

# INTERIOR DECORATION USING AUGMENTED REALITY WITH COLOR PERCEPTION

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*Abstract* - The hands of Augmented Reality has been widened in all the fields by using it we can able to merge the virtual world objects with the real world environment in the android platform. By using this application we can able to feel the visual appearance of the virtual object 3D-modelled furniture our real environment. This enables us to resize, look and feel the texture of the 3D objects also. Using this we can able to place the object and make changes in their appearance by changing the color of the object which is virtually placed in the real environment. This supports us to place the multiple similar objects in our camera screen. Here, we can able to read the recently accessed object which helps in resizing any objects that is place virtually on the screen. The major objective of the project is to resizing the object place and changing color of the 3D object placed in the environment.

**Keywords:** Augmented reality, Interior Decoration, resizing, virtual world.

## I. INTRODUCTION

Augmented Reality (AR) technology has recently been a subject of much interest, and has being used widely on PC such as 3D-game playing and information searching. But now, thanks to the development of mobile hardware, this technology appears destined for the mobile market, brought AR into everyday life. There are several definitions in the literature for Augmented Reality. In 1994, Paul Milgram and Fumio Kishino provide taxonomy of mixed reality systems that include Virtual Reality (VR) and Augmented Reality (AR) apart from Augmented Virtuality (AV). Just a few years later, in 1997, Ronald Azuma defines Augmented Reality to be a technology that combines real environment surrounding with virtual objects. Azuma notes that Augmented Reality shares three common characteristics: Combines virtual characters with the actual world Interactive in real time Registered in 3D The 2011 annual Horizon Report published by the New Media Consortium (NMC) describes Augmented Reality as the following: "Augmented reality (AR) refers to the addition of a computer-assisted contextual layer of information over the real world, creating a reality that is enhanced or augmented

Combined with handheld displays, cameras, acceleration, compass, GPS sensors, Mobile Augmented Reality has been one of the fastest growing research areas in Augmented Reality, partially due to blending virtual imaging into the video stream of a mobile device's camera in real-time and ubiquitous platforms for supporting MAR. The MAR technology can be applied widely, such as in navigation, situational awareness, and geography located information.

Based on how augmented information is aligned with actual world, there are two primary types of MAR implementations: Marker less and Marker-Based. The key difference in Marker less AR is the method used to place virtual objects in the user's view. Marker less AR typically uses the GPS feature of a smart phone to locate and interact with AR resources. Marker less AR is often more reliant on the capabilities of the device being used such as the GPS location, velocity meter, etc. With Marker less AR, no special markers are required. The software is able to recognize natural features, and more complex visual information. Aside from expanding the scope of what can be recognized and in turn augmented, it also opens up increased opportunities to create more natural interactions between digital and physical world elements which have the potential for a wide variety of applications. However, tracking and registration techniques are much more complex in Marker less AR. Drawbacks of Marker less AR including real/virtual image discrepancy, system calibration, or registration problems such as observers fail to adjust their perceptions have to be overcome. When location data isn't used, a marker is often used. Traditional markers, for example, data matrix codes and QR codes, need special black and white regions or codes to be recognized while Image Targets do not. However, in order to have more features to be found, high local contrast is needed. A Marker-based implementation utilizes the traditional marker, such as QR Code/2D barcode to produce a result when it is sensed by a reader, typically a camera mounted on the

mobile screen. Unlike traditional markers, Image Targets do not need special black and white regions to be recognized. The Vuforia SDK uses sophisticated algorithms to detect and track the natural features that are analyzed in the target image itself. It recognizes the Image Target by comparing these natural features against a known target resource database. Once the Image Target is detected, the SDK will store these extracted features in a database and then compared at run-time with features in the live camera image. Targets that are accurately detected should be rich in detail, have good contrast, must be generally well lit and not dull in brightness or color and should not have repetitive patterns. An example of a bad image target that has repeated pattern that cannot be distinguished by the detector, small yellow crosses that appear around the tree shows the features can be used to match images

## II. RELATED WORK

The goal of Augmented Reality is to create a system in which the user cannot tell the difference between the real world and the virtual augmentation of it. Today Augmented Reality is used in entertainment, military training, engineering design, robotics, manufacturing and other industries. In this application there is only two different screen, and so two different activities, but it was a good training to try how to communicate between the activities, how to display elements (TextView, Buttons ...) on the screen and how to interact with them. The first screen is drawn in a linear layout which is the simplest layout mechanism available on Android. Components can be added horizontally or vertically'. This is a pretty simple way of getting components assembled on a screen.

### A. Designing of 3d models

To make the objects interactive and for easily accessible for user 3D objects are used. Designing of 3D models can be done using various methodologies in various platforms. Some of the basic tools which can be used to design 3D object are: opengl, Google sketch up, Blender, Autoq-3d community, Art-of-illusion. These tool kits are more interactive and user friendly. By using the blender we can able to generate the objects in .obj, .mtl and .mb2 format. We can able to design various textured objects using blender tool-kit.

### B. Blender

A free and open source 3D modelling and animation application which can be used for unwrapping, texturing, rigging, water simulation, skinning, animating, rendering, particle and non-linear.

## III. TERMINOLOGIES USED IN AR

### A. Gesture based computing

The 2010 Horizon Report includes examples of augmented reality like the Wii under the category "Gesture Based Computing". It enables humans to interact with mechanical devices using simple natural gestures. In the future, the use of a keyboard, a mouse or even a touch pad may become a thing of the past.

### B. Geotagging and Geolocation



Fig 1.2.a Geotagging and Geolocation

Another important part of augmented reality applications the use of geotagging and geolocation. A Geotag is a GPS coordinate that associates content such as videos, textual information, audio or any user-generated content to a specific location. When photographers use digital cameras, they have the choice to date

stamp the video or photo. A Geotag is similar to that type of tag. AR applications draw on specific tags created by companies but will also depend on content that everyday users add through Geotagging.

### C . Marker vs Markerless Augmented Reality

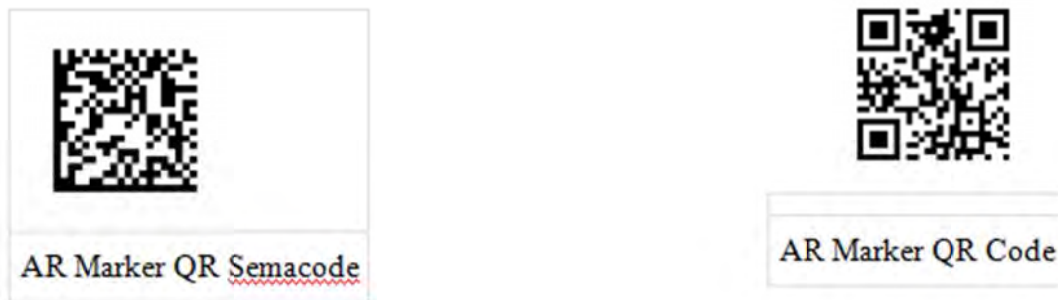


Fig.1.2.2.a Marker and Markerless

Currently, many people associate augmented reality with black and white squares that trigger augmented reality elements. These black and white squares are called markers. Markers are also called QR (Quick Response) codes or Semacodes. A QR code is a two dimensional bar code that allows its content to be decoded at highspeed. Markerless technology requires no marker to know the position of the object or person. Smartphone browsers that layer information over live locations are often considered in the markerless category, although they still use embedded "marked" information through geolocation and geotagging.

## IV. PLACING OBJECTS IN SCENE

The user can have extendable accessibility of choosing various furnishing equipments among the list of objects which are predefined. For performing this action metaio and android studio can be used. Metaio is an Augmented Reality Software Development Kit (SDK) for mobile devices that enables the creation of Augmented Reality applications. It uses Computer Vision technology to recognize and track planar images and simple 3D objects, such as boxes, in real-time. The Metaio toolbox allows to map, i.e. capture, reality in order to run Augmented Reality (AR) experiences related with your direct surrounding or objects close to you. The produced "3D maps" can be exported to the computer and used together with Metaio SDK in any of the AR scenario apps, or imported into Metaio Creator.

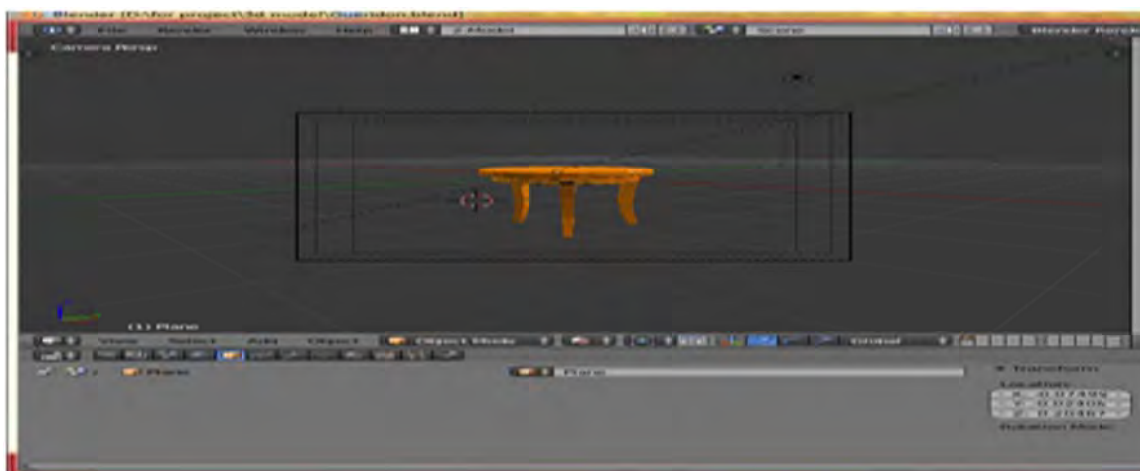


Fig. 3.1 Placing Objects

This image registration capability enables developers to position and orient virtual objects, such as 3D models and other media, in relation to real world images when these are viewed through the camera of a mobile device. The virtual object then tracks the position and orientation of the image in real-time so that the viewer's perspective on the object corresponds with their perspective on the Image Target, so that it appears that the virtual object is a part of the real world scene.

The highlighted performance is tools to catch performance, usability, version compatibility, and other problems. It encourages rich layout editor with support for drag and drop theme editing. Its characteristics

are Flexible Gradle-based build system, Build variants and multiple apk file generation. Developing with Android Studio is the preferred method because it can directly invoke the tools that are needed while developing applications. The Android modules are compiled and packaged into .apk files, the containers for the application binaries, based on the build settings. The apk file for each app contains all of the information necessary to run the application on a device or emulator, such as compiled .dex files (.class files converted to Dalvik byte code), a binary version of the AndroidManifest.xml file, compiled resources (resources.arsc) and uncompiled resource files for your application.

## V. SCALING AND COLOR CHANGING

The resizing of the 3D objects can be done using the increase and decrease buttons which are placed on the screen. The rotate option enables us to view the object in 360 degree rotation of the objects along the Y-axis. The user can place as many objects as per their wish. The placing of multiple objects of same kind can also be carried out. The user can access any objects that are placed on the screen by gently tapping them. Once the object is placed in the scene it is possible to give different texture and color for the object from the given color palette. Once the design aspect of the system is finalized the system enters into the coding and testing phase. The coding phase brings the actual system into action by converting the design of the system into the code in a given programming language.

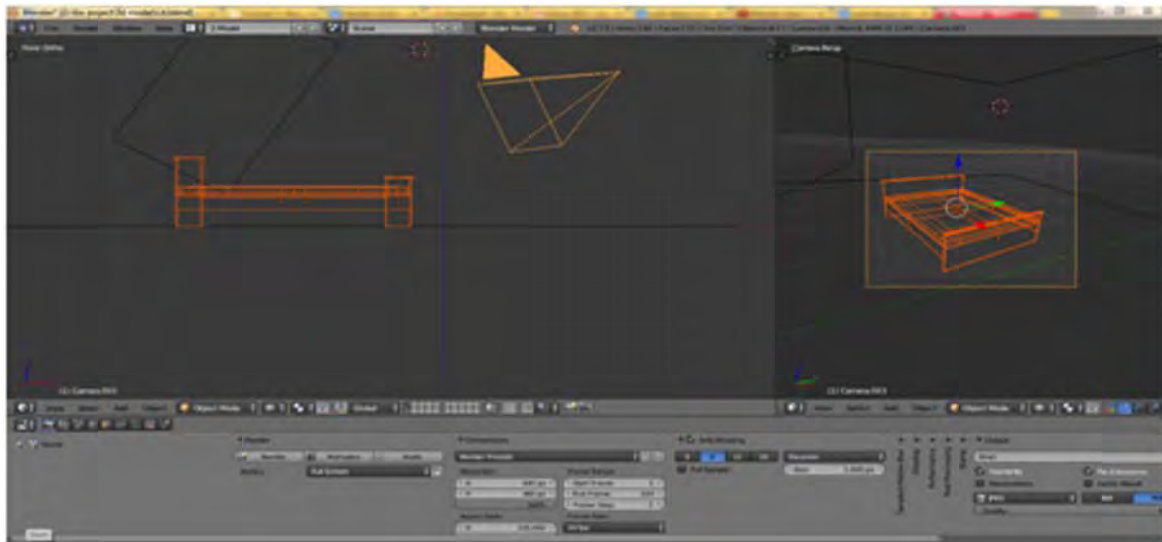


Fig 4.1 Scaling and color changing

## VI. CONCLUSION AND FUTURE WORK

The work has been proposed for different vision of merging augmented reality in android platform. By using this we can able to vibrate augmented reality in our hand held devices which suits our modern day-to-day life. This enables us to place 3D objects in the work space without any special markers, trackers and uncomfortable head mounted displays. The improvements would be first to add options to see this application such as the percentage of resources that each application takes, to see the relationship between processes.

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