International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2013): 6.14 | Impact Factor (2014): 5.611

Android Mobile Based Tour Guide System using Augmented Reality

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Abstract: ***The application mainly represents mobile tour guide system with augmented reality. Tourism is travel for pleasure; also the business process of entertaining tourists, attracting and accommodating and the business of operating tours. Augmented reality is nothing but direct or indirect view of the physical environment whose element is changed by computer generated sensory input. To guide tourist with respect to visit, there exist numerous applications. All of them are paper-based and Mobile based having restrictions of interactive visualization and accurate navigations. By considering restrictions of above applications, this system application provides a portable tour guide application with increased the augmented information, called Tour Guide System. The system provides visitors to have more intelligent, instructive and client specific experiences with expanded reality by perceiving or following the contents of a visit booklet. The GPS functionality is also available for the tourist to search tourist places. This Paper describes the features and related work on different android applications based on augmented reality.***

Keywords: Tourism, Augmented Reality, Feature Extraction, Context Management, 3D Rendering

1. Introduction

Now a days, there has been a consistently development in the quantity of individuals or persons out on visits, for the purpose of recreation, accommodation and entertainment [1]. Tourism is dependably the most grounded industry in the worldwide economy world that leading an approximated 11 percent of the world wide gross domestic product (GDP) and utilizing close around 200 million individuals and serving approximated seven hundred million overall tourists which is expected to almost double by the year 2020.

Tourism is one of the important and fastest growing industries. To guide tourist, there are various types of tourist guide techniques available such as paper based tour guide, various tourism websites and mobile applications etc. Paper based tour guide system presents static photo copied images with limited information, so they have limitations of intelligent representation and precise navigation [1,2] and its is traditional one.

The problem with websites is that they increases users memory load. There are some mobile applications available For mobile tour based guide framework, it is as yet difficult that the system should track and recognize vast number of target images continuously with low computing power. Thus, computationally efficient coordinating methods (like fixed point operations and low memory load) are necessary in mobile application based image recognition and tracking [2].
To overcome from these problems the smart tour guide application was proposed. The application consists of mobile tour guide system with augmented information. The application will help the tourist to find the accurate location also the information about the required places and it will also provide the augmented view so that the interaction between the tourist and the place will be easy. Tourist can easily understand where the place is, how the place is And he can easily visit that place whenever he wants. The GPS facility is also available for the tourist to find the places easily. The tourist will experience the physical presence of the location on their mobile phones which user wants to visit.

The objective of our framework is to give make a tour data to tourist at whatever time and anyplace in the event that they utilizes this application. Framework give tourists to have more in- formative and also interactive experiences by recovering virtual data cultural heritage image or offering connection mindful administrations taking into account context aware services based on points of interest (POIs) in perceived tour guide framework. Binary Robust Invariant Scalable Key-points (BRISK) [4] and Fast Retina Key-points (FREAK) [5], two state of the art binary feature descriptors, are connected for recognizing/tracking target images with low computational force and high level of accuracy.

2. Related Work

In this segment, the current portable mobile based tour guided applications will be investigated. These applications are more specific to specific platforms. They are arranged into two classifications: Pre-installed applications: the application must be require to introduced and run on the device. Web applications: Using web information to scan the data of tourist through thin customers on the gadget. These applications are considered as platform independence. The first approach requires a few assets like CPU like CPU computation power and storage to be installed or run on the gadget. Like- wise, the vacationer substance is defined and installed on the user device. These applications restrict the mobile devices to have some plat- form, they cannot be portable to other plat- forms, the information provided is static and limited in size a caused to the restricted storage, and they obliged time to be introduced on customer side. Also, synchronization done between the customer and the framework when required if possible. Cyberguide [8] is one

of the mobile based setting mindful visitor guide; gives different services depending for the most part on the present location and in addition history of past location. Mytilene E-guide [6, 7, 9] is intended for multi-stage: web based application for Personal Computer needs network connection and application to be installed on phones and operate without network connectivity. The visitor must associate with the web utilizing his PC or tablets to give his/her preferences; the application is manufactured and should be installed on the cell phone. The second approach remove a few downsides of the pre-introduced applications in light of the fact that required web applications can be accessed using any platform and they are accessible from anywhere. However, they require consistent availability to the network system. These frameworks utilize mobile based computing technologies the wireless infrastructure to help the tourist to get required information related to the city adapted to their personal or environmental contexts. End-client devices are constantly associated with the servers via applications UMTS or GPRS. Application GUIDE is a web based application [11], it requires a nonstop connectivity of application. Tourists can show signs of improvement and obliged data to their location and preferences. GUIDE Portable units get data by getting location messages that are transmit- ted from situated base stations. From our readings, we noticed that the application is intended for multiple platforms and the dominate technology was J2ME because it is supported in several mobile devices. Be that as it may, now, the most cell phones that attempt to predominant the entire word is Android. A few article have demonstrated the superiority of Android over J2ME, for example, [12-13] for this reason, we like to build this application and at the end an usability study will be made. A little while ago we plan and execute the first model for this application.

3. Literature Survey

Table 1: Literature Survey

Author and Year	*Title*	*Comments*
Vincent Lepetit, 2006	On Computer Vision for Augmented Reality	This paper tried to point out the limitations of the current Computer Vision techniques that prevent the implementation of mature Augmented Reality applications.
Margarita Chli and Roland Y. Siegwart 2008	BRISK: Binary Robust Invariant Scalable Keypoints	presented a novel method named BRISK, which tackles the classic Computer Vision problem of detecting, describing and matching image keypoints for cases without sufficient a priori knowledge on the scene.
Alexandre Alahi, 2009	FREAK:Fast Retina Keypoint	presented a retina-inspired keypoint descriptor to enhance the performance of current image descriptors.
MeiYii Lim Ruth Aylett 2013	Intelligent Mobile Tour Guide	The focus of this research is the development of the body-mind model for the guide.
Abhinaya, Dr.N. Chandra 2014	Mobile Travel Guide by Using Android	present the design and implementation of the Android based city tour guide system. The system is based on Web Service technology and adapts three-layer architecture.

4. Problem Statement

Augmented based tour guide system is an android application. As now in market there are few tour guide application having drawback of interactive visualization and accurate navigation and requires Fixed point operation and Low memory load. So we are proposing this application consisting of all features including more informative, interactive and user-specific experiences with augmented information So both Mobile guide system and Augmented reality can be combined to create an tour guide system.

5. System Architecture

Firstly, application user will register themselves to the system. Then user authentication is done by administrator after successful registration. If user are already registered on system then they will just login by using the mobile number. After the client logs in to the system , application consist of three options seen by the user. The first option is capture image will have consist of capture image from an off-line booklet, the second option will be the browse images from the mobile device and third option will be submit these captured or browsed image to recognization process where images is recognized with database of images.

This recognized image result is then given to the context management system [2]. The context management system is now connections to the relating destinations and substance data of every present database. Like- wise furthermore, gave GPS area information used to speak to or redefine the users area all the more precisely and give client specific data, for example, shortest path of tour and recommended site around the users of system. This was done using options get description, site information and GPS data on the system. In the event that clients catch video sequences, tracking strategy is performed. Around then, 3- D models retrieved from the contents database are rendered on the captured or browsed image[1,2].

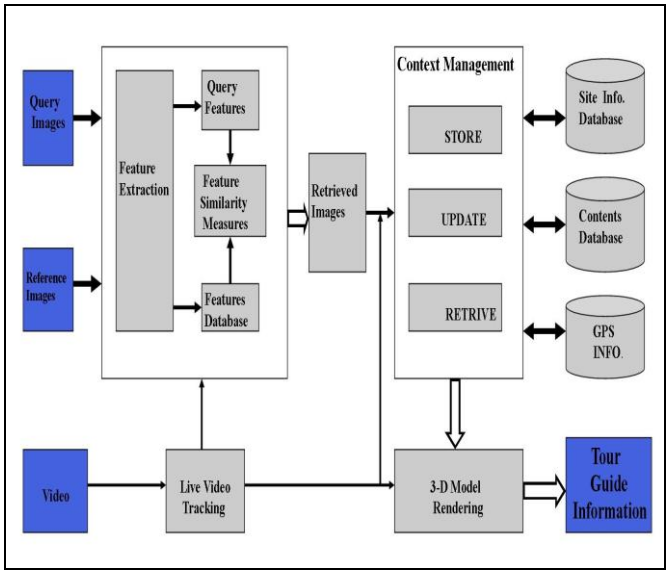


Figure 2: Proposed System Architecture

6. Algorithms

1. Symmetric and combinatorial matching Algorithm:
Input: keypoints in Query Image
Output: Similar image with highest matching score
Step:

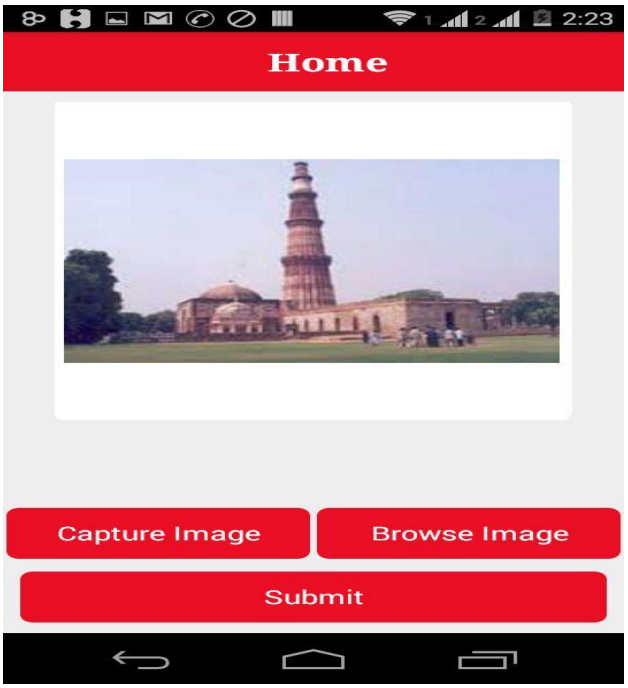
1. Compute the key points in both a query (Iq) and a reference image (Ir).
2. Perform nearest neighbor matching, and then remain matches if the ratio of the shortest and the second-shortest descriptor distance is smaller than a predefined threshold IJ (IJ=0.9). This step is denoted by **M(Ir|Iq).**
3. Compute the matches from Ir to I q . Then calculate the symmetric matches; **Ms(Ir |Iq)=M (Ir|Iq)∩ M(Iq|Ir).**
4. Follow step 1 and 2 in both BRISK and FREAK descriptor matching. Candidate matches are obtained for each of two cases, and then common matches between them (combinatorial matching) are used to finalize the matches between the images.
5. Consider the total number of matched keypoints as a match score and recognize the image by retrieving the reference image with highest match score.

2. Tracking by detection Algorithm:
Input : Video frame
Output: Recognized target object in video frames
Steps :

1. Used for live video tracking, the basic idea of this approach is that feature points are extracted from incoming frames at run-time and matching is performed against a database of feature points.

7. Results and Discussion

1] Capture Image and Recognization



Visitor Either capture Iamage or browse image. This image recognized with databse of images.

2] Image Description

System provides description of captured/browsed image after recognizing that image.

3] Results from image Recognization process

Table 2: Resut table

#Query Image	#Image in Dataset	#Relevant image	#Retrieved Image	#Correctly Retrieved	Precision	Recall
	120	12	10	08	0.80	0.83
	220	23	18	14	0.77	0.78
	300	30	25	19	0.76	0.83
	400	35	30	25	0.83	0.85

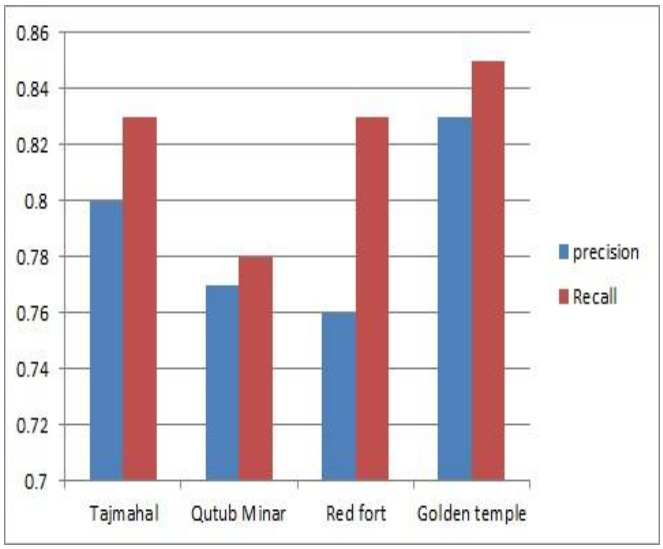


Figure: Precision and Recall

8. Conclusion and Future work

This work present another tour guide framework application using expanded reality such as augmented reality in mobile based environment to guide tourist for their tours. System is capable to handling limitations of the current Computer Vision techniques that prevent the implementation of mature Augmented Reality applications.

Till now visitor has to use different application for there desired searches but our application consist of all feature on their fingertip.

Our ongoing work consists of
a) improving user interactivity of System.
b) creating more informative and well turned 3-D contents.

Firstly, we are going to host it on google store so all tourist can get benefit of our application

Better optimized Image and make application more robust and scalable. Working of translation feature for all the language of world

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