Drishyam (Campus Guide)

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Abstract **- Augmented Reality (AR) is a term for a live direct or indirect view of a physical real-world environment whose elements are augmented by virtual computer-generated imagery. In this project, we experiment with marker less AR which relies on location data instead of physical markers. Points of interest are saved in the back end as latitude and longitude information that are queried by the front-end Android application. This report describes the development of an open-source app that serves as a base for future work on marker less AR. To demonstrate the usage of the app, an AR-Campus tour of our college Raj Kumar Goel Institute of Technology, Ghaziabad will be implemented by the app which will serve as a point object constituting of various sub locations residing in it. This project is basically aimed at providing an ease to the user exploring the campus as an unknown entity. It will integrate the pointed object within the campus into a 3D augmented reality with the help of various technologies which will integrate the pointed object and shows the query asked by the user throughout the stored information in the database and gives the output as an information which will help the user in exploring the campus very easily and independently.**

Index Terms **- Augmented Reality, Cloud Database, Unity Package, Marker Based AR.**

I.INTRODUCTION

Though it's been in development since the early 2000s, Augmented Reality did not get popular until last year's release of Pokémon Go [6]. Until recently, real AR applications required the use of a tracking image such as a QR code or image marker to function. The marker can easily be detected by some camera equipped devices which have some software installed in it. The smart phone, translates that information into a 3D model or animation that maintains a consistent position within the scene, regardless of how or where the user moves. Though it works well, marker-based AR can be limiting and inconvenient [6]. There are a lot of AR SDKs like Vuforia that integrate location to create Geo-location AR apps but all of these AR engines are licensed and do not integrate well with native app development. Also, these proposals neither provide insights into the functionality of such an engine nor its customization to a specific purpose.

There are many Smart phones to choose from on the market from leading manufacturers such as Nokia, LG, Google and Sony Ericsson with many of the companies opting for the Google operating system Android. Distribution was very well declared with the founding of the Open Handset Alliance. The Google Android code is available as free software and an open source license, allowing developers to target many different devices by developing one application using the java programming language. Even with a standard of mobile operating systems being adopted the application market is dominated by that of Apple [5].

Now a day's video games and cell phones are pushing the development of augmented reality. Everyone from the world whether they are engineer, soldier, doctor all are looking forward for the advancement of technology and through this they can get computer reality things in the field of vision.

This project can provide a base knowledge to any developer to build their own Augmented Reality based mobile application. The basic idea of the project is to help a user identify a certain Point of Interest (POI). When the user points their camera at a building, a 3D text representing the name of the building and the courses offered, is augmented onto their camera view. The user can easily see this object from various angles possible and can also interact with it by touching it for further information about the point of interest. The sample app developed as proof of concept is an AR Campus app that helps new students in identifying academic buildings all around campus.

II.LITERATURE REVIEW

There are a lot of AR SDKs like Vuforia that integrate location to create Geo-location AR apps but all of these AR engines are licensed and do not integrate

well with native app development. Also, these proposals neither provide insights into the functionality of such an engine nor its customization to a specific purpose. Michael Kenteris et.al [1] has published a paper named "An innovative mobile electronic tourist guide application". This paper provides the basis for the design and implements issues of a "mobile tourism" research protot. Namely, it enables the creation of portable tourists applications with rich content that matches user preferences. The users can download these personalized applications either directly to their mobile device or PC. 12 Cintya de la Nube Aguirre Brito [2] has mentioned about AR in the paper named "Augmented Reality applied in tourism mobile application". In the paper it is being stated that Augmented reality (AR) has been used in the last years as a tool for enhancing collaboration between the real world and virtual environments. Touristic sector is one of the field where AR has been used. The main motive of this project is to identify the benefits of the use of augmented reality through the development and evaluation of an AR tourist mobile application. Moreover, AR could be easily and effectively applied in different areas for improving the quality of service. Saswan Altshattnawi [3] has put forth a research paper "Building mobile tourist guide applications using different development mobile platforms. In which he mentioned about the applications that the applications are tailored to user preferences, so that the user can access the application from a simple interface or automatically; According to GPS positioning system the details can be viewed. The system is built to be aa effective tourist guide for Jordan, but it is flexible and easy to be for any country. To do that, the administrator need to know the GPS coordinates of each point of interest, and then the desired information may be added to database. In the research paper "Augmented Reality for Chemical Elements" [4] it is being stated that AR is a base for visualizing objects. In this paper, augmented reality technology implemented for visualizing each element in a periodic table. The object-tracking technique that is used in this application is marker less augmented reality technique. This application runs dynamically to provide some information of elements in animated video. The information that it shows in animated video form are as: atomic number, boiling point, melting point, density, atomic mass, standard atomic weight, oxidation state, symbol, phase, element category, electron configuration and many more.

III.METHODOLOGY

Augmented Reality (AR) is a term for a live direct or indirect view of a physical real- world environment whose elements are augmented by virtual computer generated imagery.

DRISHYAM is a way to provide the best way for the exploration of any campus making an individual's work more reliable and easy. After analyzing various research papers and online resources following technologies which are being used for developing this has been identified as:

1. Unity3D
2. Vuforia
3. Android Studio

A.UNITY3D

Unity was developed by Unity Technologies and it is a cross-platform. It was first announced and released in June 2005 at Apple Inc.'s Worldwide Developers Conference as an OS X-exclusive game engine. Available on Windows, Mac and Linux, unity supports both 2D and 3D development with features and functionality for your specific needs across genres.

B.VUFORIA

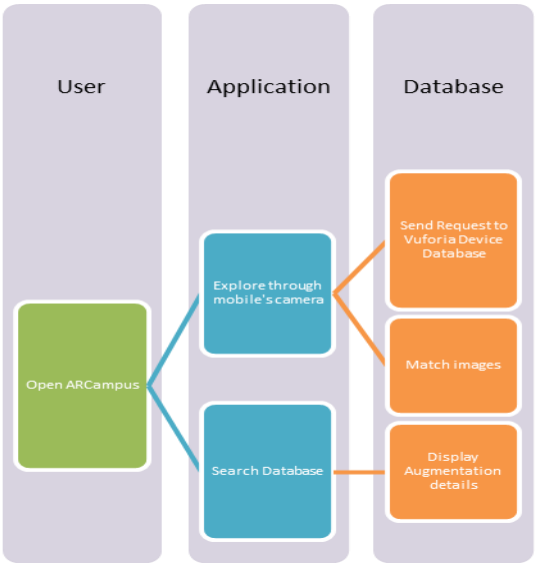
Vuforia is basically a platform used for AR development, which support many leading phones, tablets, and eyewear. A developer can easily amend or add advanced computer vision functionality to Android, iOS, and UWP apps, to create augmented reality experiences that realistically interact with objects and the environment. The Vuforia Engine Library contains technical documentation for helping in creating AR applications. We can easily see that the Vuforia Engine Library is organized by all of the platforms that Vuforia Engine supports. Vuforia supports both the Unity Engine as well as the three major native platforms: iOS, Android and UWP[6].

C.ANDROID STUDIO

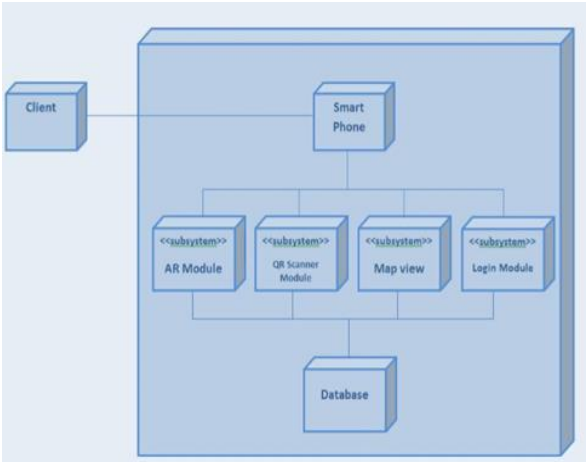
Android Studio is being used for the development purpose. It uses a Gradle-based build system, emulator, code templates, Github integration as a base for the development within the android operating

system. Every project built in Android Studio constitute of one or more modalities.

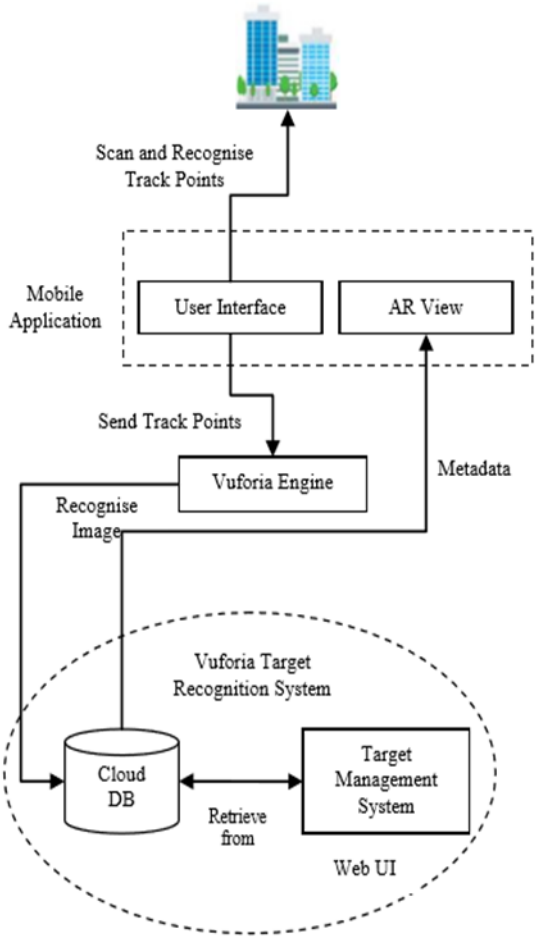
The working of the project can be better understood by the diagram below which clearly depicts that a user can easily explore the unidentified campus through mobile's camera.



This diagram clearly depicts the activity of the project. Deployment of the project is clearly seen in the diagram below and can be easily understood by that in which how the client using the smartphone can explore the campus through various modules and also with the help of database. This diagram clearly depicts the deployment of the Drishyam project.



Data base being required for the success full implementation of the project which stores the real entity data and provide the result accordingly. Database diagram shown below [9].



IV.HELPFUL HINTS

Various applications and projects are available that have provide the base for our project and help us a lot. AR can be used in various different applications. Advertising companies, such as GE Electric, are creating three-dimensional images of their products. In their adverts in magazines users are directed to a website which enables their webcam. Users then hold up the advert and the 3D computer-generated image appears. Within architecture, architects can create 3D drawings and then place them in the location of the site to visualize how it will look in its surroundings. Researchers at the University of Washington have already created a prototype contact lens and the US military's Defence Advanced Research Projects Agency is working on contact-lens displays, which could provide battlefield combat data.

Layar – is an Augmented Reality Browser, which can be downloaded from the app store easily. It works with the help of many functionalities such as mobile phone's camera, compass and GPS data to identify the user's location and field of view and retrieves data based on those geographical coordinates and provides that information over the camera view which can be helpful to the user. Developers can download the Layar Development Platform and create their own Layars with specific points of interest. As a multi-platform application, this is a unique opportunity for 3rd parties to integrate into searches, but the experience, as a user is very leggy and searches often return inaccurate or no results [8].

Google Street View – is available within the iPhone development program, which enables a map to be called, and specific points pinned onto the map. This is a great 10 feature for buildings on roadsides, but Google classes the Leeds University Campus as one particular unit making it difficult to direct users to specific areas of interest. The street views are of a static image of buildings and with a few seconds to load as you move along a street it would be hard work attempting to navigate using it. The technology currently only allows access through a personal computer rather than a mobile device so this tool currently acts as a reference or information point where users can see before their trip what a location and the surroundings may look like [7].

V.CONCLUSION

This paper provides a better way of understanding the augmented reality and helps a user in identifying the unknown place with an ease and in an effective way. It generally deals with the development of a mobile based augmented reality application for the purpose of campus guide. It uses Unity and Vuforia Cloud for information and navigational help. It is specifically designed to give an insight of a campus and it can also be further extend as a tourist guide, big hospitals, railway stations and with better creativity. This application is a prototype that can be extended in many possible ways.

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