

Smart Shopping Using Augmented Reality on Android OS

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Abstract— Now days, a mobile application has brought a lot of changes in shopping. Specially, the new technology called augmented reality system made in feasible an advanced way of information collecting by giving data of the virtual world to real world. Smart shopping using augmented reality developed in android for shopaholics who have crazy about shopping. The shoppers use this application (app) while shopping to reduce their bucks and time. Shopping is an interesting process in which a customer selects the available materials or services provided by one or more retail merchant with the intention to buy a suitable selection of them. The advantages of this application, shoppers no need to walk in to the stores. Rather than that use their device to get detailed information of shops or malls they are interested in simply by panning the devices video camera over the shop. This application is inexpensive, as a user need not actually purchase the object to see how it fits in the environment, instead customer can see before the purchase itself. The geolocation technology is used in this application to refer the finding location of a building. Geolocation is completely related to the use of positioning of mall or shops.

Keywords- Augmented Reality, Geolocation, Smart Shopping, Unity3D, Android OS

INTRODUCTION

Augmented reality (AR) is a field of computer research which deals with combination of reality with computer generated data. It is related to a real world and virtual world which is created or modified by a computer or related device. The information about the surrounding real world of the user becomes interactive and digitally manipulate with the help of advanced AR technology [1].

Smart Shopping augmented reality on android OS developed in android for who have interest about shopping. The shoppers use this application (app) while shopping to reduce their bucks and time. Today's online has come to expect a retail experience that is filled with personalized recommendations and information, helpful product comparisons, links to reviews, access to flash sales and special offers.

A new augmented reality mobile shopping app that enables retailers to personalize each individual customer's shopping experience right from the palm of their hands, via their smart phone or tablet.

Now, Shoppers no need to walk into the store rather than that device to get detailed information of shops or malls they are interested in simply by panning the devices video camera over the shop or mall.

The augmented reality technology identifies the shop and displays the important information to the shoppers that is superimposed on the product image, such as shirts, pants or dress materials. Smart shopping using Augmented Reality mobile application that will make it possible for to categorized products and receive personalized product information, cost and offers.

Before entering to the store, consumers download the app on their smart phone or tablet. After that open the application, point their device camera at shop or mall, the app will instantly recognize the shop image via augmented reality technology, and overlay digital details over the shop images – such as category of dress, shop details and about offers.

Geo-based Augmented Reality is the combination of Augmented Reality, Location Based System and GPS giving birth to such an advanced and innovative technology. Geolocation is closely related to GPS but a slight distinguishable concept may break them apart. Global Positioning System also known as GPS gives the geographic coordinates whereas geolocation gives the meaningful locations rather than just set of coordinates, for example- street address or shop address [2].

LITERATURE REVIEW

On the basis of Augmented Reality concept, it took a massive amount of time and effort spent on developing system. It is necessary to utilize high performance computers and camera in order to perform complex image processing and to get information it needs to be connected to system.

In many countries AR related research has been done in many ways for some purpose.

The Tinmith System which was developed by Piekarski and Thomas is demonstrating new techniques for mobile Augmented Reality modeling.

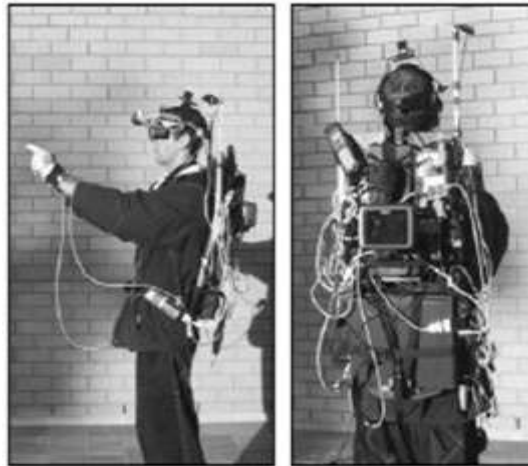


Figure I: The Tinmith System

In late 1999 a research has been done on basis of user interface technology which was built user interface technology which was built using a glove based menu and 3D interaction techniques. The system was especially designed with purpose to support applications which allow access to construct simple models of outdoor structure [3].

An Informational Tool in Tourism



Figure II: Tourism Application [4]

Based on the research was tourism application using AR in 2013 in Ireland. It was the most successful application.

The tourism application was built in order to be used as an informational tool in tourism. This application reveals that user can know about the content relevant to a place it means pointing a phone at specified location, the phone, using GPS can know what it is currently seeing and generates the contents automatically [4].

Regards have developed A Survey of Augmented Reality

This survey was identified the rapidly changing technologies and the revolution of AR. Recent days, 3D virtual objects are merged into a 3D real environment in real time. It has been used and explored various areas like the medical, manufacturing, visualization, and path planning, entertainment and military applications [5].

Shopping is made more personal by using Augmented Reality with new mobile application from IBM research which helps in case of supermarket shopping. The research was developed by IBM researcher which is an existing system.

This mobile application provides a personalized shopping experience with the feature of product comparisons and to identify a product (or) row of some items and image processing has been used, where it captures the images through the built in video camera on a users Smartphone. When the product is identified it displays the information above the product images and it will rank them based on a

number of criteria, such as price and numerical value. It also provides the shoppers with any rewards of loyalty (or) incentives which may apply and suggest some of the complementary items on basis of what the customers has viewed already [6].

By analyzing the literature review, there is no augmented reality based mobile application for the shoppers to get details of shop or malls. Also because of the peoples busy life style, they always requiring for an efficient ways to do their day today work. So that developed mobile application which can track give details over the shop images - such as category of dresses, shop details, and about offers.

ABOUT ANDROID OS

Among the rapidly growing technologies Android is also stated as one of the most. Due to the advent of 2010 there is increase in stress and has given on the usage of Free and Open Source Software (FOSS). Android is leading the current O.S market as shown in figure III, because it is open source and developed by a consortium of more than 86 leading M.N.C's called Open Handset Allowance (O.H.A). More and more applications have been developed and modified by third party user[7].



Figure III: Smartphone OS market shares

Furthermore, the Android O.S is user friendly. It has a feature of high performance and processing power.

PROPOSED SYSTEM ARCHITECTURE

At the earlier stage, the simplest augmented reality system was formed from camera, which is a computational device and some form of display. At present, such type of system incorporates all of those elements into a single device, as like tablet, personal computers or mobile phones.

The captured image will track with some specialized software. The tracker calculates proper location and orientation of virtual overlay. Afterwards, combines the original image and virtual image using the rendering module. Rendering module calculates the 'pose' and renders the final image of Virtual image or components to the display.

The important component of this system is tracking module. It calculates the pose of the camera in real time. In this context the term "pose" designates the six degrees of freedom, namely the position and rotation of an object in 3D. By using this piece of information, the tracking module prepares a virtual element to be displayed in the real scene.

The block diagram represents the architecture of a proposed system in Figure 5.2.

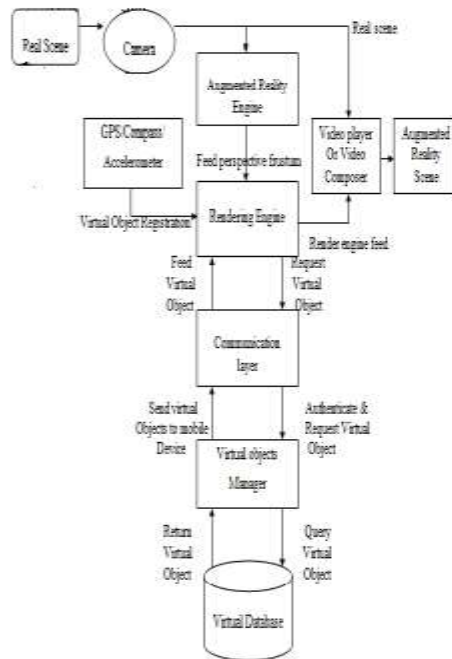


Figure IV: Architecture Block Diagram

The proposed system architecture has contains 4 following modules.

1. Camera
2. Image Capturing Module
3. Tracking module
4. Rendering module

1. Camera

A real world live video serves as an input from the android all phone cameras to the Android all phone camera to the camera module. In Augmented Reality displaying the live feed from the android cell phone camera is the reality. For image capturing module this live video stream is given as an input.

2. Image Capturing Module

The live video feed from the camera of a mobile device is the input to image capturing module. Each frame in the video is analyzed by analyzing camera feed in the module. Binary images are generated by this module i.e. a digital image which has only two possible values for each pixel. Black and white is the two columns used for a binary image. For Image processing module these binary images are provided as an input.

3. Tracking module

The tracking module is the most important process of this project, as it calculates the relative pose of the camera in real time. In this context the term “pose” designates the six degrees of freedom, namely the position and rotation of an object in 3D. By using this piece of information, the tracking module prepares a virtual element to be displayed in the real scene.

4. Rendering module

It consists of 2 inputs. The calculating pose from the tracking module is the first and second is the virtual object to be augmented. The original image and the virtual components are combined using calculated pose in the rendering module and augmented image is rendered on the display screen of the mobile device.

RESULT AND DISCUSSION

In this section contains the result of smart shopping using Augmented Reality on Android OS project and what were the new approaches found to address further researches. The project smart shopping using Augmented Reality is developed android mobile application for capture the shop or mall from user own mobile phone. That application was developed by Unity3D software. After user capture the shop or mall that image process through web service and display detail of the shop or mall lively via mobile application. The mobile application selects and recognise the specific area, in which is going to put the digital content.



Figure V: Capture Building interface



Figure VI: Display details of lifestyle & apparels



Figure VII: Display details of Men's clothing



Figure VIII: Display details of cost of products



Figure IX: Display details of mall or shop

In this project recognise the specific area like mall or any shops. These recognised area stores in servers. Then server sends the virtual object on top of the malls or shops. When the image and its characteristics are stored in the database, then the mobile application sends the extracted features of the image (captured by video camera) to server using the API.

The server processes the features received, and then searches it on the database. Then, when processing is complete, sends the results to mobile devices with digital content.

The mobile application is an Augmented Reality app developed with c# programming language using Unity3D software. The server-side implementation is done with API, which was developed using REST. REST is an architecture of web development, which is supported in the HTTP standard, allowing to create services & applications that can be used by any device that understands HTTP[8][9].

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CONCLUSION

This paper proposes a smart shopping using augmented reality on android operating system which will help to combine virtual object with the real environment in various applications. The main advantage is use low cost devices as compared to the costly head mounted display services. Second advantage is now shoppers no need to walk into the store rather than that device to get detailed information of shops or malls they are interested in simply by panning the devices video camera over the shop or mall. In the future, it is necessary to apply the augmented reality system suggested areas including advertising, education, and tourism, by making interaction between users and augmented reality system. AR has been effective for a better learning performance, learning motivation, student engagement and positive attitudes.

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