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RENDERING-BASED AUGMENTED REALITY ARCHITECTURE FOR PROMOTING TOURISM

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ABSTRACT

Information technology-supported tourism services and platforms have made it easier for individual travelers to plan and manage their trips (Chul et al, 2016). But with smart tourism,technological limitations for tourist attraction is a research need. These include decision support in the context of tourists' information processing. This study contributes a mobile technology suitable to improve smart tourism technology (STT) for travel decision support satisfaction. An Augmented Reality based mobile solution in the tourism industry is a project to suit this purpose. This application would enhance tourism in terms of exploring the visiting area before the actual visit. Sri Lanka is the case study for this research, which will be used to implement the application for possible capability evaluation. Images of certain tourist areas will be taken and processed by a third party. Rendering will be the contributing component of the augmented reality, which integrates with the images that might have been processed and saved in the database in this project. Hence, providing tourists with information about their intending place of visit. Due to the lack of up to date information and navigation support, tourists are not able to visit all the attractions during a visit in a particular case of Srilanka. This paper provides the architecture of the augmented reality that improves this situation. It shows how the image processing and the rendering integrate and interacts to provide tourists with relevant information about their intending place of visit.

KEYWORDS: *Augmented Reality, Rendering, Tourism, Smart Tourism Technology, Tourism Services, Architecture*

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INTRODUCTION

Augmented reality (AR) which is a useful visualization technique, is a field of computer research which deal with the combination of real-world and computer-generated data (virtual reality) (Donggang, 2009). Information technology-supported tourism services and platforms have made it easier for individual travelers to plan and manage their trips (Chul et al, 2016). The rapid development of virtual reality (VR) technology offers opportunities for a widespread consumption of VR tourism content (Lis et al, 2017). A mobile augmented reality (MAR) travel guide would provide necessary virtual guide for tourists to have a glance before real-life experience (Panos et al, 2015).

LITERATURE REVIEW

The tourism sector is one of the world's most important economic sectors. The increasing popularity of mobile devices presents an opportunity for developing innovative mobile tourism services for tourism-related organizations that could increase market share and enhance the perceived quality of information and services by tourists (Dion et al, 2010). AR is a visualization technique that superimposes computer-generated data, such as text, video, graphics, GPS data and other multimedia formats, on top of the real-world view, as captured from the camera of a computer, a mobile phone or other devices (Chris et al, 2012). Augmented reality (AR), which superimposes virtual information on real scenes, has provided good solutions for on-site tour guides. In contrast to the conventional types of tour guides, AR-based tour guides enable tourists to have intuitive and realistic experiences by overlaying virtual contents on cultural heritages sites (Byung-Kuk et al, 2011). Scientists proved that visualization is the best way for memorization because, through an image, students are able to get many ideas than reading or listening (Terrence, 2016). Therefore, AR could be applicable for learning by incorporating it into the curriculum of high learning schools besides tourism. In recent years, the growth of the Internet and communications networks for mobile phones has led to the development of services to provide tourism information via mobile information devices at tourist sites (Hidemi et al, 2015). In a case were a tourist area is poor in terms of internet connectivity, there will be the need for proposing a topology for improving the connectivity. These could begin with a preplan for a better topology (Datukun et al, 2016a; Datukun et al, 2016b). Improving network performance is necessary for any organization (Datukun et al, 2017). This includes tourist centers for freely and conveniently connecting virtual tourism. With the increasing levels of deployment of various forms of high-speed (or broadband) services within today's Internet, there is new impetus to find some usable answers that allow both providers and users to place some objective benchmarks against the service offerings. Furthermore, with the lift in access speed with broadband services, there is an associated expectation on the part of the end user or service customer about the performance of the Internet service. It should be "better" in some fashion, where "better" relates to the performance of the network and the service profile that is offered to network applications. And not only is there an expectation of "better" performance, it should be measurable (Onwudebelu et al, 2014). This will help in browser-based management information system provided for administrative users in virtual AR.

METHODOLOGY

This research is a project aiming at improving the tourism situation of Srilanka. A pre–questionnaire will be distributed among local and tourist bodies. Questions will be focused on getting the opinions of tourists on use of the mobile application for the pre-tourism plan in improving the tourism industry. A quantitative research method will be applied to analyze the collected data. Next, a suitable mobile application in interaction with a third party image processing metadata will be developed to improve on existing AR. The application will be presented as "rendering" application, the focused component in this work that will be integrated with the image processing component of the third part via the database. After all, a user study to check whether the given solution is viable to enhance the tourism industry in Sri Lanka will be conducted. Finally, a recommendation based on the research findings will be made for initial implementation.

In particular, only the architecture of this project will be presented in this paper. First, the input will be determined, then the simulation procedure, the rendering process and finally the visual-auditory. After which, the process flow for the architecture will be presented.

RENDERING-BASED AUGMENTED REALITY ARCHITECTURE

The architecture in Figure 1 shows the processes in the system's flow, which is the focus of this paper. It is the initial part of this work. These processes include the Input, Simulation, Rendering, and Database. The database is clearly the element that provides all the information required for the interaction. It keeps track of the images processed and providing necessary, response to the interaction initiated by the application. The inputs are the images, which has been processed and inputted into the database. The rendering is the application, written in Java, that initiates the interaction by making a real image pointed at to look up to her mapped image in the database and then execute any touring video for tourists' guide. The components of the system's architecture as shown in Figure1 includes Image recognition Part (processing); used by several SDK's and frame, positioning and orientation. Then the Augmented reality Part; rendering (video or 3D object) and the object's superimposing. Based on the diagram of the architecture, the flow between the input and the database is two-way. This means that in as much as sufficient inputs can be made, anyone can also be removed at any time. The flow between the simulation and database is inter-dependent, looking up to each other, providing one-way communication to the rendering. More so, the rendering is as well inter-dependent with the database, interacting one to the other providing one-way visual auditory as output (s). In essence, images are uploaded for visual tracking. These images would train with feature extraction algorithms. From there, the "tractable object" is called. "meta information" are also uploaded, which would push to the end users after successful tracking. The Meta information would be images, videos, web URLs, and 3D models. The user opens the proposed app in Android or IOS device and points to the surface which intend to be tracked. The device to the recognition (online) and real-time downloads linked meta information from the backend services object, which may be the 3D model or the video. They may superimpose on the target surface. If a user request for additional information they would push to users (Text, images, URLs). The backend would update with the tractable status.

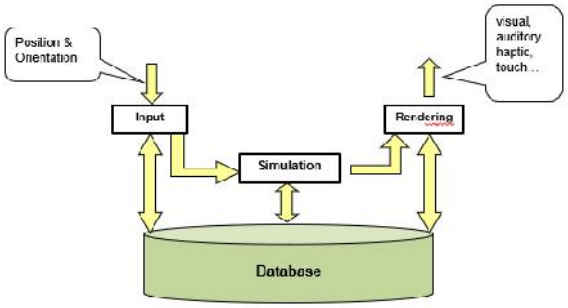

Figure 1

CONCLUSIONS

In as much as the system architecture is important in starting and progressing, the program will be in the next work. In the subsequent part of these work, which is the next work, shots of program execution, will be presented. This will be towards a user study to check whether the given solution is viable to enhance the tourism industry. This will be carried out in Srilanka. Hence, we could conclude that this architecture is ready for subsequent development. As such the next paper will be in connection with this one.

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