Google Augmented Reality Maps

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Abstract -At present the usage of maps has been increased a lot in the recent years after the introduction of Google maps. It has been easy for the new age smart phone users to navigate through the streets in easy with the help of google maps. The new features introduced in this have made it easier and more reliable for the users to use these maps. In this paper we will be observing about how google has introduced a new feature in their maps the AR view. This new feature is a combination of street view and visual position system. We will be discussing about the usage and how this is implemented in the real world.

*Key Words***:**Augmented reality, Visual position system, AR core

1.INTRODUCTION

The AR technology is has advanced rapidly over the last few years and the number of real-world applications have increases. Augmented reality (AR) is an interactive experience of a real-world environment where the objects that reside in the real world are enhanced by computer-generated perceptual information, sometimes across multiple sensory modalities, including visual, auditory, haptic, somatosensory and olfactory.[1][2] AR can be defined as a system that fulfills three basic features: a combination of real and virtual worlds, real-time interaction, and accurate 3D registration of virtual and real objects.[3] Whereas Google LLC is an American multinational technology company that specializes in Internet-related services and products, which include online advertising technologies, a search engine, cloud computing, software, and hardware. It is considered one of the Big Four technology companies alongside Amazon, Apple, and Microsoft.[4][5][6]. Google Maps is a web mapping service developed by Google. It offers satellite imagery, aerial photography, street maps, 360° interactive panoramic views of streets (Street View), real-time traffic conditions, and route planning for traveling by foot, car, bicycle and air (in beta), or public transportation. In

2020, Google Maps was used by over 1 billion people every month.[7]. This will make us to understand that google has made it easy for users to use the maps to navigate through the street of any city. We can assume that google has the highest users in navigation in general public as they give information's and suggestions along with navigating the user.

The Use of Augmented reality into the maps as a feature was introduced in the 2018 Google I/O. Then the feature was only released to few of the selected devices like google pixel and only for the android user. The use of AR core SDK was the main reason for the feature to work fluently.

2. Implementation and Design

The feature was an added advantage to the already present google Map App introduction of the AR view helps how the navigation was going to change the way a user is going to navigate. The implementation of this feature is mainly depended on:

- AR core SDK
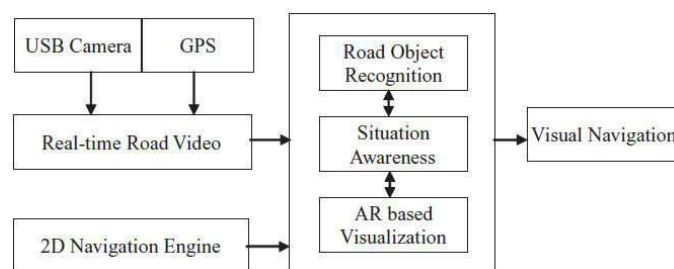- Google Maps
- Street View
- GPS
- VPS

Fig: Block Diagram of Visual Navigation using AR

These were the main important thing which helped making this a real-world application.

AR core SDK is a Google's platform to build the augmented reality experience this SDK helps to enable users' phone to sense its environment, understand the surrounding and interact with them using googles information. Some of these API's are available to Android and IOS platform.

Google Maps belongs to google cloud platform with has the information about the positions and other necessary thing about a particular object of place. This map has a background information collected by google form a long period which make the maps to be more interactive and useful to users.

Street View is a Google maps feature which has the ability to take the user to that particular location virtually with him going there physically. This is a pre-recorded instance recorded by the Google's street view cameras.

GPS known as Global Positioning System. It is a satellite navigation system used to find the object location on the ground. It was introduced in the year 1960's by the United States Military later expanded to general use.

VPS know as Visual Positioning System This new visual system is envisaged for Google Maps wherein with greater accuracy, the VPS will use the phone's camera along with Google's extensive back-end data to analyse the route. It will allow the camera to detect current location based on nearby shops, signboards, etc. and then will suggest the navigation path for the journey.

All these play a vital role in making Google AR maps to run smoothly and accurately As GPS has accuracy of few meters Videos Positioning System helps to detect the Object in theimage and get their position as these objects are not movable this helps to determine the position of the users by detecting the depth and distance from the image captures by the camera.

The working of Google AR Maps is a simple to understand but is also complex to accomplish. Basically in the old Google Maps Application the Maps used GPS to know the exact location of the user and navigate that person though the streets from that particular location. But, GPS has only a few meter accuracy and it needs direct Satellite help to give out the

position the satellite signals inside a city are very weak and are not easy to fetch the accurate location using these signals. To overcome this VPS is used where it uses the surrounding building to know to detect the position of the user. This done first by fetching the image of that building form the camera of the phone processing that image through the google cloud platform to know the location and information about the building this will give the maps the exact location of the building from by analysing the depth of that image the distance from the that building is identified which intern helps to know the location of the user and the location of the device.

Fig: How Visual Positioning System works

Form here the augmented reality kicks in to show the navigation route to the user this is done by displaying Augmented arrows in the screen of the device to show the direction in which the users has to move.

Fig: Augmented Arrows Showing the Direction

These Arrows will direct the user to move in a certain direction and take a turn to a certain direction. This feature will help the Dis-abled people to get the direction more easily and efficiently. There is an added waring system in this application where it tells the user to stop looking at the phone and see the

way the user is walking so that the user wont get hit to a rod, pole, a person or run into on coming traffic.
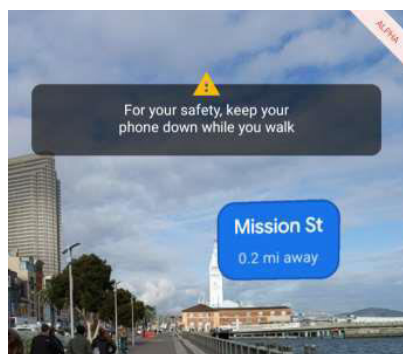

Fig: Alert Message Shown for safety

An Added Advantage of this feature is that the Information fetched by the VPS from the cloud will be shown to the user. This information is about the building in which the camera is directed these will be show as a card augmented to the building
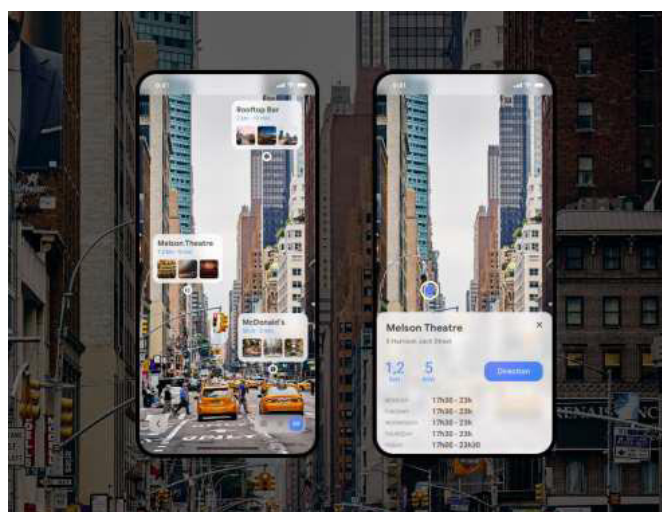

Fig: Image detection and information Augmented

These Information consists for building history, hotel Review and their best dish, Movie theatre and movie timing, etc. This feature will help a user who's in a new place or is unbale to speak the local language. This feature helps to make the world easier to access and fun to be instead of boring 2-Dimensional Map.

To make this feature more interesting the developer have created an Augmented fox to show the direction to the user. This make the experience of using this feature more fun and interesting.

Fig: Augmented Fox Showing the Direction

3. CONCLUSIONS

To conclude the topic the application at present launched to Google Pixel users and few of the top end models which can support Google AR Core are able to use the beta version of the application. This technology is going to change the way maps are going to used in the real world. This technology can change the way navigation is going to be used as this technology is going to rock the world to its core when a complete full stable version of the map is going to be released to the market[8]. This also helps those new people who are new to City and don't know about the place they are visiting. This technology is going to help even the elderly, children and difficulted people to navigate easily. Making it fun to use and helpful will make this application to have a bright future when it is going to be launched.

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