Virtual Campus Tour Using VR

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Abstract

In this era of rapid technological innovation, the idea presents an innovative approach to creating a virtual tour of a campus using only cell phones. Using mobile photography, we capture panoramic images of campus landmarks and employ advanced stitching techniques to create an immersive and interactive virtual experience. Using this low-cost, readily replicable method, academic institutions may showcase their campuses globally, giving stakeholders and prospective students a feeling of accessibility and community. The process entails using the power of contemporary cellphones to take high-resolution pictures, guaranteeing an exquisite portrayal of the campus landscape. The resulting virtual tour improves the user experience overall with information overlays and straightforward navigation, in addition to being a useful marketing tool for schools. The approach helps to democratize educational access by decentralizing the process of providing virtual tours.

Keywords: *Decentralizing, Stitching, Navigation, Panoramic images.*

1. Introduction

The introduction of cutting-edge solutions into the constantly changing field of educational technology is redefining how educational establishments are perceived and engaged with. This study introduces a novel initiative aimed at transforming virtual campus tours by leveraging the widespread use of smartphones. In an era where potential students seek more than static brochures, [1] the method presented in this study harnesses the power of mobile photography to create a dynamic instrument for generating visually stunning and immersive virtual experiences. Traditional campus visits can be resource-intensive and pose logistical challenges. By tapping into the capabilities of smartphones—ubiquitous devices that have become indispensable in daily life—this concept overcomes these constraints. The study demonstrates an economical and successful approach to creating extensive virtual tours by combining sophisticated stitching [2]. Algorithms with smartphone pictures. These tours provide a cross-border, interactive, and user-friendly platform while showcasing the physical features of the campus. In examining the novel approach, this paper explores how it promotes connectivity, accessibility, and engagement while delving into the specifics of the research. [3] Adding to the larger conversation on the democratization of educational access, the innovative method for virtual campus tours is presented as a tool to encourage academic institutions to utilize technology for creating an engaging and welcoming environment for all participants.

2. Proposed System

Our creative method of creating a virtual tour of the campus is based on how widely used cellphones are, which means that specialized gear like 360-degree cameras or more advanced photography equipment are no longer required. Our suggested approach takes advantage of the widespread availability of modern smartphone cameras and their increasingly advanced

capabilities [4] to make the process of creating a thorough virtual tour both affordable and accessible. The fundamental component of our system revolves around the intelligent use of smartphone cameras, particularly those equipped with wide-angle lenses. Opting for the wide-angle feature ensures the capture of large scenes in a single frame, minimizing the need for laborious manual stitching and enhancing the speed of image acquisition. This strategic decision simplifies the overall process of creating virtual tours, streamlining the photographic workflow. To seamlessly combine separate photos, we employ sophisticated stitching tools. [5] These software programs are not only easily accessible and user-friendly but also highly skilled at precisely aligning and merging photos to construct a seamless and engaging virtual world. By not relying on specialist cameras, our method becomes more cost-effective and democratic, enabling educational institutions with limited funding to showcase their campuses attractively. In summary, our proposed solution offers an affordable and effective alternative to conventional techniques that rely on expensive equipment. By harnessing the capabilities of smartphones with wide-angle lenses and utilizing stitching software, this approach aligns with current technical trends and the overarching goal of making virtual campus tours a flexible and widely accessible teaching and learning tool. [6] The process of creating 360 pictures is shown in Figure 1.
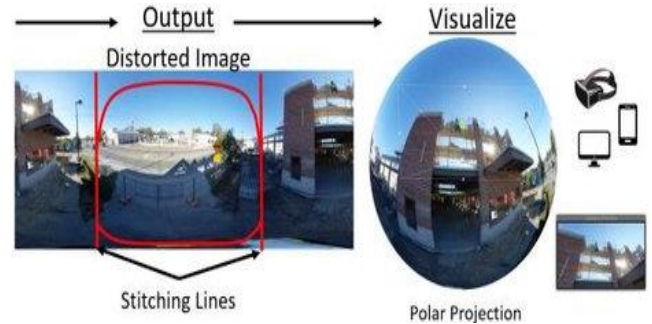

Figure 1 Process of Creating 360 Pictures

2.1 Procedure Capturing Images

Gimbal Setup:
To ensure smooth and controlled movement, start by setting up the gimbal and making sure it is stable and properly calibrated. [7]

Smartphone Mounting:
Assure a steady and level orientation by firmly mounting the smartphone fitted with a wide-angle camera onto the gimbal.

Camera Configuration:
To get the best possible image quality with high resolution and clarity, adjust the camera's settings. Turn off any settings that could lower or compress the quality of the images. [8]

Wide-Angle Mode:
To get a complete perspective of the surroundings, use the smartphone camera's wide-angle mode to capture large scenes in a single shot.

Stabilized Shooting:
Make use of the stabilization functions on the gimbal to take crisp, shake-free pictures. By doing this, the virtual tour is guaranteed to remain polished and eye-catching.

Strategic Angles:
Strategically arrange the images such that important landmarks and places of interest are captured. Make sure there are multiple perspectives to give a comprehensive picture of the school landscape. [9]

Consistent Overlapping:
Keep the overlap between successive shots constant so that post-processing may be done seamlessly. This guarantees that the final virtual tour's image transitions are smooth and seamless.

Lighting Considerations:
Take note of the lighting and take pictures in the best
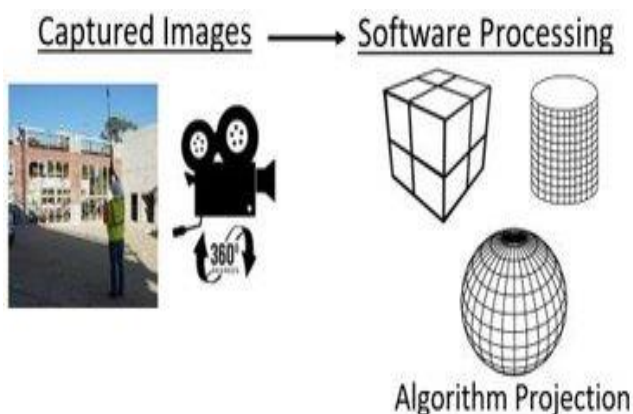
possible daylight to maximize brightness and clarity. As necessary, change the exposure settings to account for various lighting conditions. [10]

Pixel Integrity Check:
Check the taken pictures from time to time to make sure the pixels and clarity are still there. To preserve image quality, fix any focus or exposure problems right away.

Review and Refinement:
Once the photos have been taken, go through them on the smartphone to find any missing information. Retake some of the images if needed to ensure a thorough and eye-catching virtual tour. [11]

2.2 Procedure Stitching

Transfer Images to Laptop:
To enable smooth data transfer, USB-C cables should be used to connect cell phones to computers.

Organize Image Files:
To guarantee a smooth workflow when stitching, make a special folder on the laptop and arrange the photos in a methodical manner.

Select Stitching Software:
Pick a dependable stitching program with capabilities that help you create panoramic images. Well-liked choices consist of Hugin, Adobe Light room, and PTGui. [12]

Import Images into Stitching Software:
Launch the stitching program of your choice, then import the well-organized photographs into it.

Arrange Images:
To keep the virtual tour's logical flow intact, arrange the imported photographs in the right order.

2.3 Procedure Adding Pics into VR Tour

Create VR-Compatible Format:
To ensure compatibility with virtual reality platforms, convert the Figure 2 shows stitched images into a format that is compatible with virtual reality. 360-degree photospheres and other forms suitable for virtual reality applications are common formats. [13] Main Block image shown in Figure 4.

Utilize VR Tour Software:
Make Use of VR Tour Software: Incorporate the VR-ready photos into VR tour software. This software makes it possible to create a virtual environment that is navigable and interactive.

Map Images:
Carefully arrange the images in the VR tour program so that they line up with the campus's layout. Make sure the order is clear and easy to follow for a smooth navigation experience.

Add Hotspots:
Place interactive hotspots throughout the VR experience at strategic points. Users can browse to these hotspots, which act as clickable points that offer further details or insight on particular campus elements. [14]

Incorporate Navigation Elements:
To make the virtual tour easy for users to navigate, provide user-friendly navigation elements like menus or directional arrows.

Embed College Logo:
Use the college logo to cover up any distracting features, like tripod stands, by placing it strategically across the virtual reality area. Make sure the brand blends in seamlessly and doesn't detract from the overall impression. [15]

Exporting a VR Tour Package:
It is essential to export the tour package in an easily navigable manner after the virtual tour has been painstakingly created within the VR tour program. Software for virtual tours usually has a number of export options, giving it flexibility to accommodate different user preferences and platform types. A VR tour can be exported from such software in a few different ways.

Web Embed Code:
Create an embed code for consumers to easily incorporate the virtual reality tour into their websites. This makes it simple to share and embed on websites of educational institutions or marketing platforms. [16]

Offline Package:
Export the virtual reality tour to an offline package, which users can download and utilize off the internet. In circumstances where access to the internet may be restricted, this alternative is beneficial.

Executable File (.exe):
Create an executable file (.exe) so that users can use it to run programs on their computers. This format provides a practical offline usage option and is

appropriate for stand-alone apps.

Mobile App Package (.apk, .ipa):
Android (.apk) and iOS (.ipa) mobile app packages: Package the virtual reality tour into these mobile app formats so that consumers may access it on their tablets and smartphones.

360-Degree Video:
Create a 360-degree video file by exporting the virtual tour. This format offers a more immersive experience to a wider audience by being compatible with VR headsets and video-sharing sites. Stitched 360 Library image shown in Figure 3.

Social Media Sharing Links:
Provide straight sharing links that work on well-known social media networks. This makes it easier to share the VR tour on social media sites like Facebook and Instagram, which expands its audience. Innovation centre shown in Figure 5.

Cloud Hosting Services:
You can export the VR tour bundle to be stored on Dropbox or Google Drive. After that, users can access the tour via shared links, which improves distribution and accessibility.

HTML5 Package:
To ensure compatibility with contemporary web browsers, export the VR tour as an HTML5 package. With this format, consumers don't need to install any additional plugins to experience the virtual tour straight in their web browsers.

QR Code:
Create a QR code that, when scanned, takes users to the VR tours download or online version. This method works especially well with mobile devices.

VR Platform Integration:
Export the virtual reality tour in a format that works with well-known VR platforms, such Oculus or HTC Vive, so that consumers may utilize specialized VR hardware to experience the tour.

LMS Integration Package:
Construct a package that is intended only for Learning Management System (LMS) integration. This makes it easier to integrate the VR tour into learning platforms and makes it a useful tool for exploring campuses virtually in the context of online courses or traditional classroom settings.

3. Results

The smartphone-based Campus Virtual Tour presented here offers an engaging and cost-effective virtual experience through the utilization of wide-angle pictures and sophisticated stitching tools. Throughout the campus, strategically marked hotspots enrich the virtual reality tour, seamlessly merging photographs captured using smartphones. A distinctive aspect of our method is the deliberate exclusion of dedicated cameras, as the effective wide-angle lenses of smartphones proficiently capture expansive scenes. Additionally, we intelligently employ virtual reality tour software to export the experience in various formats, ensuring cross-platform accessibility. Export options encompass mobile app bundles, social network sharing links, executable files, and site embed codes. Furthermore, the strategic integration of the college emblem serves a dual purpose: enhancing branding and discreetly concealing tripod stands within the virtual reality setting. The result is a dynamic, intuitive, and visually stunning cross-border virtual tour. This flexible tour package caters to diverse preferences, offering options from comprehensive web integration to offline exploration. The tour's adaptability seamlessly aligns with contemporary educational trends, providing schools with a cutting-edge tool to comprehensively showcase their campuses.

Figure 2 Stitched 360 Image 1

Figure 3 Stitched 360 Image 2 Library

Figure 4 Stitched 360 Image 2 Main Block

Figure 5 Stitched 360 Image 2 Innovation Centre

Conclusion

The Campus Virtual Tour, which can be accessed using a smartphone, is evidence of the effective integration of creativity, accessibility, and immersive technology in educational outreach. The power of everyday gadgets has allowed us to democratize the creation of virtual experiences, providing educational institutions with an attractive and reasonably priced tool. The virtual tour may be viewed by numerous users across various platforms due to the multitude of export options. In addition to reinventing the traditional campus tour, this initiative adheres to the contemporary idea of leveraging technological innovation to raise student awareness and involvement.

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