

# Augmented Reality based Interior Decorator System

Soni Punit <sup>1</sup>, Singh Rajneesh<sup>2</sup>, Singh Amit<sup>3</sup>, Shahani Amit <sup>4</sup>, Prof. Jangid Pravin<sup>5</sup>

<sup>1,2,3,4</sup>BE Student, Dept. of Computer Engineering, Shree L.R. Tiwari College, Maharashtra, India

<sup>5</sup>Prof. Dept. of Computer Engineering, Shree L.R. Tiwari College, Maharashtra, India

\*\*\*

**Abstract** - This project will provide the people with an attractive and interactive interior design application using Augmented Reality. Nowadays, there are a lot of people familiar with the computer system and communication technologies. There are several problems induce me to create an interior design application in AR. Nowadays, people are busy with their work. People have no time to go to various stores to buy furniture for their home, shop or office. There is difficult to fulfil the customer's contentment to decorate their room without imaginary picture to refer. Printed furniture catalogue is basically a paper based information with lots of texts and images which does not provide any interaction for the user. And people can't view a better graphics of visualization because the design layout is statically presented on papers. Due to that, AR and 3D technology must be applied into interior design area. It is an application, which includes furniture and furnishings will develop in 3D surface of object and present by using augmented reality. It will perform the interactive and attract the attention.

**Key Words:** Augmented Reality, Marker based, Image Capturing Module, Image Processing Module, Tracking, and Rendering.

## 1. INTRODUCTION

Augmented reality is a technology which allows user to have an interactive experience with the real world. Augmented reality technology is categorized into two types – marker-based and marker-less. Marker-based system is inexpensive and easy to use. The project is an android mobile based application which will be compatible with all the existing and upcoming versions of android handsets. The user has to install the application on the android handset or tablet. Then place the markers on the floor at required positions. Start the application which will allow to start the camera. Project the camera on the marker. The marker will be detected, the co-ordinates of marker will be calculated and 3D objects will be created dynamically. This application can detect multiple markers and create multiple virtual objects. The objects are viewed virtually in the real world and the user can rotate it virtually. Also user can resize the object and select different colors for the object to select the best suitable furniture design for the house.

### 1.1 MOTIVATION

AR technology is growing day by day and its applications are widely used in various fields such as gaming, military,

education and various other mobile applications. The main objective is to build an application on the same technology so that it would help our user to interact with the virtual objects by assigning them in their desired place so that it would let the user to visualize their furniture without the presence of actual furniture thus guarantees their complete satisfaction before buying the same furniture. Our aim to make furniture shopping time saving and hassle free.

## 1.2 PROPOSED WORK

### A. System Architecture

The system architecture of marker based system consists of 7 modules:

- 1) Camera
- 2) Image Capturing Module
- 3) Image Pre Processing Module
- 4) Image Processing Module
- 5) Tracking Module
- 6) Rendering Module
- 7) Display Module

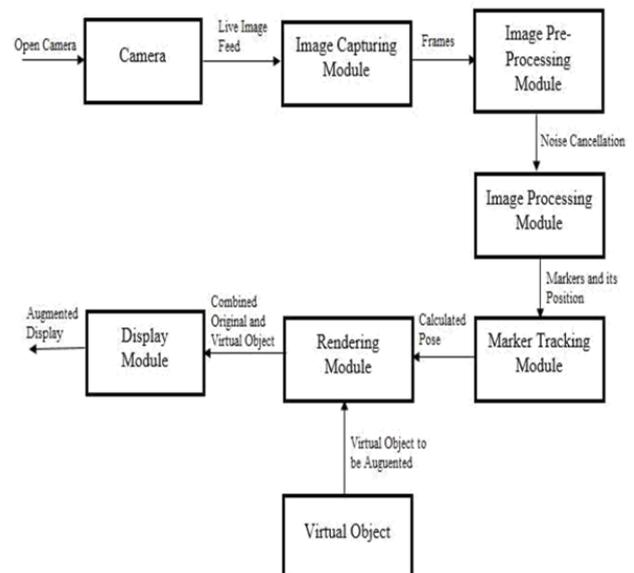


Fig -1: Architecture of AR

### 1) Camera

A continuous image feed is given to the camera of android handset.

### 2) Image Capturing Module

The input to Image Capturing Module is given. This module analyses each frame in the live camera feed and generate the binary image consisting of only two values for each pixel i.e. 0 for black and 1 for white.

### 3) Image Pre Processing Module

After receiving the binary image, unwanted noise will get eliminated.

### 4) Image Processing Module

The binary images generated by the Image Capturing Module are input to the Image Processing Module. This module process the binary images and detects the marker using image processing techniques. To place the object in the real world, marker position is determined.

### 5) Tracking Module

The 3D object will be placed according to the marker obtained from image processing module wherever user moves his device.

### 6) Rendering Module

The Rendering Module has 2 inputs. First is the calculated pose from the Tracking Module and other is the 3D Virtual Object to be augmented. This module combines the original image and virtual components. It displays the augmented view on the screen of android handset.

### 7) Display Module

The desired output will be display.

#### B. Use Case

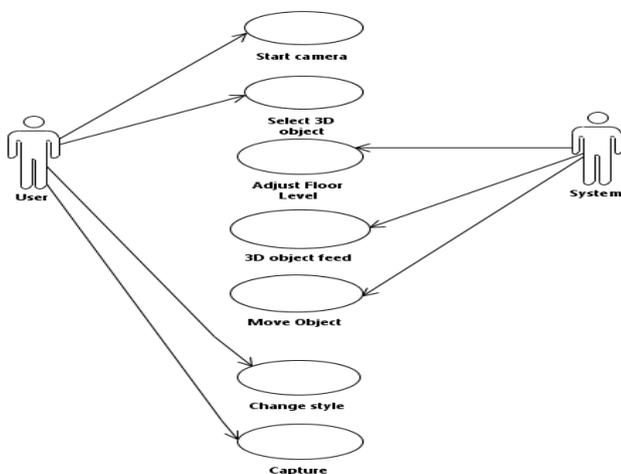


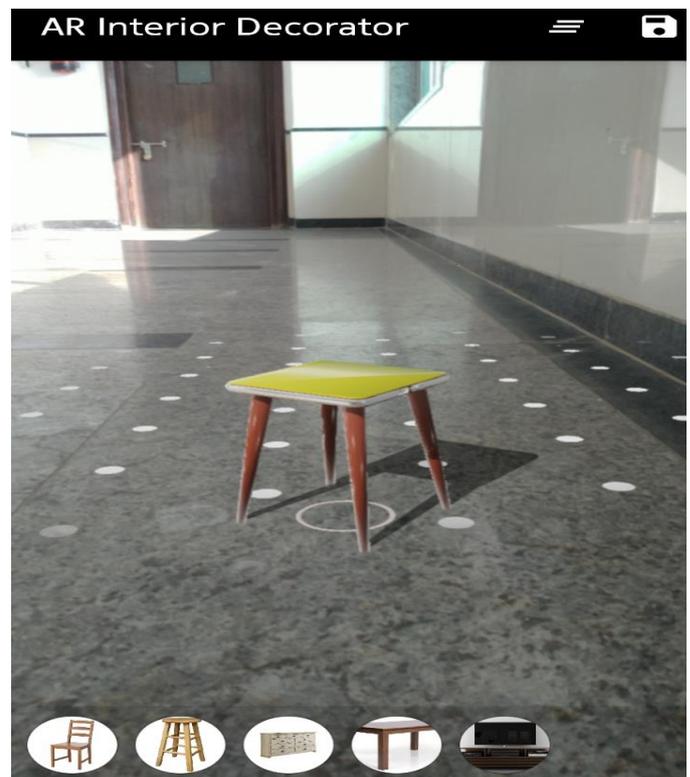
Fig -2: Use Case

## 2. IMPLEMENTATION

The operation of the system is described as follows.

1. First the user downloads and prints the markers from the interface. The size of the marker may vary depending on the area of the room and the nature of objects to be overlaid.
2. The user launches the application and places the marker in the appropriate position near the area which he wants the object to render. Every marker is associated with objects and stored in the application internally.
3. The next step is furniture arrangement. Objects render on the marker and are viewed by the user in real time.
4. The user is displayed with a furniture set. Furniture which the user does not want to appear in the scene can be removed by simply sliding the image out of the scene.
5. Initially, the objects render on the marker coordinates. The user can manually manipulate the objects. Dragging the object will change the position of the object.
6. The object can be rotated and the plane of rotation is easy for the users to understand as it can be viewed in real time.
7. Objects can be changed on the same marker. Every marker has number of objects of the same category- sofa, bed and so on. If the user wants to view a different sofa or different bed, three-point touch is enabled and the user can view variations in sofa, bed and all other objects.

## 3. RESULT





## REFERENCES

- [1] Milgram, P., Takemura, H., Utsumi, A., and Kishimo, F. 1994. Augmented reality: A class of displays on the reality/virtual continuum. In Proceedings Telemanipulator and Telepresence Technologies: 2351-34, Retrieve 2007-0315
- [2] Wang, Gu, David, Gong & Kim (2007) A survey of Augmented Reality.
- [3] Woodward, C., Lahti, J., Röykkö, J., Honkamaa, P., Jäppinen, J., Rainio, K., and et al. 2007. Virtual and augmented reality in the digital building project. International Journal of Design Science and Technology, Vol.14, No.1, 23-40.
- [4] Siltanen, S., and Woodward, C. 2006. Augmented interiors with digital camera images. In Proceedings of Seventh Australian User Interface Conference, Australia CRPIT, 33- 36.
- [5] Phan, V. T., Choo, S. Y. 2010. A Combination of Augmented Reality and Google Earth's facilities for urban planning in idea stage. International Journal of Computer Applications, Published by Foundation of Computer Science, USA, vol. 4, No. 3, 26- 34.
- [6] Tiina and Sanni 2012. Understanding Virtual Reality: Interface, Application and Design. Morgan Kaufman Publisher.

## 4. CONCLUSION

The Augmented Reality Technique has become a hot issue in the field of computer vision technology, with its different user experience, slowly and deeply changing people's life, which includes many different fields such as education, medical, advertising and so on. The study on Augmented Reality Technique is mainly divided into two directions, one is implementing camera 3D registration by identifying the markers in scene, the other is updating camera pose by doing 3D reconstruction to the unknown scene, rendering the virtual objects in real-time. This paper mainly used the second method to research, realized the Virtual Home Augmented Reality System, which can support auxiliary information to people when decorating and selecting furniture, help users feel the placement of furniture in the room in advance before putting them in.