Visual Positioning Based Local Guidance System

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Abstract- *With the growing accuracy of Geo-tracking devices Geo-location based services are at its maximum demand. By combining the location tracking system with mapping technologies on can get the real-time live location tracking over the map and application of these can be extend at different verticals. Google map is one of the best examples of Geo-location based tracking, but still Geo-location services are working in 2D plane where user can see the map from satellite view and find the path or spot on map and not the directional information from specific location. Along with GPS technology digital compass and the positioning sensor can be better utilized to have details information from current hanging location. Proposed system is Visual positioning based local directional and geo-location based information extraction system. Where system utilized the digital compass, position sensor and GPS device to get the users position over plane and get the information matching the position.*

Keywords- VPS, GNNS, GPS, Geo-Location

I. INTRODUCTION

With AR on, a future version of the Maps app will merge its traditional interface with a live camera view. With well-known problems about user must deal with when navigating an unfamiliar locale, even if you do have your smart phone on you. That's why the Google is presenting an updated version of its Visual Positioning System (VPS) : A way for folks to avoid getting lost when out and about. Rather than craning over your phone and hoping you're walking in the same direction as the blue Global Positioning System (GPS) dot, the camera can look at your surroundings and work it out for user. In the example, if a person walks out of a subway stop and they don't know where they're going, they simply hold up the phone and launch the camera. Lens will then identify where you're standing and compare it to Google's database of Street View images in the region. Once the system has your position, an arrow overlay will pop onto the screen, telling you if you need to venture left or right. Proposed system is to Design and Developing VPS (Visual Positioning System) where a mobile app guide user with the help of dynamic pop-up information about view user is seeing using mobile camera currently.

The proposed system is inspired by Google technology for visual positioning system where with the help of geo-location, directional compass and accelerometer mobile application will show location information over camera frame about focused direction. Over the past ten years, Global Positioning System (GPS) has found widespread use in consumer vehicles. However, due to the satellite links required for obtaining a positional fix, accuracy and robustness are sensitive to environmental factors such as tall buildings, mountainous terrain or adverse weather. Recently, efforts have been made to improve on these issues by adding ground-ground communication channels, as used in Assisted GPS and Differential GPS. However, even these improvements are of limited use in difficult situations such as parking lots, and still rely on outside communication. A rudimentary calibration of the camera is required, consisting of both the intrinsic camera parameters and the extrinsic parameters, which define the mounting point and orientation of the camera relative to the place. There is no stringent accuracy requirement on this extrinsic calibration, as the algorithms are designed to cope with the additional pitch. Augmented reality (AR) is a hot topic in mobile apps today. Smartphones and tablets have the power and the hardware capable of enabling developers to write interesting new applications that incorporate live camera and video feeds, hyper-accurate sensor data, and other real-time user data in interesting ways. Here we'll begin exploring the world of augmented reality, and what the Android platform has to offer for developers looking to build AR applications and provide deep, rich experiences to their users.

II. EXISTING SYSTEM

Google or Bing mapping system is helping user navigating on roads and allow user to locate the spot or route to the specific spot. It's showing user where he is moving and guide him towards the destination. Google also come up with the street view where user can see where he is roaming in 3D space or area. Street view can show location but can't guide user in 3D space. It's bit easy to understand and develop a navigation or mapping system, if we looked at map from top view or by satellite in 2D manner using just a X, Y or Longitude, Latitude. But it's bit difficult to guiding user in 3D space cause it add another dimensions like direction, viewing angle, tentative location, distance from object.

III. PROPOSED SYSTEM

First, we need to define (in broad terms) what this application will do. We want to stick with the typical features of an AR application, and improve it over time. So what kind of application will we build? We're going to build a location-based AR app. These types of AR apps generally show where things are in the real-world by indicating where the app thinks they are over the camera view when the user holds the phone up and moves it about. A different type of AR app is the type that recognizes the object using computer vision algorithms and can either draw information over the camera to show what the object is, how it's oriented, or perhaps add or show other objects in the view. While we won't be building this sort of AR app, many of the techniques we teach here can be applied to either type of AR application. The basic architecture of a location-based application involves a camera view, the user's location, the phone's orientation compared to the real world, and a list of locations for items that we want to show on the display – the data with which we augment the camera's vision of the world.

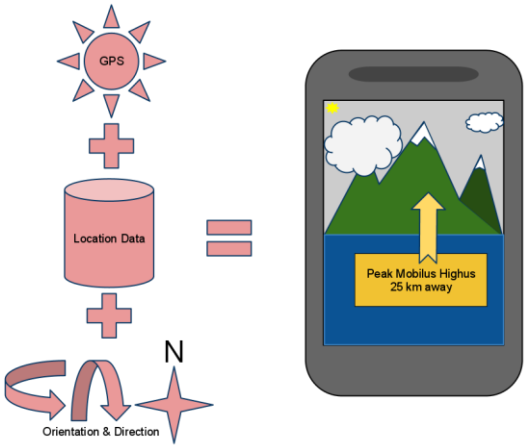

Figure 1.0 System Overview

This first part of proposed system will express about the camera and the sensors and in the next part, it's about location data and the math involved in building the app.

Proposed system or typical AR application requires access to the following device features:

- Access to the camera view
- Access to the user's location
- Access to other device sensors, especially a compass (accelerometer and gyroscope can also be useful)

The application may also require other services and permissions, such as network access, but these are not central to the AR aspects of the application.

IV. METHODOLOGY

Design and Developing Visual Positioning System(VPS) where a mobile app guide user with the help of dynamic pop-up information about view user is seeing using mobile camera currently User just need to hold a mobile camera toward the object it may be building, street, shop, mall, office, just a board, or any other object in street view. With the help of different sensor and some complex mathematical algorithms system can calculate the user position information in 3D space and send a query to database and fetch relative information. It's not about image processing or the augmented reality.

VPS(visual positioning system) is mainly used to help navigating and directing user in 3D space which can't be viewed by mapping system like Google maps or bing.GPS device works in 2D space and provide only X, Y(Longitude, Latitude)

VPS requires 3 main components:

1 Geo location: to have the location of system or user
2 viewing direction: to identify the user viewing direction like south, north, etc.
3 detecting angle: to get the users viewing angle like viewing between ground level to high level.

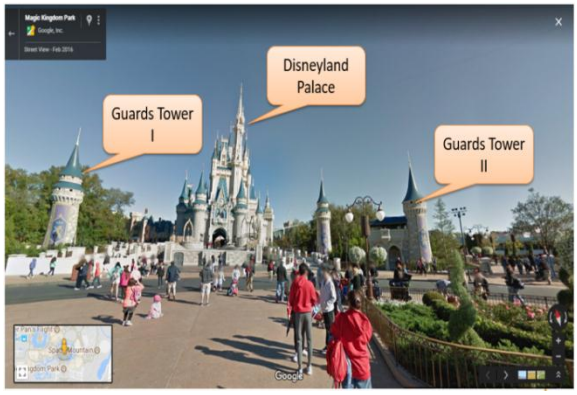

Figure 2.0: location analyzing

As you are moving in the street and you don't know exactly where you are standing. Then you just need to hold the phone in your hand and open the camera. As soon as user open the camera instantly a pop up will appear on your mobile screen indicating names of the tower, buildings when you move the camera in front of that particular building.

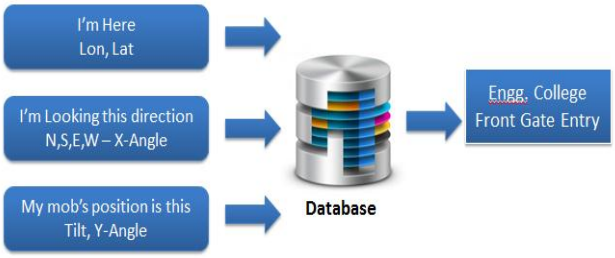

Figure 3.0: Database Retrieval Process

Here we are using the sensor information, camera view and mapping view. Sensor is used to navigate the directions east, west, north and south. Camera is used to show the images. Mapping will give the information about source to destination If the user wants to find the factory from front gate, then the user will send the requirements like the directions and position to the database then database will fetch the requirements sent by the user and then it shows the destination to the user.

Requirement Analysis

Hardware:

- Supportable Android Mobile Phone with
- Magnetic Compass: it is an instrument that uses magnetized steel bar to indicate direction relative to the earth's magnetic poles.
- Inbuilt GPS: GPS is a device that is capable of receiving information from GPS satellites and then to calculate the device geogrophical position.
- Inbuilt Accelerometer: is an electromechanical device used to measure acceleration forces.
- Inbuilt Camera: It is used to show the image.

Software:

- MS SQL Server: Is a RDBMS developed by Microsoft . This product is built for the basic function of storing retrieving data as required by other applications.
- Android Studio: It is the official integrated development environment (IDE) for Google android operating system.
- Java: Is a general purpose computer programming language that is class-based, object oriented and specifically designed to have as few implementation dependencies as possible.
- Android Simulator:

V. CONCLUSION

With the help of visual positioning system user can know the better details about the environment around by just moving the mobile camera view to the specific direction or pointing the mobile at particular location or building. Project cound give following advantage and benefits of the system

- Ease of navigation, guidance in historical places
- Helps in navigation in small campus where Google map won't help
- Google street view has limitation of showing location only not the legends, proposed system will help in the same.

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