Enhanced Visitor Experience Through Campus Virtual Tour

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Abstract: With the growth of technology through years, the marketing industry able to evolve to be more competitive with their competitors and also increase the volume of potential buyers towards their products. Together with the capabilities of the Internet nowadays Virtual Tour have became a popular way of travelling through space or time, which has been used for varieties of industries from travel tours, viewing architecture buildings, estate agencies, park, campus tours and others. The education industry did not miss out this opportunity due potential student might not be able to physically visit every campus before enrolling and continuing their studies. In this paper, Asia Pacific University of Technology & Innovation, Malaysia has been chosen to be the case study of the Virtual Tour implementation by using the photo-stitching technique where it generates the panoramic view of the campus area which will enhance the journey when interacting with the APU website. The aim of this research is to mimic the real world with computer generate environment and increase engagement of users with the enhanced Virtual Reality technology. Research results shows that with the embedded Virtual Tour in the APU website, it is more effective to user engagement together with the feeling of reality, immersion and popularity towards the APU website.

Index Terms—Campus Tour, Immersive, Panorama, Photo-stitching, Virtual Reality, Virtual Tour

1. Introduction

Asia Pacific University of Technology and Innovation (APU) is one of the most Malaysia’s premier private universities. APU has earned enviable reputation as an award-winning university through their achievements in winning a host of prestigious awards at national and international levels.

There are various ways the university used in representing their campus, facilities, services and others to the customers such as website, brochures, school tours and others. But those mediums illustrate more on still images together with some videos, which does not able to engage the user more and not all potential student or parents are free to come at the intended time and venue created by the university.

Research have shown that with the expansion of the Internet use, Virtual Tour became trending in increasing the user engagement towards the product delivered and it is widely being used in different field such as medicine, engineering, computer science and others [1].

With the virtual tour it will allow the parents together with the potential student to visualize and explore much better about the campus environment and others where it can give a huge impact for them in making the final decision on which campus to choose in pursuing their studies.

The main goal of this paper is to evaluate the effectiveness of the Virtual Reality implementation in the website in determine the engagement of the user with the services provided through the APU website. Due to the difficulties such as timing, location, transportation that might arise on the student and family side, virtual reality able to provide another way to the user in accessing the campus anywhere.

2. RELATED WORK

There are a numerous virtual tour application implemented around the world. In Malaysia, there are a few universities, colleges and even private schools have implemented the virtual tour in promoting their products and services to potential student and parents.

Most of the virtual tour designed by the institution are web-based application and created using the photographs stitching method. The purpose of stitching multiple images is to create beautiful high-resolution panoramas. And most of the virtual tour created is focused on series of panoramic pictures, rather than focusing on the quality and the experiences.

Photo stitching technique is widely used as one of creating many projects for virtual tour, where in Tsinghua University Virtual Tour, photo stitching have been used apart from different techniques used in creating their fantastic panorama view [2].
According to the Bakirman (2012) [4], the walkthrough for their specific faculty, was created using panoramic image through photo stitching technique apart from another techniques implemented in their virtual tour project. With the evolution of virtual tour, it became a trend in having a tour delivered online where visitors use their mobile devices / gadgets a lot in their daily routine[5]. Table 1 shows the summary of review towards three institutions, which the virtual tour have implemented in their main webpage. Based from the analysis, it shows that most of the virtual tour created are the desktop –based virtual tour and is not available through mobile devices.

| Institution          | Features                  | Monash University | The Alice Smith School | INTI University |
|----------------------|---------------------------|-------------------|------------------------|-----------------|
|                      | Interaction               | Drag moving around video | Hot spot and button navigation | Button navigation |
|                      | High quality photo / 3D model | Yes               | Yes                    | Yes             |
|                      | Multiple view point       | No                | Yes                    | Yes             |
|                      | Instruction to use        | Yes               | Yes                    | Yes             |
|                      | Device compatibility      | Desktop           | Desktop                | Desktop         |

Table 1: Review of Existing Virtual Tour

3. Implementation

In creating the virtual tour there are few methods, which can be used to create the panoramic images. For this research, panoramic images are created through stitching method, image collection with overlapping views in providing more effective information besides improving photo resolution.

For this research specific devices were used in capturing images of the APU surrounding which are library, classroom, laboratory rooms, offices and others. By using the Mi Sphere 360 camera, it speeds up the process since the device come with image converter where it is used to stitch the image for the next process rather than using another software to do it. In creating the panorama view, photo stitching is used. It is the process of combining multiple photographic images with overlapping fields [3]. Figure 2 shows the spherical image from the Mi Sphere device and the Figure 3 shows the stitched photo from the converter.
Once the photo stitching are done, Adobe Photoshop is used in enhancing the quality of the images. This is essential where it enhances the quality of images for human viewing by removing unnecessary noise, blur, increase contrast and others.

CUPIX is a cloud-based software company that developed a state-of-the-art 3D virtual tour solution that gives users easy way to capture an indoor scene and create a true-to-life virtual experience. The panoramic images are uploaded into the software and automatically connects the scenes. Further modifications were done towards determining the hotspot for the virtual tour, see Figure 4 below.
Figure 4: Overall view of the virtual tour creation using CUPIX software

Upon completing the components of the campus virtual tour, a web site has been developed to host the application. Figure 5 shows sample codes written in HTML5.

Figure 5: HTML5/CSS/JavaScript and Link for Virtual Tour

4. Result and Discussion

An APU landing page appears when visitors visit the virtual tour. Different sections of the website includes the “Take A Tour” button, which directs the visitor to the main entrance of the campus as shown in Figure 6. Users can navigate forward or side-wards using the mouse or keyboard to explore the selected area.
5. Conclusion and Future Work
With the implementation of the virtual tour it enhances the visitor experience toward exploring the campus. This helps in providing an alternative way to the potential student and parents to conveniently tour the campus without coming to the physical building of the university. It also helps new students be familiarized with the campus environment as they can easily view and read information about the campus through the software.

In enhancing the quality and the features of APU virtual tour, below are couple of suggestions, which could be possible in the future:
1. Current user needs to select one specific block/area to navigate. The virtual tour application can be improved by combining all the blocks/area into 1 single environment where the visitor can walk directly in the 3D environment to the others block.
2. Virtual tour guide can be developed in guiding the visitor such placing instructions and advice the visitor how to navigate through the application.

6. Acknowledgments
Authors would like to thank Asia Pacific University, Malaysia for the international conference opportunity also for journal publication.

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