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Augmented Reality for Advance Shopping

Prabhanjan V. Padhye[1], Geetanjali B. Deore[2], Ankita D. Aher[3], Shubham B. Bhokare[4]

U.G. Students, Dept. of Computer Engineering, R.H. Sapat College of Engineering and Management Research, Nashik, India[1,2,3,4]

ABSTRACT: In today's modern era, with the advent of technology many people rely on GPS systems to find a destination. However, locating a destination within the confines of an indoor environment is still a challenge as GPS signals do not work indoors, and most people still resort to the conventional method of referring to a physical floor plan or directory. We present a novel location-based augmented reality application that supports intelligent shopping experience in malls. As the key functionality, Application provides an augmented reality interface people can simply use ubiquitous smart-phones to find mall retailers, then Application will automatically recognize the retailers and display the directions on the phones. The application will provide information regarding sale and discounts at runtime. Technically, The Augmented Reality Application addresses two challenging data mining problems, including robust feature learning to support hetero-generous smart-phones in localization and learning to query for automatically gathering the retailer content from the cloud for augmented reality.

KEYWORDS: Indoor navigation system, Augmented reality, Vuforia SDK, Image Targets, Rendering, Vuforia Cloud

I. INTRODUCTION

Various indoor navigation systems have been introduced which include the use of Wi-Fi based systems, Bluetooth, RFID and QR codes. The interactive indoor navigation system uses Augmented Reality (AR) to enrich information representation and enhance user perception and experience. AR refers to the technology whereby computer generated sensory inputs and information is blended into our physical view of the world in real-time via the camera live feed that is being displayed to the user. We leverage on the AR concept to overlay an interactive virtual map of the indoor environment together with its navigation path to guide visitors to their intended destinations.Hence the purpose of this project is to provide shoppers with the personalized information and shortest walkways enabling them to easily locate the required shop. Also, transform marketing into a convenient and welcomed service for consumers. The Vuforia SDK is an AR solution that provides the image recognition and processing capabilities for the proposed application. Once the position and location of the user has been determined initially through visual recognition, the proposed application will continue to track the user's movement through a PDR system in the event that the Vuforia SDK is unable to recognize the next location or landmarks.

II. RELATED WORK

Mihaela Cardei[2] introduced Campus Assistant Application on an Android Platform. This paper states that, College campuses can be large, confusing, and intimidating for new students and visitors. Finding the campus may be easy using a GPS unit or Google Maps directions, but these changes when you are actually on the campus. There is no service that provides directional assistance within the campus itself. This paper presents the architecture and design specifications for a campus assistant application on an Android platform. Scenarios are illustrated for the Florida Atlantic University – Boca Raton campus. Available AR-based indoor positioning methods usually need artificial markers to estimate the camera position and orientation. For example, Parketal. [3] Have present AR-based field inspection scenario using artificial 2D markers within the frame of a BIM-based construction defect management system. Once the location of the maintenance component (target) and the operator's position (starting point) are determined, appropriate routes have to be calculated. For this purpose, topological routing graphs are generated based on either derived 2D floor plans or 3D building geometry (e.g[4]). Subsequently, routing algorithms (e.g.Dijkstra, A*)

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are applied to calculate paths with minimal path costs. Knowing the current position and orientation as well as the route, navigation instructions are presented to the user. However, these instructions are usually point markers and arrows on 2D floor plans [4]. As proposed by the authors, indoor natural markers such as exit signs, fire extinguisher location signs, and appliances labels have the potential to support AR-based navigation and maintenance instructions [5]. However, small markers, changing lighting conditions, low detection frame rates and inaccuracies might prevent these markers from being practically employed within an AR context.

III. PROPOSED SYSTEM

The proposed system is an augmented reality application for advance shopping experience. The application will scan the real world environment and augment it with the help of images, path finding using the shortest path algorithm to evaluate the shortest way to reach the destination required by the user and description like entry, exit, washrooms, fire exits, etc. Another feature of the application is to provide customer with the latest discounts and offer in nearby stores will walking through the guided pathway.

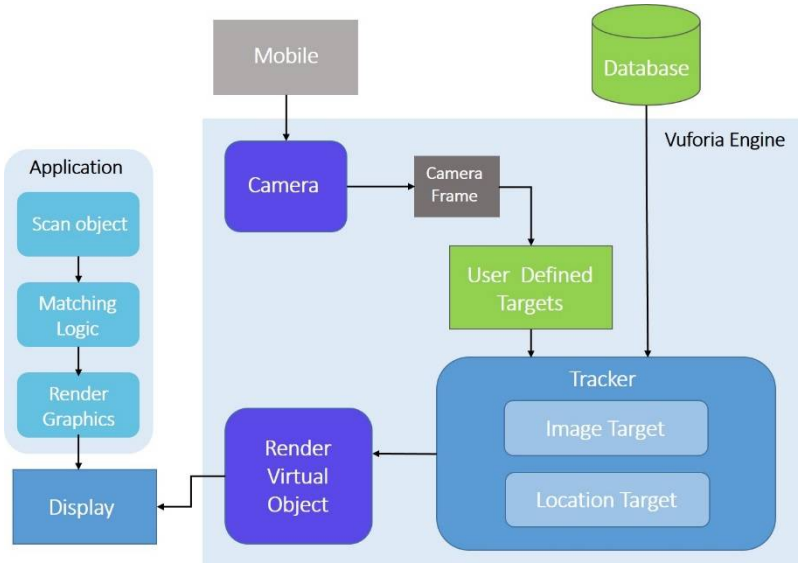

Fig 1: System Architecture

A. CAMERA MODULE

When the application is launched, the camera module invoked to serve the purpose of scanning the run-time scene. This module then passes the camera frames to the user defined target for further processing. The user defined target is used for identify the type of target image scanned. Based on output generated from the user defined target image the tracker module calls the target functions. The camera module ensures that every frame is captured and passed to the tracker efficiently.

B. TRACKER MODULE

The tracker component contains variety of functions for performing the detection and matching of real-time objects passed by camera module. The tracker module contains algorithm that detect and track real-world objects in camera video frames. The tracker can load multiple dataset at the same time and activate them. The module consists of mainly

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two components as image target and location target. Location target is used to determine the current location of the user.

B. RENDERER MODULE

On the successful fetching of the required virtual image and the description from the database, by querying the database to fetch and requested record. On obtaining the required image from the database, it has to be rendered in real time environment. Hence, the renderer module is invoked to give the user expected output in an augmented form.

IV. IMPLEMENTATION AND RESULTS

We have implemented the proposed system with the help of Unity 3D engine and Vuforia SDK. A sample model is designed for the entrance of the shopping mall to show the entry and exit along with related information. User has to open the android application and point the camera towards the mall to scan it. Augmented view is rendered real-time on the screen when the natural scene matches the image on cloud as shown in the fig2 where 3D markers are visible to the user. Following is the sample implementation of system for the entrance of City Center mall Nashik :

Fig 2: Original Picture

Fig 3: Augmented Picture

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V. CONCLUSION AND FUTURE SCOPE

In this paper, we have proposed a location-based augmented reality application for advance shopping in malls. We use natural marker based augmented reality framework for a shopping mall that can accurately track the user's current position and guide him to the specified destination by displaying runtime direction arrows using a mobile device for a large indoor building environment. Furthermore, we used a pedometer algorithm and employed Dijkstra's algorithm to find the shortest path to reach the destination.

As a future work, we are planning to use recommendation system to provide a user with real-time recommendations for new arrivals of goods in a mall and also provide them with latest offers and promotions in different sections of the mall. As a result, we will collect a large amount of data and routing method will be more efficient.

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