

# Tourist Guide based on Mobile Enabled Augmented Reality

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**Abstract** - Visiting tourist places help to explore new things and gain knowledge about its history and its importance. This article proposes for use of augmented reality in tourism to enhance touristic experience by providing a mobile interactive application through which one can know facts and information. Augmented reality is the technology that expands our physical world by adding layers of digital information onto it. This application is implemented using marker based AR. It uses hidden images as markers. Once camera spots this marker, the app triggers the augmented reality elements. It superimposes information on to the real world. Through this system, tourist can gain better information about the historical place with the help of mobile interactive application.

**Key Words:** Augmented Reality (AR), Markers, Tourism, Mobile-App, Geo-Location Data.

## 1. INTRODUCTION

Augmented Reality is a complex field utilizing information technologies in diverse areas such as medicine, education, architecture, industry, tourism and others by augmenting the real-time real-world view with additional superimposed information in chosen formats. The aim of this paper is to present an overview of application aspects of using augmented reality technologies in tourism domain technology. This technology is revolutionizing the traveler's experience by making the journey much more seamless, interactive, and simple. Thus, enhancing the tourist experience throughout the process. Augmented reality is an interactive experience of a real-world environment where the objects that reside in the real world are enhanced. The use of augmented reality technology within the travel industry is still a relatively recent development and, as a result, new uses are emerging all the time. Augmented Reality focuses in enhancing physically-based reality perception through computer-generated sensory output. Augmented Reality: 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.

Objects and 2D graphics are inserted and handled by the AR applications with the help of Geo Location Data, AR Tags.

## 2. LITREATURE SURVEY

According to **GökovAR Enis** Karaarslan, Mugla Üniversitesi, ICSG of Istanbul. On "**Augmented Reality Application for Smart Tourism by**" Had the following features and required the following future work,

### Features:

- Gives current instant position co-ordinates;
- Remove need for carrying brochures and maps;
- Provision to view extra virtual image on the actual image on the same time;

### Future work:

- Gamification;
- User Ranking;

According to Anabel L. Kečkeš and Igor Tomičić, on Interdisciplinary Description of Complex System: "Augmented reality in tourism Gives the Overview of Key Factors section, identifies and elaborates below factors and Functionalities: which includes Routing navigation and Tour generation. It had following issues: Interoperability, Portability and Overlay Types were Text, Graphic. Some Technologies used were Handheld integrated and Head-mounted.

Timothy Jung and Dai in Danny Han gave their idea on iUrban Heritage Tourism by, Article in e-Review of Tourism Research · March 2014." This paper aims to examine the current implementation of AR in the Urban Tourism context and identifies areas of research and development and had following features: Pinpointing the tourist's location, Enhance the holiday experience through AR gaming, such as Time Warp, Tourist to get in contact with the destination prior to the actual trip .Future work Is directed in exploring the ways AR can

be used to enhance the tourist experience. Such could be focused on tourist acceptance and ease of use to implement AR effectively as well as on the design and use of content through AR for purposeful employment.

The Loupe - Tangible Augmented Reality for Learning to Look at Ancient Greek Art Areti Damala, Eva Hornecker, Merel van der Vaart, Dick van Dick, Ian Ruthven Mediterranean Archaeology and Archaeometry 2016.” The Loupe: Tangible Augmented Reality for Learning to Look at Ancient Greek Art this project aims to provide a thematic tour clear, educational narrative and storyline, able to be followed by the visitors.

About the devices Head mounted device: HMD is a display device placed on the head or as part of a helmet and that shows both images of the real and virtual environment over the user’s vision of the world. HMD can either be video-see-through or visual see-through.

Hand held devices: Handheld devices are small computing devices with a display that the user can hold in their hands it uses video-see-through systems to overlay visuals onto the live environment and use sensors, such as digital compasses and GPS units for tracking sensors, fiducially marker systems and many more.

Mobile augmented reality have seen huge growth in past few years. Also claims the tourism is one of the primary fields in which AR technologies has shown to be a natural fit. Mentioned the usage of semantic web and linked data principles and technologies. Mobile augmented is one of the most popular and suitable form of AR. Due to the universal growth of mobile devices and pervasive computing. Identifies the advantages of utilization of linked data and principles for providing enhanced content. Geo data integration, overlapping of dataset and ontology matching have been identified to have aspects of linked data integration.

Enhancing cultural tourism experiences with AR technologies. This paper suggests on tourist organizations to come up with attractive multimedia content that attracts tourists. It says that large amount of information is lying in digital format, like audiovisual content, electronic texts or geographical data systems which is unused or barely used and is unreachable for visitors. Coming up with a innovative multimedia content with usage of such data can help tourists enrich their knowledge at the tourist place.

Augmented Reality Mobile Application Of Balinese Hindu Temples: Dewata AR By Adi Ferliyanto Waruwu. Smartphone is an ideal mobile device for AR because it has a built-in camera that enables object-capturing, Gps and accelerometer. Processor that can do high computation. Vuforia is a library or SDK that supports for AR in mobile devices as android .Vuforia works on marker based technology. It analyses images by detecting markers in it to produce information geo example -text, video ,3d object in camera from detected marker by Vuforia API. Vuforia library provides the basic code of AR that supports IOS,

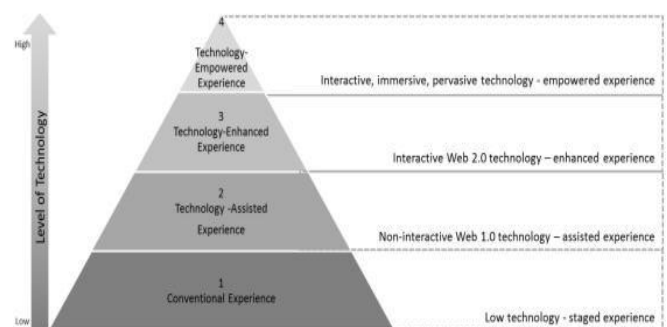
android and unity 3d. Vuforia also has a marker less feature which enables the usage of colorful marker instead of using conventional marker

Augmented reality has the embryonic of boosting the surrounding physical environment of the tourist in a meaningful way. The common approach for developers and content publishers is to use isolated databases for providing rich content for the augmented reality application, but it limits the information depth of surroundings examination for tourists. Hence, researchers have analyzed and exploited Semantic Web and especially Linked Data technologies for enriching content in mobile augmented reality applications for tourists.

Augmented reality can deliver an experience to tourists which is much more than reality a new dimension of consumer satisfaction is emerged which is known as experience, so the companies working under this domain are not just selling the products and services, but also providing the experience through interaction with them. Experiences increase the value of the product, brand, company. Tourist experience are the foundation for experience economy.

According to Yuan and Wu, 2008 Tourist Experience is divided into five stages, planning, going to destination, stay in destination, return and memory of destination here each stage is suitable to be affected by experiential marketing. Tourists have expectations and perceptions, the experiencing process connects experiential marketing and expectation of tourists this process is actually experience setting, later the experience, perceptions of tourists can be seen as the result of experiential marketing. Experiential learning on-site, is proven to magnify the learning experience and have long lasting impressions on the visitor

Picture 1. Hierarchy of experiences in tourism



If the tourist organization needs to reach wider audience, they would have to build attractive multimedia content to attract tourists. It requires new systems to support innovations. A bright example would be the PRISMA project, which is the implementation of augmented binoculars which allowed tourists to retrieve multimodal information about

The monuments and historical buildings of the city. The further consideration was to add the option to see the multimodal information in different states of the year that is, with rain, cloud and sun.

There can be a question asking how these innovative technology can actually increase the learning experience ? And

Answer is, Experiments were conducted by using three focus groups on Augmented Reality for cultural heritage tourism context and findings demonstrate a positive response from participants revealing that new experience was gained as a result of AR experience supporting the potential of AR in cultural heritage tourism. According to Yovcheva et al., 2014, in tourism mobile enabled application provide a quick knowledge of the location based information in unfamiliar environments and that has seemed to be very useful.

There was a study to investigate how mobile enabled augmented reality application enhances learning experience of visitors at the small Jewish museum in UK. The museum displays the historic collection of Jewish objects and artifacts as means of preserving Jewish heritage. The target market was 75% school children, the AR application was installed on iPad of the participants, On the application four areas were available for Exploration information about the museum, camera access for AR experience, AR museum map and navigation area, and an interactive quiz based on the AR experience and Overall there were 10 point of interest to be discovered through variety of objects. Over the course of two days three groups conducted this activity with 19 students. They were allocated 20 mins to identify 10 points of interest and complete the quiz the questions were focused on Experiential Learning Cycle (concrete experience, reflective observation, abstractconceptualization, active experimentation).Thematic analysis was employed to identify, analyze and report themes emerging from the data set in relation to each of the four main aspects from Kolb's (1984) Experiential Learning Cycle.

**Concrete Experience :** Participants stated that their experience was increasingly fun, and they sought a positive feeling to learn outside the classroom Participants also felt a sense of personal achievement by completing the quiz by themselves without being instructed.

**Reflective Observation:** Participants enjoyed 2D/3D AR avatars and the enjoyment of text and images with audio. They also stated that the 3D avatars helped to maintain learning experience and participants really enjoyed uncovering stories of the hidden Jewish culture and they requested for more markers.

**Abstract Conceptualization:** In terms of Abstract Conceptualization all participants agreed that the application assisted them in obtaining new knowledge and skills and also stated that limited information was available without the AR application.

**Active Experimentation:** all participants achieved a increase in correct answers on the second time of quiz event and hence it supported the effectiveness of the AR application as the learning tool.

The above study concludes that beyond being interactive and innovative, Augmented Reality technology should be implemented cardinally to increases competitiveness and ensure sustainability. Understanding the emotional response to the Augmented reality technologies is crucial, and hence the future of technology will be determined by the visitors.

### 3. TECHNOLOGY USED

**MARKER-BASED AR:** uses markers hidden in images. Once a camera spots a marker, the app triggers augmented reality elements. AR mobile platforms require the use of web servers.

Marker-based AR or recognition based AR provides us comprehensive information about the object, First it performs object recognition then it senses the object in front of the camera and offers on-screen information. Markers may be printed images or physical objects.

#### **TRACKING:**

Mobile augmented-reality systems uses one or more motion tracking technologies such as: accelerometers, gyroscopes, GPS, optical cameras and sensors these technologies help achieve various levels of accuracy and precision. And also the most important thing position and orientation.

#### **DEVELOPMENT KIT:**

Vuforia is a augmented reality software development kit for mobile devices which help develop augmented reality applications.

Vuforia provides API's in c++, jav, Objective-c++ and .NET languages .in this way, the SDK supports both development for Ios, Android and UWP while it also enables development of AR applications in unity.

### 4. DESIGN

**FLOWCHART: Flow chart of augmented reality (Chart-1):** Here AR is combination for real word scene viewed by the user and virtual scene generated by system.

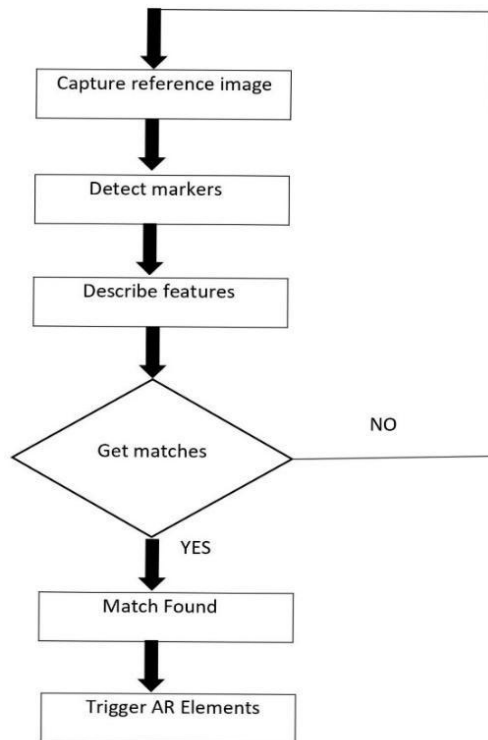


Chart-1: Flowchart of marker based Augmented Reality.

## 5. CONCLUSION

As discussed in this paper usage of AR technologies is very important and plays important role in development of tourism. By implementing augmented reality in this sector we look forward to develop an interactive mobile application for better experience when people scan the Karnataka map.

## 6. FUTURE WORK

Future work would involve enhancing the less attractive tourist area, could involve adding more tourist places to the existing domain in much more innovative way. Gamification example: some simple quiz if the augmented historic element could be an innovative modification. Triggering Augmented elements based on Geo-location coordinates.

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