Developing Virtual Reality Apps to Enhance Tourism

Kundan Khandare[1], Shashikant V. Athawale[2] (Assistant professor)
khandarekundan@gmail.com[1] , svathawale@gmail.com[2]
Chinmay Deshpande, Samruddhi Sonawane, Shashank Zanzad
Department of Computer Engineering, AISSMS COE, Pune, India
Savitribai Phule Pune University

Abstract

In the tourism sector, virtual reality has been used to develop a one-of-a-kind, immersive experiences that give visitors a sense of being there in person. The user is immersed in a three-dimensional experience thanks to virtual reality. Users engage with 3D worlds instead of just seeing a screen in front of them. Virtual reality can be utilized in the travel business to capture tourist places in a distinctive and immersive way. These virtual travel experiences try to replicate the genuine destination as closely as they can. The use of virtual reality (VR) in tourism is currently widespread. People enjoy travelling and learning about new locations, and thanks to virtual reality (VR), they can now learn about and experience a place without actually being there. VR is a fantastic tool with many dimensions and applications. This paper focuses on the implementation of Virtual Reality in the real world through the use of various devices , sensors.

Keywords: Virtual Reality, Virtual Tourism, Tourism

Introduction

Virtual reality (VR) transports the person into a new environment, often using VR goggles. The goal is to shut out the physical space and make the user feel like they are immersed in a new digital world — real or imaginary. Virtual reality software creates a new world by:

- Developing objects that exist in a virtual 3D space.
- Adding in sensory feedback to give a sense of presence — for example, sound or haptic feedback.
- Emerging the user in interactive elements.

A variety of devices can provide a realistic VR experience, but the most direct approach is with a VR headset. These devices, while all somewhat unique, each react to the movements of the user's head and eyes. In other words, when you turn your head to the left, the display moves accordingly. To enhance this further, a stereoscopic display creates a 3D simulation. Compared with more familiar 2D technology, 3D stereoscopic displays have an increased number of pixels. This helps to give even more depth and definition to the image and environment. Basically, the technology in each VR headset helps trick your mind into perceiving the virtual world in the same way it perceives the real world, thus creating a fully immersive experience.

The VR Application Development Process

Mobile application development companies are already at the forefront of improving and disseminating the use of VR technology. This is largely done through the integration of VR application development. VR has proven to be one of the hottest app development trends and has already been embraced by many large companies. Big businesses like Sony, Meta, and Samsung have already created VR enabled devices and apps.

No matter the industry, VR application development follows a similar path.

Step 1: Define App Concept & Goals

Before diving into the "how," it's first important to address the "what." The most important step in creating a VR app is to define clear goals for what you want your app to achieve. It is only once you know *what* you want to build that you can start to answer the question of how you're going to build it. Without clear goals and parameters, you'll never have a clear vision. Without a clear vision, you can't create a cohesive and precise VR experience.

When defining your app's goals, it's critical to look at your app from the point of view of the user. What will they expect? What do you want them to experience? At this stage, features that create an immersive and compelling experience must be considered.

Step 2: Platforms

Once you have a clearly defined concept and goals for your app, it's time to begin the actual development process. The first part of this process is to choose an appropriate platform and a software development kit (SDK). Choosing a platform is an essential part of the development process and can have direct influence over app adoption rates. This, in turn, has a big effect on revenue.

Consider these questions when deciding on a platform:

- Are you developing for Android, iOS, or both?
- Which devices are you considering?
- Are you developing your VR app inside VR providers, like Oculus, or will it be stand-alone?
  Some VR platforms, like SteamVR, XboxVR, and Oculus Home provide a complete set of VR development tools. If you choose one of these platforms and utilize their tools, you won't need any further software installation.

Step 3: VR Engines

Another critical element to VR application development is the selection of an appropriate engine. Often referred to as "game engines," engines store all the data that users will see and interact with in the virtual environment. What's more, engines render all the virtual images, and provide the input methods users will ultimately use. The most popular VR engines include Unreal Engine 4, Unity, Google VR, and Amazon Sumerian.

Many of today's engines are available to use for free. Additionally, some engines are easily integrated with specific software SDKs and multiple application programming interfaces (APIs) can be used to customize the engine to your app's specific needs.

Step 4: Hardware

When it comes to mobile VR application development, there are two main categories for the types of devices available for experiencing VR:

- **Handheld VR viewers:** These devices are quite basic and do not offer a head strap. That means the virtual environment is experienced by attaching the mobile device to the VR viewer and

holding it up to the user's eyes. This style of VR hardware has only one point of input – the smartphone itself. Cardboard-compatible designs, like Google's discontinued Google Cardboard, are an example of this.

- **Wearable VR Head-Mounted-Displays (HMDs):** HMDs are more technologically robust than handheld VR viewers and often include some form of controller for improved input. They allow a smartphone to be inserted into the headset, offer strapping in different forms, and include features to enhance the VR experience.

Deciding on the kind of hardware you want to use to run your VR app is critical. Generally speaking, it's preferable to choose an option that is battery-efficient and comfortable to use.

Step 5: Designing & Prototyping

As with other applications, VR app development involves a lot of design. After all, what good is a VR environment if it doesn't look good? When it comes to designing a VR app, it's wise for developers to consider prototyping the VR experience. This aids in testing concepts and systems, and validating the app's original goals.

Additionally, prototyping helps test that your virtual environment accurately conveys a sense of scale, uses all the hardware's sensors correctly, has an accurate user viewing position, and more.

What Software Is Used for Virtual Reality?

VR needs to not only look real but feel real. Virtual reality software development tools can make that happen. And you can get some virtual reality software free.

Software Development Kits (SDKs)

A software development kit (SDK) includes a set of software tools and programs used for specific platforms. It can include libraries, samples, process, guides, tutorials, blueprints and more. For VR software development, the VR SDK you select determines the hardware your users will need. It is important to research options and determine the best fit for your product. Some of the most popular SDKs for VR software development include:-

1) HTC Vive

OpenVR SDK is an open VR software development kit (SDK) and API that supports HTC Vive and other VR headset related devices. SteamVR SDK and VRTK (Virtual Reality Tool Kit) are also used for HTC Vive. These offer additional benefits like access to controllers, chaperoning, models, and preview in Unity play mode.

2)Sony Playstation

To develop for the Sony PlayStationVR, you need to have PSVR Dev Kit and to become a registered developer. Features of this VR SDK include 360-degree vision, incredible visuals/audio, and enhanced tracking.

3)Oculus/Samsung

Considered the best SDK for Oculus Rift, Oculus SDK comes with game engine specific kits. It also includes sample assets, audio packages, and more. There are also supporting SDKs for Windows and Oculus Mobile. The Oculus Mobile SDK has been used for the Samsung GearVR and includes tools and libraries for C/C++.

Game Development Engines

Game engines are vital for VR software development. Using a game engine allows you to bring all your assets together and gives you a powerful editor for 3D elements. They integrate with artist and designer tools, as well as CAD software, to help you build realistic visuals and experiences.

1)Unreal Engine 4

Unreal Engine 4 (UE4) offers teams a powerful set of VR software development tools. It works with a multitude of VR technologies. With UE4 you get:

- Access to scripts in C++ and/or Python to customize the tool for your needs.
- Multiplayer framework combined with a flexible editor.
- Blueprint visual scripting which helps you design prototypes fast.

2)Unity

Unity is well-known for game development with a specialty in mobile. But it also can be used to design VR solutions. Teams across industries have used it to design training and simulation because it works well with all popular VR platforms. With Unity you get:

- Powerful 3D editor.
- Built-in artist and designer tools, as well as support for CAD tools.
- Collaboration features that streamline your process.

3)Cryengine

CRYENGINE is well known among game developers. But it is also a powerful VR software development tool. It works with a variety of platforms. With CRYENGINE you get:

- Stunning visuals to create characters.
- VR app that can be used with their sandbox tools.
- Built-in audio solutions to design a truly immersive experience.

Conclusion:

This paper focuses on virtual tours using virtual reality. With the strides made in technology and the increase in user adoption rates, VR application development is both tempting and profitable. VR technology provides tourism sector with a chance to fully connect with tourists. Virtual reality offers the opportunity to create a new sense of engagement and authenticity between the destination and the visitors. Virtual reality technologies are an effective means of immersing users in digital experiences, which in turn enables users to interact with destinations in more meaningful ways. The idea of virtual tours was supported by an android application which contains some additional features as well for its users. A quality virtual travel app will give users some wonderful world experiences. All in all, a good virtual reality apps have a huge impact on tourist and the tourism industry.