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# A Review on Augmented Reality City Tracking

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**Abstract:**

AR research has advanced to such a level that new research opportunities arise. These opportunities can attract the attention of research and the interests of researchers who deal with geospatial data and its applications at regular intervals. They provided an excellent review of the current development of AR research. Emphasis is placed on the follow-up of the research with the aim of proposing new research topics on the development of new localization techniques and improving the performance and soundness of the follow-up. As discussed in recent conferences and youth literature, a trend in computer vision tracking techniques are model-based tracking methods that require a 3D CAD model of environments or a 2D model. It should be noted that recently acquired 3D models can contribute to the further development of robust localization techniques in urban areas in combination with other sensors (e.g. GPS and inertial sensor) to build a hybrid tracking solution. The need for a hybrid tracker is due to the complementary nature of the sensor and the vision-based trackers.This review focused on the various augmented reality city tracking.

## INTRODUCTION

The science and technology that dominates 3D / 2D visuals in real-time video frames to add data and contextual information to the real-world scenario is known as augmented reality (AR). One day, AR research will have progressed to the point where new research possibilities will appear. These potential may draw the attention of researchers and pique the interest of those who work with geospatial data and its applications on a regular basis. They did an outstanding job of summarising the present state of AR research. The research is being followed up on with the goal of proposing new research subjects for the development of new localization techniques as well as enhancing the performance and soundness of the follow-up. Model-based tracking approaches, which involve a 3D CAD model of settings or a 2D model, are a trend in computer vision tracking techniques, as explored in recent conferences and young literature. It should be highlighted

that newly acquired 3D models, when combined with other sensors (e.g., GPS and inertial sensor) to create a hybrid tracking system, can contribute to the future development of strong localization techniques in urban settings. The complimentary nature of the sensor and vision-based trackers necessitates the use of a hybrid tracker.

**What is Augmented Reality?**

A direct or indirect picture of a physical and actual environment, whose elements are increased by sensory inputs supplied by the computer, such as music, video, graphics, or GPS data, is referred to as augmented reality (AR). It's linked to a broader notion known as reality mediated by computer, in which a computer alters one's perception of reality (possibly even diminished instead of augmented). Virtual reality, on the other hand, replaces the real environment with a simulated one, whereas augmented reality improves present perceptions of reality. The superimposition of new information, such as the scores of a live video of a sporting event, is a common example of incremental approaches used in real time and in a semantic context with environmental factors.

Information about the user's real world becomes interactive and digitally modified with the use of advanced AR technologies (such as adding computer vision and object recognition). The real world is overlaid with information about the environment and its things. This data can be virtual or actual; for example, real data can be detected or measured as electromagnetic radio waves superimposed in exact alignment with their location in space. The components of the digital world are highlighted in a person's perceived physical environment via augmented reality. An AR helmet for construction workers, for example, could display information on construction sites. The Virtual Fixtures were the first working AR devices that provided users with immersive mixed-reality experiences in the early 1990s.

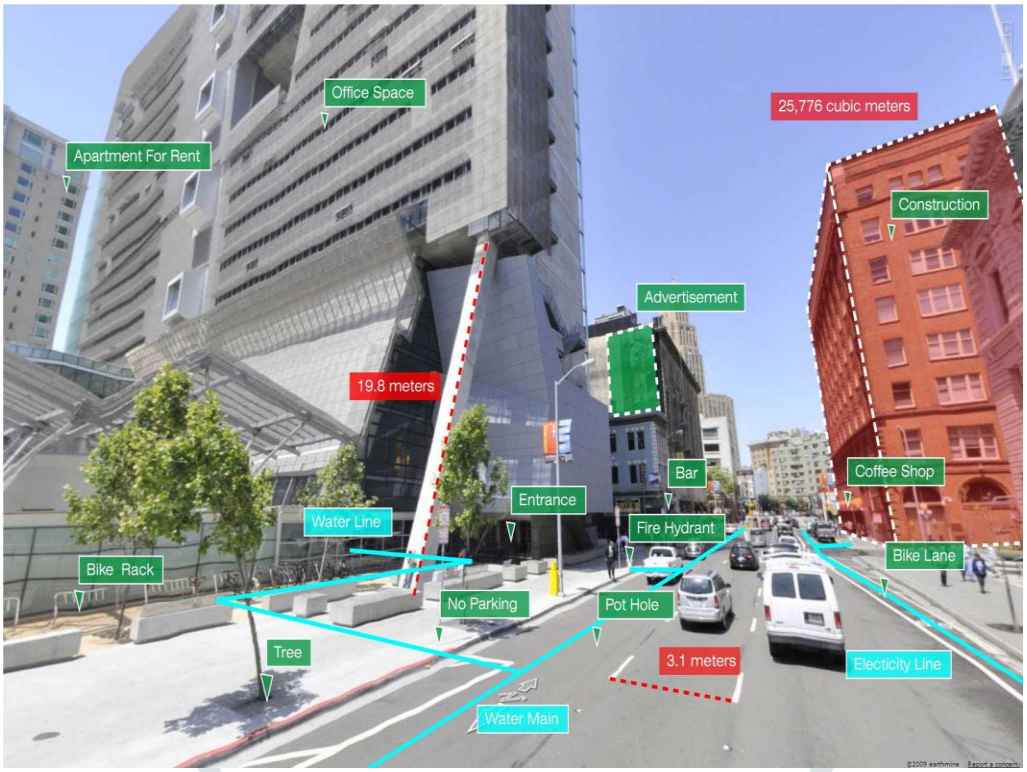


Figure1.1 A R city System

**What is Navigation ?**

The process of controlling and controlling the motions of a vehicle from one location to another is the subject of navigation. Land navigation, marine navigation, aeronautical navigation, and space navigation are four general categories in this navigation area.

**History**

On October 28, 2009, a beta version of the application was launched to coincide with the launch of Google Android OS 2.0 (Éclair) in the Motorola Milestone (known as Motorola Droid). Google Maps Navigation was first released in beta form in the United States. On April 20, 2010, the application (version 4.2) was released in the United Kingdom, as well as Austria, Belgium, Canada, Denmark, France, Germany, Italy, Holland, Portugal, Spain, and Switzerland. On June 9, 2010, the application (version 4.2) was released in Austria, Belgium, Canada, Denmark, France, Germany, Italy, Holland, Portugal, Spain, and Switzerland.

It's also an artistic phrase for navigators' particular expertise that allows them to conduct navigation tasks utilising GPS in automobiles. All navigation techniques require the user's position to be determined in relation to known positions.

Any skill or study that involves determining position and direction can be referred to as navigation. Orientation and pedestrian navigation are included in this definition of navigation. Visit human navigation for further information on the many navigation methods used by people.

Google Maps Navigation is a Google mobile application for Android and iOS that was subsequently incorporated with the Google Maps mobile applications. This application connects a GPS navigation system to the Internet and provides real-time voice instructions on how to go to a specific location. These voice instructions will provide all of the map specifics for the destinations' routes. The application necessitates the use of Internet data (for example 3G, 4G, WiFi, etc.). It usually determines its position using a GPS satellite link and compares it to the current location. A user can enter a destination in the app, and the programme will sketch a path to it, which will be followed if the user continues.

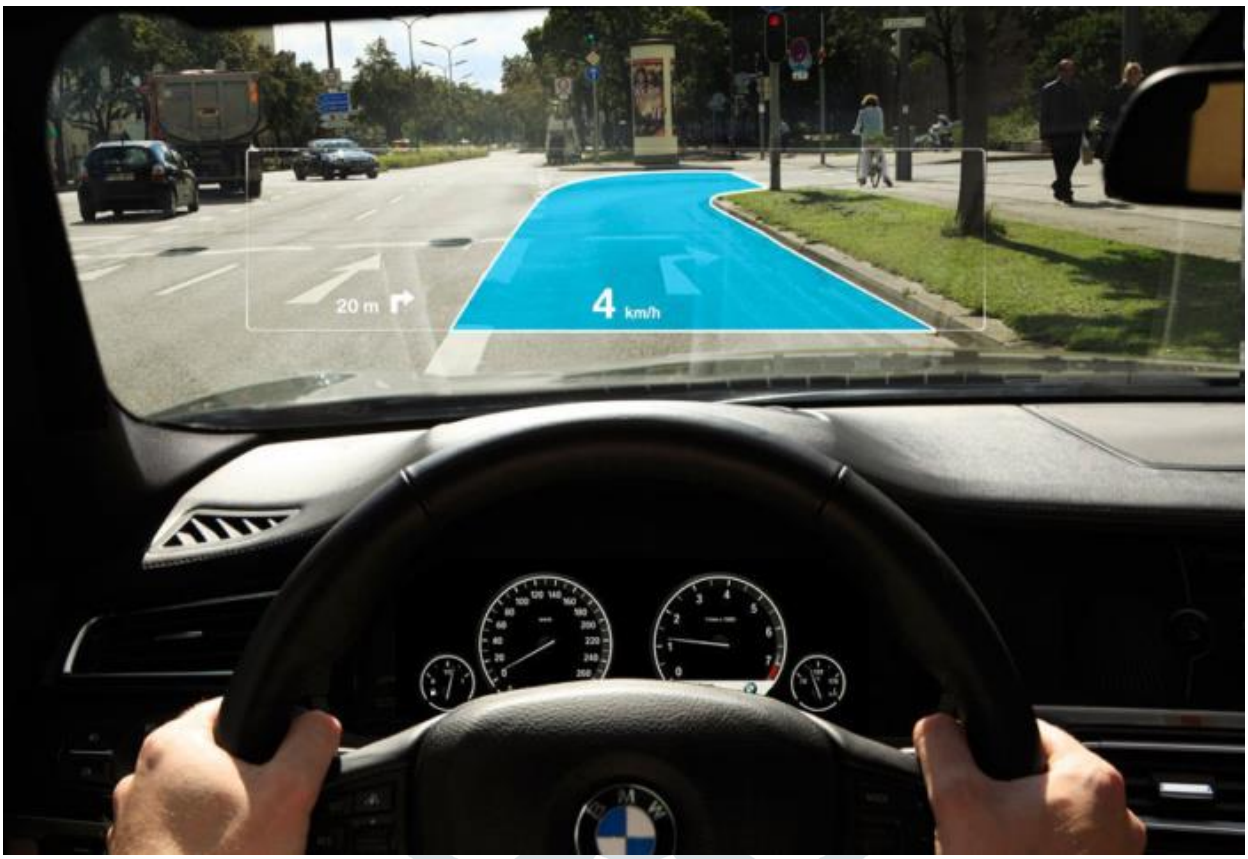


Figure 1.2 City Navigator

**Custom Camera:**

Many programmes now allow users to shoot photos and film movies in a variety of settings. This guide will show you how to perform the same thing in map navigation apps. There are two methods for integrating maps and cameras. One of them is to use the Android phone camera's built-in application, which is a relatively simple operation with mobile phones. This method does not allow you much control over the camera because the camera application's inbuilt features handle everything and you are unable to investigate it. In this manner, it will be appropriate when the application merely demands an image or video from the mobile phone's camera. Many programmes now allow users to capture photos and film videos for a variety of purposes. The second option is to design a custom interface for the camera and include the map-integrated capabilities. This

will take more effort because we will have to do everything ourselves and both of us will have to perform a good job. When developing an app that primarily handles images and videos, such as Facebook or WhatsApp, creating a bespoke camera interface will come in handy.

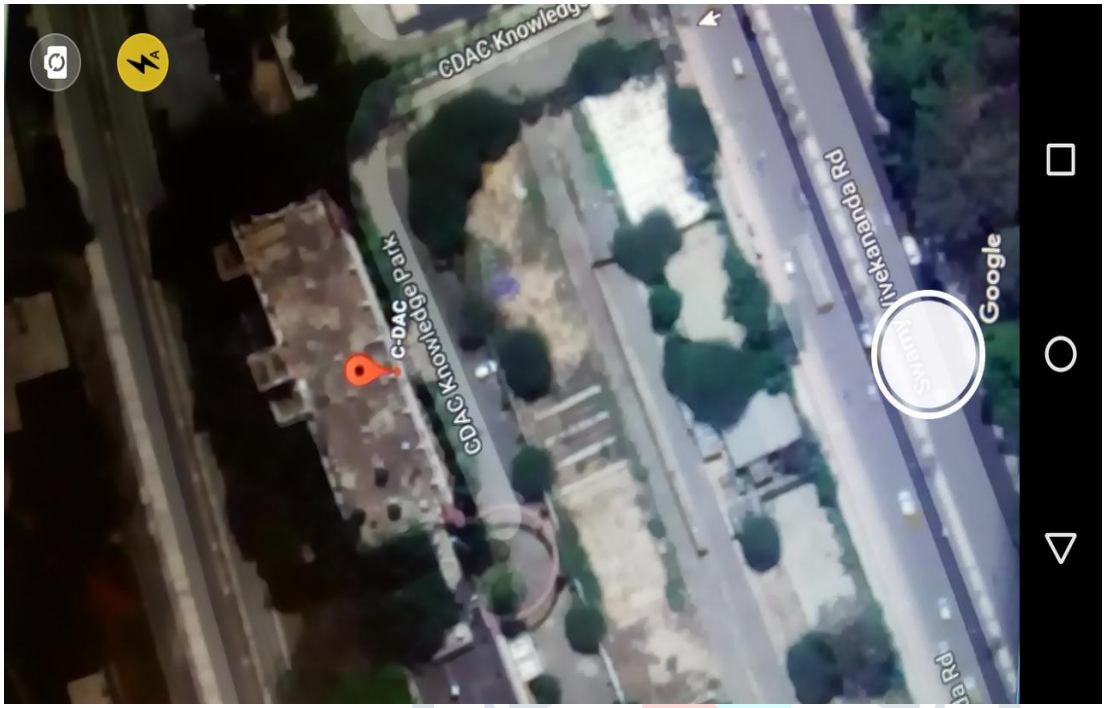


Figure1.3 Map Display on Custom Camera

**Google Map:**

Google Maps is a web mapping service that Google has created. It provides satellite imagery, road maps, 360-degree panoramic street views (Street View), real-time traffic conditions for roads across the world (Google Traffic), and route planning for travels by foot, automobile, bicycle, or public transportation. You may always check your location in the app and confirm it.

Lars and Jens Eilstrup Rasmussen of Where 2 Technologies created Google Maps as a C++ desktop software. Google bought this company in October 2004, transformed it into a web application, and launched it. Google Maps was introduced in February 2005, following the acquisition of a geospatial data visualisation firm and a real-time traffic analyzer. In the beta version, the Google map began to function properly. The service's front-end is built with JavaScript, XML, and Ajax. Google Maps also has an API that allows you to integrate Google Maps into third-party websites, as well as a locator for urban businesses and other organisations in many countries across the world. Google Map Maker allowed users to collaborate on expanding and updating global service assignments, however it has been suspended since March 2017 and is no longer available. However, contributions to Google Maps through crowd sourcing will continue because the firm said at the time that these elements would be transferred to the Google Local Guides initiative. They will be transferred later as well.

**Google Maps API**

Following the popularity of reverse engineering mashups such as chicagocrime.org and housingmaps.com, Google released the Google Maps API in June 2005, allowing developers to incorporate Google Maps into their websites and use it. Although this is a free service with no adverts at the moment, Google warns in its terms of service that it reserves the right to display ads in the future. This is spelled out in their terms of service.

It is extremely possible to place this Google Maps site on an external website when we want it, where the exact data we can display can be overlay, using the Google Maps API. Although the Maps API began as a JavaScript API, it has since been expanded to include an API for Adobe Flash applications (which has since become obsolete). All of these technologies are used in this, and after the beta, a service for the recovery of static maps, images, and web services to perform geocoding and generate directions is also updated. This Google Maps API is used by over 1,000,000 websites, making it the most widely used Web application development API on the Internet.

**Conclusion**

The basic aspects of AR and the main concepts of this technology describe the main fields in which AR is applied today and the important AR devices. Augmented Reality (AR) is the synthesis of real and virtual images. In contrast to virtual reality (VR) in which the user is immersed in a completely artificial world, augmented reality superimposes additional information in real scenes: usually the regenerated calculation charts overlap in the user's field of vision to provide more information about the environment or to provide visual indications for the realization of an activity. In its simplest form, augmented reality can superimpose simple reflections, arrows or text labels to the user's view; for example, the arrows could guide the user to a foreign city. More complex applications can show complex 3D models, represented in such a way that they seem indistinguishable from the surrounding natural scene.

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