

# Vision of Future: Augmented Reality Vision via Augmented Web

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**Abstract**— The Basic Theory of augmentation is "superimposition of a certain part or object over something that already exists.".Augmented reality is a technological leap that brings virtual world objects to real world with simple markers,locations , images etc.Marker is actually an anchor for the virtual object to get fixated in real world only in the eyes of the viewer , allowing the user to interact with the marker and also provides security. This technology opens up a portal for various new applications to be developed, significant leap in technology and hardware designs etc.The Computer Vision is the main soul of the Augmented Reality Technology enabling the Computer or the device to see the real world in its own format.

**Key words:** Augment, Virtual Reality, Marker, Object Tracking, Image Tracking, GPS, Camera Feed, 3D Modeling, Scaling, Computer Vision

## I. INTRODUCTION

The best definition of A.R is given by Azuma as "3D virtual objects are integrated into a 3D real environment in real time."<sup>[1]</sup>

Augmented Web is a technology that enables the web browser to act as portal and your vision companion for the augmentation. It uses the camera of the device and performs operations on the camera feed to augment it.

There are few products of Augmented Reality like Google class, Microsoft HoloLense and many more. Today Google Glass' price in UK is 1500 USD and in India it is about INR 98130.68. So common man cannot afford the google class.

The smart-phone is found in every household and is the best gateway to manipulate how we see reality.

## II. HISTORY AND PREVIOUS WORK:

Since 1990 'Augmented Reality' floated around but in reality the birth of A.R was at the start of century.History of the Augmented Reality started with the idea of overlaying data over spectacles by an author L.Frank Baum, named character markeras the years passed by men invented machines which took data from the environment and hence the A.R was entering its Age. At the same time Virtual Reality and Mixed Reality steps ahead with advancement of Technology.

Augmented Reality only modifies the percept of human senses and allows the user to interact with virtual object in his senses over his device i.e Mobile Phone.

Morton Heilig's 'Sensorama' is the perfect example of virtual reality however the perfect example for Augmented Reality is the head-mounted display by Sir. Ivan Sutherland.



Fig.1

## III. APPROACHES AND VARIATIONS:

The idea is to augment make (something) greater by adding to it; increase. the real vision with the computer vision , that is with the help of a mobile device (eye-wear - future scope) through which we can see the real time image with the help of camera and screen. We have different approaches for this, those are:

### A. Marker Based:

A marker is an object of real world be anything which can be read by the computer or the device via computer vision to identify and replace with the information that is conjoined with a marker. Meaning that the device will specifically look for the markers in the real world and replace the marker with the adjoined data that is fed to the program.

Example:- This kind of application will be useful for games like tag or find or house decor , floor planning etc.

### B. GPS Based:

In this, we plan to have a real time image from camera and the synchronized location with the help of GPS system. With this we plan to get the useful information about the location from the WikiPedia and would give the user an option near the location when the camera is taken over that particular location. On clicking on this option, user would be provided with brief details about that particular location. The user would also come to know about near-by places such as restaurants, movie theatre, etc. Relative example for this kind of application is Lumia Camera.

### C. MarkerLess:

The Field of Marker-less Augmented Reality is still a far-fetched vision due to limitation of the hardware on the handheld devices.

## IV. SYSTEM DESIGN AND PROPOSED POSSIBLE SOLUTION

Our proposed system is related to augmented web and/or web-app.

Proposed Solution using Node.js as a server.

### A. Node.js:

Open-Source and Cross-Platform are the Solutions for Future Computer Applications design as they provide each and every developer complete access to a specific or wide range of technology to work with. Node.js is such a

Technology which is used for developing server-side applications written in javascript. Created by Ryan Dahl and other Developers at Joyent it was first published for usage on Linux Platform in 2009. It uses the Google Chrome's V8 Engine and low level I/O API. Node.js is a leading upcoming technology to develop network programs similar web-server. The main difference between php servers and node.js server is a term called "blocking". In php the successive command gets executed only after the previous command is executed, but in node.js all commands are asynchronous in nature and process simultaneously and use call back to signal completion hence it is non-blocking. It is Event driven for web-apps in JavaScript and can scale to a great extent without using threading, by utilizing callbacks in functions which is a simple model of event-driven programming<sup>[4]</sup>. With the advent of High mobile Processing power and extension of web-browsers capability we can fully implement the application in JavaScript.

– Required Components:

A basic Node.js server and JavaScript libraries for computer vision and 3d rendering facial recognition etc.

– Proposed Solution:

Daemon process that will send camera feed to the server where it is processed and stored as a video file that will be sent to the users device.

V. RESULT OF PROTOTYPE APPLICATION:

Graph below shows the prototype application of A.R on mobile device Sony Xperia E3. The frame rates drop during analysis of marker but rise once it's identified and is being tracked. However for on the fly marker the fps is 2-3 max. Hence standalone is a heavy choice for mobile devices.

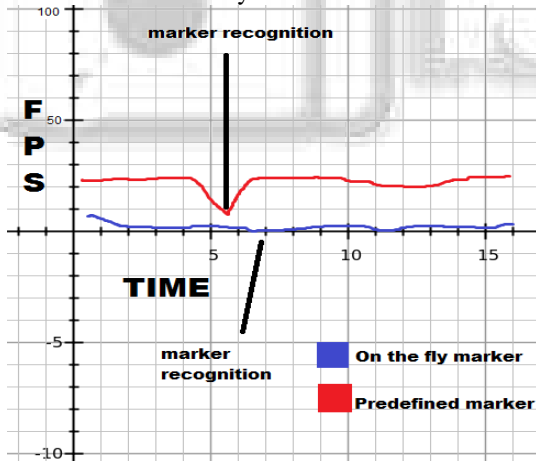


Fig. 2

Marker-less seems futuristic but it is as it seems. The current power of mobiles is too low to handle a marker to be generated on the run. Even if done offers low fps unless the users phone is a high end one.

VI. EXPECTED RESULT:

For the true open source and cross platform we expect our application to run as a web-app where users video stream is sent over to the server and processed and sent back to the user as a video file giving the frame rates of around 20-25fps.

VII. CONCLUSION:

With the Application that we are proposing at the current stage we expect it to solve daily life problems of users like viewing a certain 3d model or knowing which space in parking lot is free or list out which item is present in which aisle in a mall and many more.

The challenges that might be faced while developing this type of application was detailed in <sup>[1]</sup> and <sup>[2]</sup>. The Idea to make a Head-Gear for the masses was referred in <sup>[3]</sup>.

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