

# Augmented Reality

Author: Bhawik Kumar Chawda

Co-Author: Dr. Priya Swaminarayan,

Department of MCA, Parul University, Vadodara, India.

**Abstract:** As we know that Video games have been entertaining us for nearly 30 years, ever since the famous ping Pong game was introduced to arcades in the early 1970's. Computer graphics have become much more cultivated since then, and soon, game graphics will seem all too real. But now a day's, researchers plan to pull graphics out of your television screen or computer display and accommodate them into real- world environments. And these new technologies are called as "Augmented reality".

This technology will truly change the way we see the world. You can experience yourself stepping, running or driving on the street with the help of augmented-reality displays, which will ultimately look much like a normal pair of glasses, informative graphics will appear in your field of vision, and audio will be relatively with whatever you see. These improvements will be refreshed after every interval to reflect the moments of your head. In this paper we have discussed various tools, technology, application area and algorithm based on "Augmented Reality".

Keywords: Augmented Reality, Virtual Reality, Scientific Visualization.

## 1. INTRODUCTION

As we see Nowadays, with the more advanced development of high performance and low-cost hardware, computers are already considered as part of our everyday life. High performance electronics gadget is now everywhere around the world and they provide great and contiguously improve and enhanced resources ready to support us in the execution of our ordinary or more complex tasks. A way to feat these new resources are given by Augmented Reality (AR). With the help AR technology, it allows the user to see the real-world environment, augmenting it with superimposed virtual objects. In other words, while VR replaces reality, AR supplements it, creating an environment in which real and virtual objects demoniacally exist. Augmented reality displays overlap information in your field of view and can take you into a new world where the real and virtual worlds are tightly coupled. But one thing to remember that, this technology is not just limited to desktop or mobile devices. As we know, Google Glass, a wearable device with optical head-mounted display, is a perfect example.

## 2. APPLICATION AREA

### 2.1. EDUCATION

Handy learning materials – anytime, anywhere. Augmented reality has the ability to replace, physical models, paper, textbook, posters, printed manuals. It offers compact and less expensive learning materials. As a result, education becomes more accessible and mobile.

### 2.2. HEALTHCARE

BioFlightVR: Bioflight offers a various range of medical VR and AR services. Bioflight is an Augmented reality technology which has an advanced doctor training and 360° enhanced videos to help doctor's and surgeons learn about various new products and procedures within their field. Along with this company has also developed an "AR " on medical training which help's students and physician to filter their learn and increase their confinement.

### 2.3. MILITARY

TAR [Targeted Augmented Reality] looks like the night-vision goggles (NVG), but it can offer much more possibilities. It can show a soldier their exact location, and the positions of the enemies and enemy forces. The device is fitted to the helmet in the same way as goggles are, and can work during both night and day. So, the main benefit of TAR is to replaces the handheld GPS device, so that soldier would not have to look down again and again to check their GPS location.

### 2.4. ENTERTAINMENT

We bet that, the first game that comes to mind when we are talking about an AR game is Pokémon go. Even those they are not different to PC games must have heard about this global craze. Young and old alike went about catching the weird creatures to finish their collections. The AR game was praised for increasing physical activity in people – you really need to move around to seek out your Pokémon. At an equivalent time, there are complaints that players could cause various incidents and accidents being too engrossed within the game.

## 3. ALGORITHM

- 3.1. Basics of AR: SLAM – Simultaneous Localization and Mapping.
- 3.2. ORB-SLAM Algorithm.
- 3.3. OPEN-CV Face Detection Algorithm.

#### 4. TOOLS AND TECHNOLOGY

- 4.1. Image Recognition.
- 4.2. Tracking The 3D Object.
- 4.3. Unity support.
- 4.4. Open Scene Graph Support.
- 4.5. GPS Support.
- 4.6. Vuforia.
- 4.7. Google ARCore.
- 4.8. Apple ARKit.
- 4.9. MaxST.
- 4.10. Wikitude.

#### 5. LATEST TRENDS IN AR

##### 5.1. Shopping

Based on a report from Gartner, a minimum of 100 million users were expected to utilize AR-enabled shopping technologies by 2020, which is one among the most well-liked retail trends of this year. A BRP report indicated that 48% of consumers said that they'd be more likely to shop for from a retailer that provided AR experiences. Unfortunately, only 15% of shops currently put AR to use.

##### 5.2. Navigation

One of the foremost obvious use cases for AR technologies is indoor navigation, People already lean heavily on maps services from both Google and Apple to urge around outside, but indoor navigation stands to be the utilization case that blows the general public away.

##### 5.3. Remote Assistant

Microsoft is moving forward with a beta of a video-calling system that employs augmented reality to make holographic-style representations of participants. Cisco Systems are additionally performing on a project called "Musion" that brings together its networking products with AR technologies.

##### 5.4. Automotive Industry

Genesis G80 utilizes variety of features to make sure accuracy, including tracking the driver's line of sight to make sure that holographic overlays are always within the right spot. rather than having to seem down at a GPS panel within the dashboard, the driving force will see arrows on a heads-up display providing live directions. Porsche is additionally making major investments in similar technologies.