

Campus Navigation Using Augmented Reality

Jayshree J. Kolhe¹

Department of Computer Engg,
Sandip Institute of Engineering and Management
Nashik, India

Ashwini G. Chaudhari³

Department of Computer Engg,
Sandip Institute of Engineering and Management
Nashik, India

Kanchan S. Lachake²

Department of Computer Engg,
Sandip Institute of Engineering and Management
Nashik, India

Harshali S. Bagul⁴

Department of Computer Engg,
Sandip Institute of Engineering and Management
Nashik, India

Abstract:- College campuses growing day by day so they can be huge and complicated for visitors. It is very difficult for them to reach at their destination or exact place. GPS, satellite images, Maps, etc. provide us adequate information, but it doesn't provide the information when we are actually on the campus. The issue with the GPS technology is that a signal from the satellites does not pass through walls/ ceilings. An AR system supplements the real world with virtual objects that appears to coexist in the same space as the real world. This android application guides us within the campus itself including both the indoor and outdoor location information via augmented reality.

Keyword: - Augmented Reality (AR); GPS; Navigation; Markers; Android

I. INTRODUCTION

A campus has very huge and complex structure, especially new students and people who are on it for the first time have a hard time to orientate themselves and find places. It is very hard to access the intentional place. Nowadays many of campus occupied very large area. The college campus area is large area and it has many departments and sections. For the new visitors maps are provided at the some places but to find the exact destination user does not get the accurate detail information. They try to find destination by static map which is too time consuming. The Answer for this problem is "Augmented Reality". Our navigator application helps user to obtain the path much more detailed than existing application can be provide. A simple navigation application development would not be simple task. The representation of graph structure, with locations of (canteen, account section, class rooms, Cabins, parking lots etc). This application helps the user to route from his current location to its accurate destination location. The basic intention of this application is to provides facilities to everyone who has complication for finding routs in campus, Including outdoors as well as indoor navigation using smart phones. Augmented Reality System is use to enhance the user's perception of an interaction with the real world through supplementing the real world with 3D virtual objects that appear to coexist in the same space as the real world. Augmented reality (AR) is a live view of a physical, real-world environment. Element of environment and physical world are augmented by computer-generated graphics.

II. SYSTEM ARCHITECTURE

1. User Android Phone

User needs phone having android operating system, based on Linux kernel and basically designed for touch screen mobile devices such as smart phones and tablets.

2. Camera Interface

Android framework support for various cameras features, allowing user to capture images and videos in user application. Android framework captures images and videos through the android.hardware.camera2 API or camera Intent.

3. Pattern reorganization

In pattern reorganization the input data is classified into objects. Input data is received through camera interface in the form of images or videos.

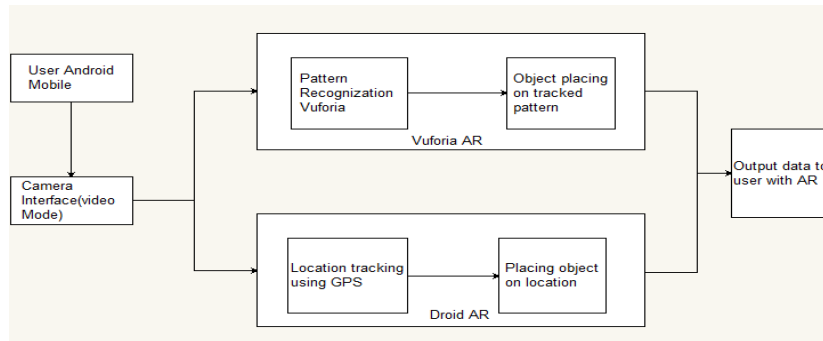


Fig.1. System Architecture

3. Pattern reorganization

In pattern reorganization the input data is classified into objects. Input data is received through camera interface in the form of images or videos.

4. Object placing on track pattern

Object recognition and tracking used to create a augmented reality application with a webcam in MATLAB.

5. Location tracking using GPS

The location of user can be located automatically by location based application .Only need is to integrate location module in application

6. Vuforia AR

It is developed by QUALCOMM. Vuforia SDK supports android with unity support.This SDK supports multiple target at a time and local and cloud databases.

VuMark is use in Vuforia. It is the next generation of barcode. The designs of VuMark are customizable, so user can have unique VuMark for unique object. VuMarks can be created using VuMark Designer tool.

The Vuforia object scanner is an android application. It will scan a physical 3D object.

7. Droid AR

Droid AR is open source AR SDK, supports image tracking and markers as well as location based AR. It is Digital Record Object Identification. It is software tool. It can be easily downloaded and used under the GNU GPL v3 License.

III. MATHEMATICAL MODEL

Z is the system that navigate user to location.

$$Z = (G, S, D, U, M)$$

Where,

G is a GPS

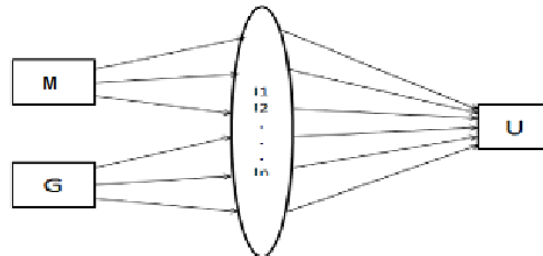
S is a sensor

D is a database server

U is a number of users i.e. (u_1, u_2, \dots, u_n)

1. Start state=Enter the query

2. End state=Get map of location
3. Input: Location
4. Output: Map
5. F=Set Of Function
F= (f1, f2)
Where,
f1=start ()
f2=getLocation()
6. Success case=Location Found and showing Map
7. Failure case= Invalid Location



CONCLUSION

In this paper we presented a campus navigation application developed on an Android platform. The application provides various navigation services to users at Sandip University campus. Campus navigation can be an effectively used in wide campus such as collage, Hospitals, Malls, etc. The shortest path feature of this application will save time of user. Hence the strength of this application is the easy to use navigation feature which is able to find paths on campus to user defined locations.

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