"NEW NORMAL" CONCEPTUAL APPROACH; AUGMENTED REALITY (AR) TOURISM IN TERENGGANU

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ABSTRACT

Tourism is one of the sectors that has been badly affected by the COVID-19 pandemic. Consequently, governments around the globe have taken measures to ease the economic downturn in households and businesses activities to prolong survivability among public. In the longer run, this tourism industry will desperately need to adapt to a post-pandemic "new normal" to sustain the income of its tourism players and operators. An alternative in coping with the new normal is to migrate from the classical model to advanced or high-technology approaches. "High-Tech" devices or tools can play an important role toward the recovery of the turmoil of the tourism industry due to this pandemic. Under the new SOP to alleviate this c-19, health conscious and hygiene protocols, and as well as social distancing are likely to remain in place for a foreseeable future. Unavoidably, touchless services delivery and investments in digital technology could facilitate the industry recovery. The use of modern technology becoming a necessity of many destinations to stay competitive and attractive to the new norm of the tourism industry. A new form of technology that could be suitable to regaining the tourism industry is by using the concept of virtual and Augmented Reality (AR). The aim of this paper is to give an insight on the basic design of a mobile AR Tourism application for Terengganu state which designed to pique the attention of locals and visitors alike in Terengganu's tourism destinations. The accessibility of this application is not limited by space or time and can be accessible anywhere or at any time. Several interested places will be selected for AR Tourism research and practice. The AR Tourism application will be designed to serve a specific purpose for the user, while multi-language functionality, ease of use and the capability to personalize the application are among the main requirements that need to be considered in attracting tourists and encourage regular usage among tourism enthusiast.

Keywords: Tourism, Augmented Reality, AR Tourism, Covid-19, Mobile Application.

1.0 INTRODUCTION

Given the recent COVID-19-related lockdowns and travel bans, new tourism strategies are needed to meet the growing demand for innovative products and services while also ensuring long-term sustainable development. The tourism industry's exponential growth in the last five years has posed significant challenges in tourism marketing. The utilization of current technology is critical for many destination-marketing businesses in order to create a competitive opportunity. The tourism industry has pinpointed mobile-based virtual experiences

as a possible way to improve the existing situation (Yagol et al., 2018; Cranmer et al., 2020). Museums have already started to conserve media such as radio, video clips, and photos in order to enhance the visitor experiences, however the approach were lacks in the interactive aspect of tourists and technology (Vassilakis et al., 2017).

Augmented Reality (AR) is experiencing rapid development and implementation in many industries (Wrenn, 2012; Zulfabli et al., 2019). Although attempted in various ways, the use of Augmented Reality for tourism purposes such as outdoor navigation (Reitmayr et al., 2004), tourist binoculars by overlaying interactive information (Fritz et al., 2005) and reconstructing archaeological information (Vlahakis et al., 2001) has yet to be thoroughly investigated in order to present a valid model of implementation. The status of AR studies in tourism have not yet been mapped. In a nascent area like this, a review of previous research is critical to revealing the current state of the field and providing guidance to researchers interested in participating (Chuah, 2018).

AR is a unique user interface technology which provide innovative ways to transfer knowledge or information. Aside from that, despite the technology's interest, no mobile AR application about Terengganu tourism has been produced to promote Terengganu itself. Furthermore, the end-user point of view has been widely neglected in the development process of AR in tourism. Therefore, the aim of this paper is to discuss the concept to implement AR technology in tourism industry. More specifically, mapping the trajectory of research to date will help researchers identify trends and determine the subjects which are of continuing importance.

2.0 AUGMENTED REALITY IN TOURISM

In general, Augmented Reality refers to the use of computer-generated content to augment the real world, which is now largely supplemented with graphical content (Hyun et al., 2009). Even though Augmented Reality technology has been around for more than a decade, it is still a relatively new concept in the tourism industry, and it has not yet reached its full potential (Bottani & Vignali, 2019). As a result, accurately defining Augmented Reality is always a challenge. AR provides significant benefits for many industries due to its nature of mixed environment, or computer enhancement of real world's setting (Azuma et al., 2001; Reinhart et al., 2003; Van Krevelen et al., 2010: Kaplan et al., 2021). Academics as well as industry practitioners argued that Augmented Reality provides many opportunities for mobile computing applications, which need to be seized in industries such as tourism, as being linked with the context of the immediate location (He et al., 2018).

Augmented Reality has been deemed to have a great potential for the tourism industry due to its ability to enhance the local surroundings (Han et al., 2019). Tourists are those who have "little or no awareness of the area" (McKercher et al, 2003). As a result, a location-based technology that can access information in the immediate vicinity would be extremely beneficial to this industry. The usage of Augmented Reality devices has the potential to develop the next generation of computerized tourist guides, as travelers are generally interested in their surroundings (Hughes, & Moscardo, 2019). According to Höllerer and Feiner (2004), the user interface should not only be able to pinpoint the user's location, but also provide background information of the area that might be of interest. This concept has sparked a lot of interest in developing a tourism application for mobile phones. Such applications are always being updated in order to improve their effectiveness and ensure that they are fully functional. The city of Vienna offers a tourist guide application that can both navigate the user to specific attractions and provide location-based information on multiple locations that can be selected at will (Cauchi, & Scerri, 2019). Thus, it is multiple-user friendly, which allows various users to

share information, while constantly being mobile supporting the trend of social networking

In order to continue attracting visitors, the tourism industry needs to invest in new technology on a regular basis, ideally for mobile use (Han, & Jung, 2018). It was argued that this is a great challenge for many destinations around the globe that lack sufficient funding opportunities (Fritz et al., 2005). As of 2021, the majority of smartphones provide navigation, GPS map-based systems, which are able to pinpoint the user's exact location. The literature states that mobile phones are able to access up to date content, flexibly to deliver text, image and video data and can provide additional information on a map-based system. However, such programs are currently being improved, as their capabilities are limited and they do not provide multi-user functionality (Kečkeš, & Tomičić, 2017).

Current AR implementations in tourism do not effectively engage users and do not deliver a better experience for visitors. Furthermore, it has not yet been perfected and contains numerous flaws that must be addressed before it is released to the general publics. Another challenge is getting people to accept and use these devices, as many travelers still prefer conventional sources like travel books and other forms of media (Mieli, & Zillinger, 2020). Nonetheless, due to its practical utility, which can be used both indoors and outdoors, Augmented Reality has a great chance of becoming a mainstream technological tool in tourism in the future (Fritz et al., 2005).

3.0 AR TOURISM APPLICATION

The AR Application will be able to deploy a 3D model to an Augmented Reality (AR) content which is in animated 3D model input format. Figures 1 and 2 show the example of 3D model and animated 3D input format in AR device. The deployed content will be device agnostic. The AR application core engine can be used by Android OS and IOS. The software will not require a custom version of OS for the content to utilize and will be installed in a standard OS version for smart devices. Thus, the application can be used by a user selected smart device such as phone and tablet.

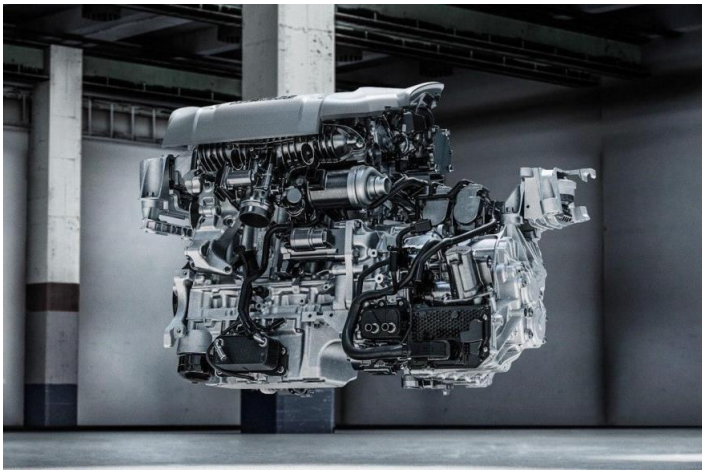

Figure 1: Example of 3D Model

Figure 2: Example of animated 3D input format

The AR software and generation tool will be able to output to an application that the user will define. Other than that, the software and generation tool will be able to support the followings to the users: a) Display animated slide, b) Display video MP4 files, c) Creating 3D, 2D, video, and text content. Figure 3 shows the example of text and AR content.

Figure 3: Example of Text in Augmented Reality Content

Figure 4 shows the user interaction in AR application. Users will be able to interact with the AR content such as zoom into and out of the 3D Content. For smart devices with touch screens, user will be able to pinch fingertips together to zoom in and pull fingertips to zoom out the content. Meanwhile, for wearable head mounted displays, users will be able to zoom in and out the content by pinch fingertips (right and left hands) and pull hands apart. Other than that, users are also able to rotate the 2D, 3D, video, and text content. For smart devices with touch screens, users will rotate fingertips to rotate 3D, 2D, video and text content. Moreover, users can utilize a single finger sliding left/right/up/down to rotate 3D, 2D, video and text content. Users also able to lock the 3D, 2D, video and text AR content view but will not allow the user to modify location, position, and else. Lastly, users are able to take a snapshot of their smart device display. This will allow them to share that snapshot with other users.

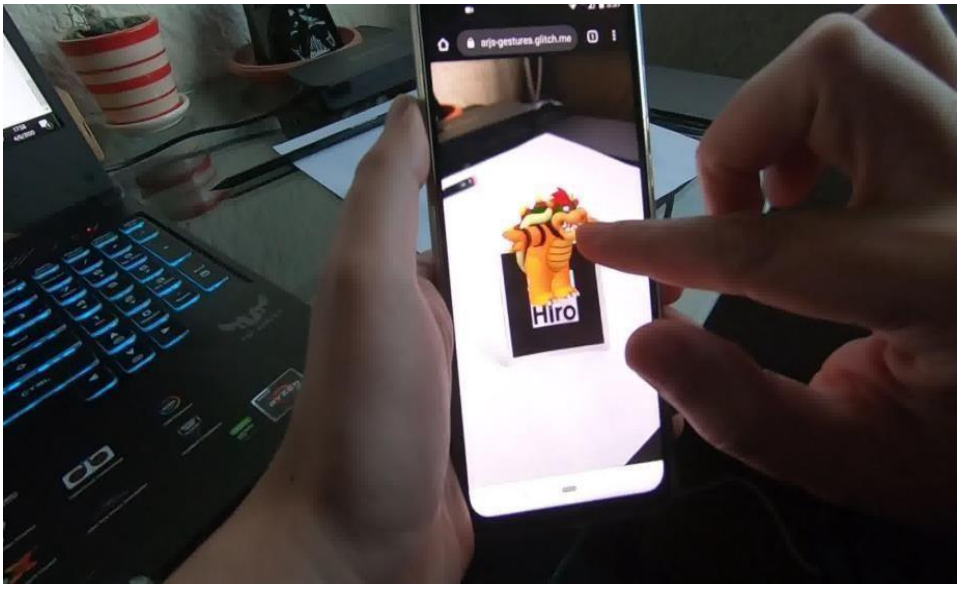

Figure 4: Example of User Zoom into the AR Content

The AR application will be able to produce unique QR codes, image and icon. This QR codes can be assigned to assets on the production. Figure 5 shows the example of AR generate QR code.

Figure 5: Example of AR Generate QR Code

Other than that, this AR application can be linked to IoT data to specific locations. Thus, a "Localization tags" will be created through the use of QR code, icon & image. Figure 6 shows an example of AR location pop-up application.

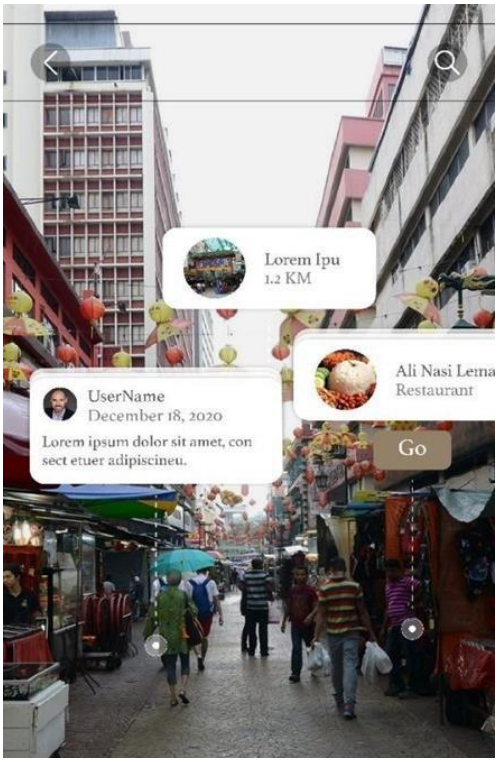

Figure 6: Example of AR Locations

4.0 PROPOSED METHODOLOGY – AR TOURISM IN TERENGGANU

The developed app will consist of marketing video, geolocation AR and AR marker. The marketing video of interested place in Terengganu will be promoted through media channel to attract tourist. The developed app of this AR will be introduced in the marketing video so that tourist can download the app and inherently using it effectively while enjoying the new norm of tourism activities in Terengganu. In the AR app, interesting places around Terengganu with introduction video will be listed in the app so that tourists can planned their vacation before they come to Terengganu.

The developed AR app is also equipped with Geolocation AR features for tourist to find places easily and marker features to give the explanation about the places and treasure. Geolocation-based AR stands for a markerless, position-based, and geo-based Augmented Reality. This method does not require special markers to identify the location of virtual objects. Location-based AR relies on GPS, accelerometer, digital compass, and other technologies to identify a device's location and position with high accuracy. Most modern mobile devices have the required sensors, so this powerful technology is available for every mobile owner. This helps tourists discover new places and quickly find the most popular sightseeing in a real-time mode using their mobile devices. Navigation apps with location-based Augmented Reality dramatically improve the effectiveness of navigation systems.

The final method that will be equipped in the developed AR app is the marker-based AR features. Marker -based AR will help to explain and provide important points based on marker which will be set on certain important points around Terengganu. For example, a marker-based AR will be set at Terengganu Inscription Stone and tourist will point their camera

at that stone. Then, the device will recognize it from the live camera view. This can be achieved by placing a distinctive picture or shape on the stone. That picture will be recognized and the animation or additional information can start immediately, tracked to the appropriate place on the stone. The user can also move around and see the virtual world "stick" to the real surface of the stone. Figure 7 showed the proposed architecture for AR Tourism Application that will be implemented in Terengganu.

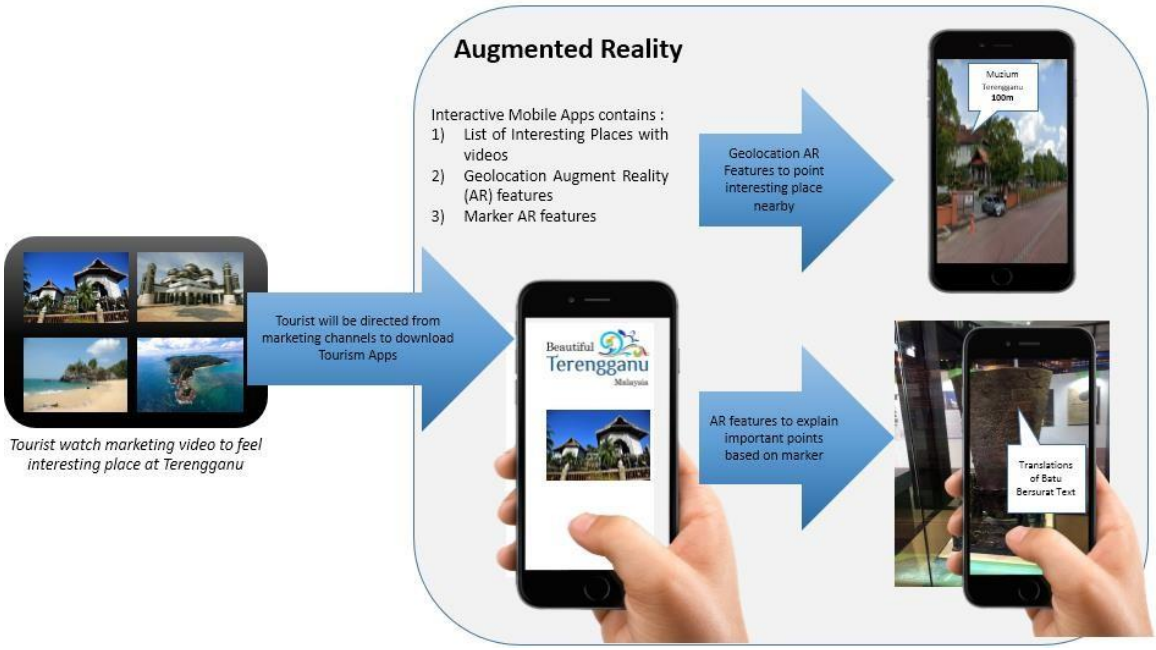

Figure 7: Architecture of AR Tourism in Terengganu

5.0 CONCLUSIONS

On the basis of augmented reality, many applications have been developed and are still rapidly venture into various sectors of economic industries. Few of the developed applications are largely used in the tourism industry and it is about time to introduce this "High-Tech" and "New-Normal" solution to rich fauna and flora views in Terengganu and inherently in Malaysia as well. In summary, the objective of this paper is to propose the usage of augmented reality applications in the tourism industry which indeed benefits its operators and key players, that will hopefully recover the business entity growth and to fight the widespread of the deadly virus of C-19.

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