IMPLEMENTATION OF AUGMENTED GUIDANCE FOR CAMPUS EXPLORATION

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Abstract : This study aims to provide a feasible and a immersive experience to view and explore the campus with the applicability of augmented reality in obtaining an innovative mobile application. Using the easiest way to imply and deploy into an application, area target feature is considered, and also a comparison of existing works done to differentiate the types of works conducted in providing a method to achieve the campus exploration is discussed. The study conducted reveals the basic information in getting practical suggestions for applying the implication of the whole process of developing a campus exploration application with a relevant method for easily obtaining the expected results.

I. INTRODUCTION

Augmented Reality (AR) is the innovation to make a future with a reality-based interface and is moving from labs around the world into various enterprises and consumer markets. AR supplements this present reality with virtual objects that appear to coincide in a similar space as this present reality. It was perceived as an arising innovation, and with the fast advancement of portable web innovation, the present smartphones are incredible and little enough to help the figuring and graphical overlay, and are ready to accept this exceptionally new and energizing sort of human-PC connection in the palm-sized smartphones [1]. AR technology can be utilized in mix with different applications to create a helpful and practical apparatus. The application built brings new user encounters to event searching based on a combination of AR, mobile technology, and global positioning system (GPS) location-based techniques.

The application is proposed to assist users to discover day to day events by imagining events over the present reality and showing the guide and course to the events progressively. Regular AR route frameworks use arrows for direction along a course. However, the situations to which the arrows are pointing can be unclear on the grounds that the genuine size of the arrow is indeterminate. Interestingly, when route is guided by an individual, it is straightforward the bearings given instinctively. Further most, this route approach furnishes a feeling of safety with the assumption for arrival at the ideal location, because the application user can arrive at the location as long as the user follows the pilot. In the proposed method pilot is the 3D character which helps the user to relocate to the destination on click to the necessary destination spot on the mobile interface, which will be providing a replacement of human guide for exploring the campus. The application can be developed by adding on the technical features like Area target creation for indoor exploration of campus with department or building wise division and Geo-referenced map creation for outdoor exploration of whole campus. By using a powerful tool like Unity to develop the actual design of application and importing the contents for deployment will have an insight towards possibility in building the application.

II. EXISTING METHODS

The design given as a virtual guide shows data alongside the 3D map of campus. At the point when the user checks the marker image that have been put in explicit location, a virtual 3D map will show up and when the position and location of the user will also be identified naturally. The application at that point will keep on track of the user's development and guide the users to their objective by overlaying turn-by-turn route markers onto the camera live feed [2]

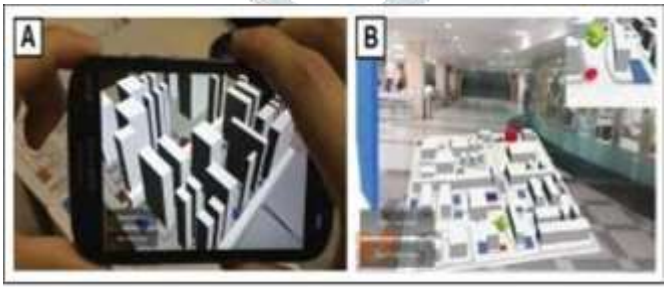

Figure 1.A: Virtual 3D map being augmented over a physical floor plan,
Figure 1.B: Virtual guide with route path [2].

In this method AR based situating segment deals with a rundown of regular markers, for example, exit sign and fire extinguisher signs. For every marker the name, the position, the direction and the connection to the PNG file are put away. This data can be naturally removed from computerized fabricating models. The SDK arrangement file contains the PNG file names just as the real marker measures in milli-meters dependent on the marker list data. Utilizing the video transfer of the coordinated camera, the SDK consequently distinguishes and tracks markers. When a marker has been effectively distinguished, the SDK outputs its name, distance and horizontal angle. The incorporated Motion Sensor of the iPad gives the direction of the gadget in the user's hand [3].

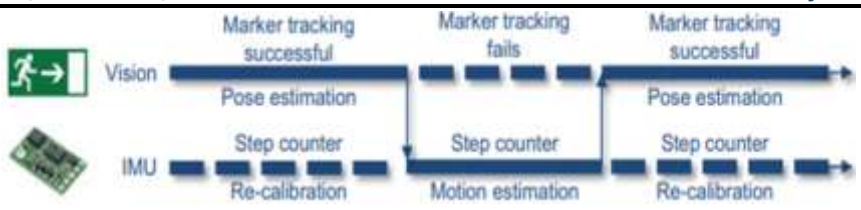

Figure 2: Idea of fusion vision-based posture estimation and IMU based movement estimation for AR based indoor positioning and routing [3].

III. PROPOSED METHOD

Implementing a 3D character using AR technology to perform interactively with the user in place of a human navigator. It is easy for the user to understand the directions intuitively through interactions with the 3D character. Additionally, the reliability can be improved by giving the 3D character a favorable image for both indoor and outdoor navigation around the campus.

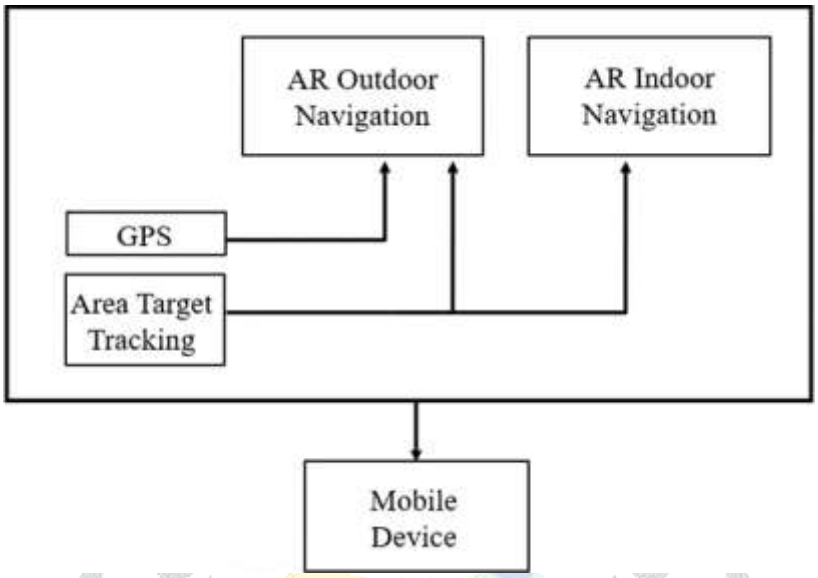

Figure 3: Block diagram for the concept

IV. IMPLEMENTATION

4.1 Indoor Exploration

Initial process is obtaining the target data for object recognition henceforth making real-world data of images being available and presenting the content into augmentation stage. This is quantifiable using the Vuforia Area Target creation method, Area Targets is a Vuforia powered environment tracking feature that enables to track and augment areas and spaces. By using a 3D scan as an accurate model of the space to create an Area Target Device Database, hence can easily deliver augmentations to stationary objects in the scanned environment [4]. Vuforia Area Targets supports scans made with ARKit enabled devices with inbuilt LiDAR sensors, Matterport Pro2 3D camera, NavVis M6 and VLX scanners, and Leica BLK360 and RTC360 scanners. The Vuforia Area Target Creator app lets to scan, generate, and test Area Targets – all within one application. It also allows to retrieve the Area Target dataset files and all other authoring assets for the Unity Editor. Area Target Generator (ATG) application can be used to create Area Targets from the scanned data. Area Targets as a runtime highlight are just supported on iOS gadget fit for running ARKit, Android gadgets equipped for running ARCore, and the Microsoft HoloLens gadgets.

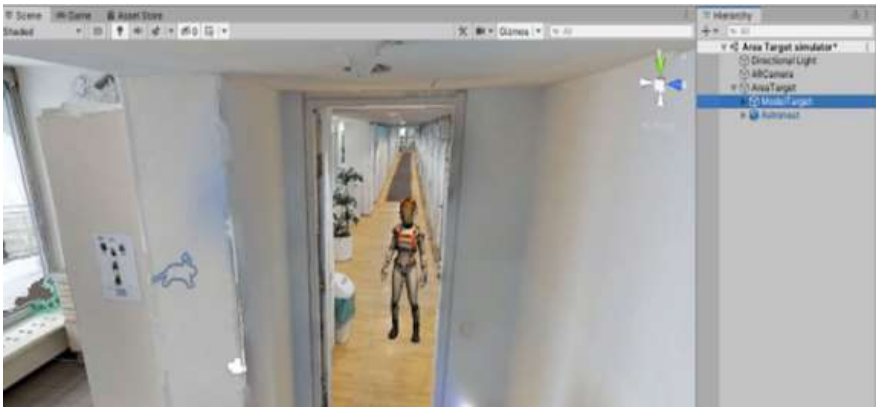

Figure 4: Area target generated is imported into unity for additional processing [4].

As a process in unity occlusion can be added on the real environment by enabling the Occlusion Mesh, obstructing of objects will be realistically achieved with feature. Next the 3D model constructed and animated from a modelling software is imported and the animation of the character is created as per the directional actions required for guidance to turn right, walk straight etc., along with these, necessary audio information for communication is also implanted. Empty object positional points are created on the area target to define the changes to be applied for the character while guiding the direction. When the character hits these points, a trigger is initiated to the character and this will change the behavior of character and display further directional guidance to the application user. To attain this trigger, mesh collider must be enabled and the whole process is scripted using the C sharp programming language and hence resultant is obtained. Rather just navigation, at certain points information feeding about a topic or an object within the department can also be done, by adding highlighting anchors on the area target. Information shared could be in the form of audio, video or image contents which describes the selected objective in real-time.

4.2 Outdoor Exploration

Primary requirement is obtaining outlined design of the campus as a geo-referencing map from Mapbox, mapbox is a location data platform for mobile and web applications. Obtaining satellite constructed location data of campus with the necessary SDK provided by mapbox. Importing this dataset into unity and placing the animated, voice trained 3D model as similar to the indoor exploration. Pointing out the synchronization points having different spots on the map and when the character reaches the spots in real-time, will be reflected with the resultant of guiding the user to move further.

4.3 Application Behavior

Campus exploration application is designed to guide the user to navigate around campus and provide essential information about the campus. The application is welcomed by the 3D Character in seeking the destination to guide, and when the destination is selected the character guides the user to location. The application will also be able to view contents stating the details around the area of visit. When on tap the 3D character must share vocal information regarding the content and also the 3D projection of the contents can be showcased within augmented space. The application is built with a platform independent application development tool, which can be deployed into any devices.

V. CONCLUSION

This paper describes a navigation system where the user is guided by a character using AR technology. Proposed method will be providing efficient and reliable procedures to implement augmented guidance for both indoor and outdoor campus exploration and also adds on a lead to further processing in making an artificially integrated guidance with an interactive character communication during the exploration of the campus.

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