist destination environment which will be implemented on the system. The 3D modelling process will be done on the Blender 3D Software.

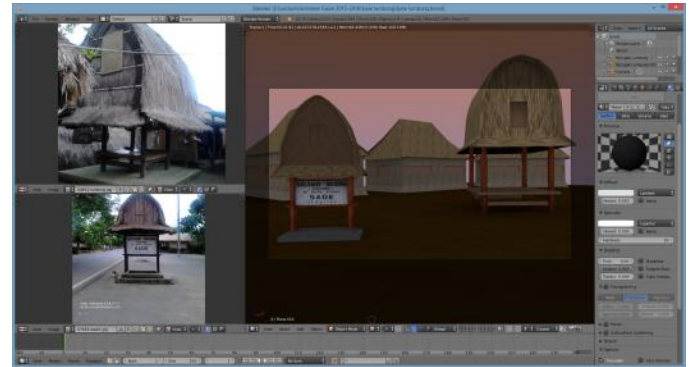


Fig. 5 3D Modelling Process on Blender

After the first phase, the development phase will be continued to import the 3D Environment model from Blender to Unity Game Engine. In this phase, the process of scripting the programming language C# will take place. The logic utilization of this application mostly will be implemented in here.

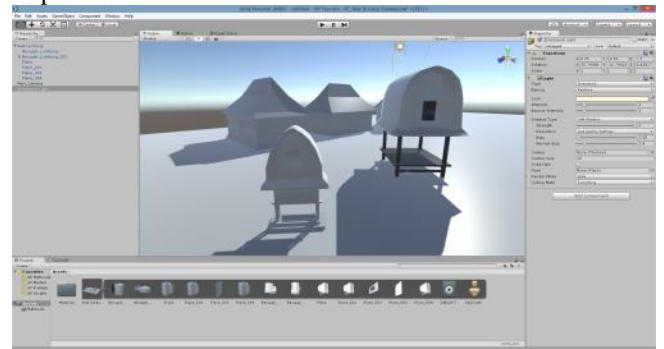


Fig. 6 Importing the 3D Environment from Blender to Unity

The third phase is to integrate the Oculus Rift DK 2 with the application. The process is simple because the Software Development Kit and utilities that have been provided by Oculus simple indeed. Just drag and drop the library for unity from the Oculus development site, and the Oculus will integrate instantly.

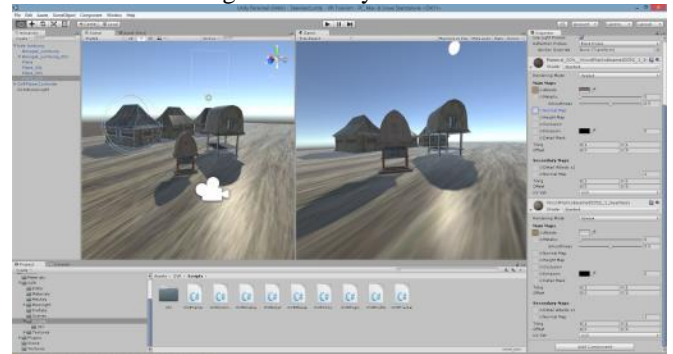


Fig. 6 Integrating the Oculus Rift DK 2 to Unity

The last phase is where the final touch for the application will be done. Beta testing of the application also will take place in this phase.

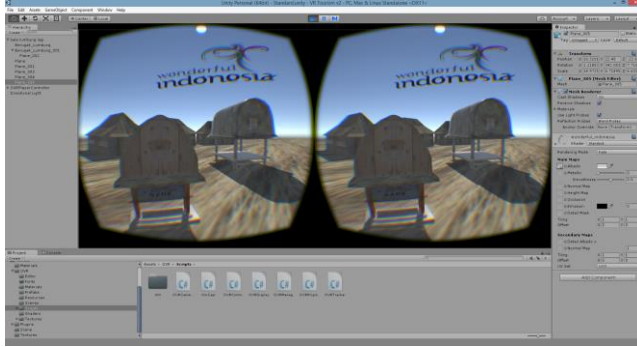


Fig. 7 Beta Testing the Application

## V. CONCLUSIONS

Tourism is one of the biggest contributors to the economy that can help the growth of a country, especially Indonesia. By increasing the promoting activity in tourism areas, it may increase the interest of potential tourists to visit Indonesia.

With the help of the Oculus Rift, the prospective tourists will feel a new sensation of tourism advertising.

They can interact directly with the tourist destination virtually. Therefore, the information that they perceived will be better and not limited by time and cost constraint.

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