

# Virtual Furniture using Augmented Reality Technique

Akshata Salunkhe, Priyanka Paygude, Arti Salunke, Amit Wachakawade  
Computer Engineering  
RMD Singhad School Of Engineering  
,Savitribai Phule Pune University Pune, India  
akshatasalunke16@gmail.com , pripaygude95@gmail.com  
artisalunke80@gmail.com , amit.wachakawade123@gmail.com

**Abstract**— The speedy growth of android applications is creating a great impact on our lives. The aim of this research Virtual Furniture: An Augmented Reality Approach is, to create a virtual atmosphere using an Augmented Reality. In this paper, we discuss about how it will look after placing the furniture in the users room. The goal purpose of this project is to develop an application for trying different furniture items in furniture stores without physically visiting the furniture store which is very time consuming activity. Due to these application user can analysis virtual furniture and communicate with 3D virtual furniture data using a dynamic and flexible user interface

**Keywords**- AR- Augmented Reality, 3D -Three dimensional, virtual furniture, Tangible AR ,Interior design

\*\*\*\*\*

## I. INTRODUCTION

In an AR environment the virtual furniture can be displayed and customized in real-time on the screen, allowing the user to have an interactive knowledge with the virtual furniture in a real-world environment. Accordingly, this Project will to presents an augmented reality system for designing/educating/presenting interior design projects using overlaid virtual furniture in a physical environment based on a usual PC home system. Tracking markers are positioned on the floors or walls to label the scale and coordinate system of the room. Next, the user selects virtual furniture on the screen and situates it in the design space. In the AR scene, the 3D virtual furniture is included into a real environment and can be set alongside real furniture.

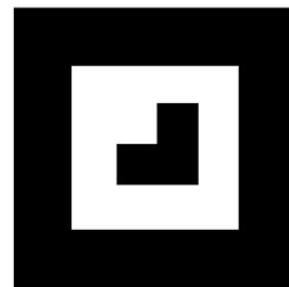


The three basic ethics of interior design: color, scale, and proportion within a predetermined space thus, The proposed AR system is focused on giving the user the litheness to design using these three basic ethics.

## II. BASIC CONCEPTS

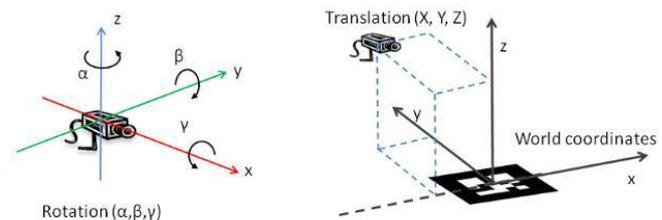
The way of the system is described in the these paragraphs. First, the user prints out the markers that will be used, where the technique and size of the markers can be defined from the

user interface in order to adapt it to the environment (i.e. viewing distance and size of the room).



As the user walks around the room, they take a series of capture marker images with a digital camera. Then it check whether the captured marker is equivalent to the predefined marker.

Thereafter, the furniture augmenting system is ongoing. The system includes functions for managing images, moving and re-sizing and rotating them, and significant marker properties and threshold values for manipulating objects. Then can see the piece of (virtual) furniture on the marker card, however, the user also can shift an object to the desired pose by moving the marker.



The proposed Application mechanism as follows:

1. The camera captures video of the real world and Many AR applications use stiff directions in the marker coordinates. As a result, when looking from

an opposite direction, the object is moved to an deviant direction.

In contrast, the planned approach is more natural for user exploitation as no knowledge is required of the marker coordinates. First, a virtual chair and meeting table are assigned as the main samples in the current AR experiment. Once the virtual furniture has been set the user can correct the scale using digital images on the screen or a manage marker band through a touchable AR effect. In the AR photos, the user keeps the control marker outline in their hand as they approach the virtual furniture. The virtual adjusted slide appears on the control marker outline, allowing the user to interact with the virtual furniture through manipulating the control marker band. Sends it to the application.

2. Application searches through each video frame for any square shapes mark
3. If a squared marker is found, the application calculates the position of the camera relative to the black square marker .
4. Once the location of the camera is known a computer graphics model is drawn from that same position
5. This model is drawn on top of the video of the real world and so appears as present on the square marker
6. The final output is 3D virtual object on the real word

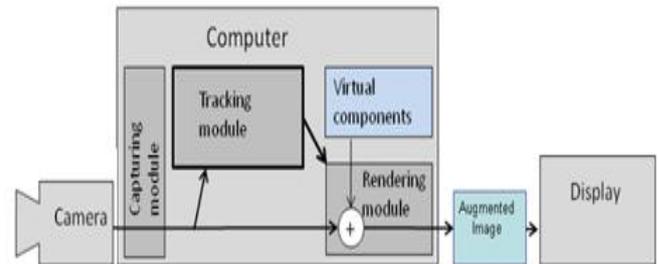
A marker is nothing but sign or image that a computer system can sense from a video stream using image processing, pattern recognition and computer vision techniques. Once detected, it then defines both the correct scale and pose of the camera. This approach is called marker-based tracking . The system calculates the pose using the information from the detected marker location.

The basic marker detection process consists of the following steps:

1. Image acquisition
2. Pre-processing
  - Low level image processing
    - Line detection/line fitting
    - Detection of the corners of the marker.
3. Detection of potential markers and reject of obvious non-markers
  - Fast denial of obvious non-markers
  - Fast acceptance test for potential markers.
4. Identification and decoding of markers
  - Template identical (template markers)
  - Decoding (data markers).
5. Computation of the marker poses.

### III. SYSTEM ARCHITECTURE

For implementation, two separate modules were developed: one for creating and managing the 3D database, and the other for displaying, as show in below figure



First, CAD applications extract information from a drawing and link it to a database. For the given space, geometrical information is then extracted from a three-dimensional database of furniture .After loading the geometries, the location and direction of the views for the user are calculated based on data marker tracking. Simultaneously, the location- and direction- based geometry data are transformed using transformation matrices to produce images that align beside other objects in the real view. As such, the position tracker and orientation tracker are key elements of AR systems and the development AR technology. The properties of the furniture graphics are saved in a database generated by a CAD application, e.g. 3DSMax software, while OpenGL renders the final graphics. Plus, an AR Tool Kit software library is used to compute the 3D positions and orientations of the virtual furniture

### IV. CONCLUSION AND FUTURE SCOPE

This system will assist buyer who want to buy furniture in real environment. Customer will used it to determine how to set up furniture in house. This system proposed the furniture outline augmented reality application based on the visual maker-based tracking methods. Customer will have the literal view that how to set up the office, house and any space which is required for the used. User can try out various combinations virtually, without physical movement of furniture items

### ACKNOWLEDGMENT

Every orientation work has an imprint of many people and it becomes the job of author to express deep gratitude for the same. We take this opportunity to express my bottomless sense of gratitude towards my esteemed guide **prof. Sonal Fatangare** for giving us this splendid opportunity to select an present “**Virtual Furniture: An Augmented Reality Approach**” Project and also providing facilities for successful completion. We thank **Prof. Vina -Lomate**, Head, Department of Computer Engineering, for opening the doors of the department towards the understanding of the seminar report,

all the staff members, for their indispensable support, priceless suggestions and for most valuable time lent as and when required. With all respect and gratitude, I would like to thank all the people, who have helped me directly or indirectly. We also thank my friends for their help in collecting information without which this Project not have seen the light of the day.

### REFERENCES

- [1] Haptic Palpation for Medical Simulation in Virtual Environments Date of Publication: April 2012 Authors: Ullrich, S.; Kuhlen, T. Virtual Reality Group, RWTH Aachen Univ., Aachen, Germany
- [2] Augmented reality approach for paper map visualization Date of Conference: 27-29 Dec. 2010 Authors: Adithya, C. Dept. of Inf. Sci., B.M. Shrinivassayya Coll. of Eng., Bangalore, India Kowsik, K. ; Namrata, D. ; Nageli, V.S. ; Shrivastava, S. ; Rakshit, S.
- [3] ZhiYing Zhou, Adrian David Cheok, Jefry Tedjokusumo and Gilani Syed Omer, wIzQubesTM- A Novel Tangible Interface for Interactive Storytelling in Mixed Reality, The International Journal of Virtual Reality, 2008, 7(4):9-15
- [4] The study and improvement of Augmented reality based on feature matching Date of Conference: 15-17 July 2011 Authors: Ruobing Yang Media Sch., Linyi Univ., Linyi, China