

## REAL TIME VISUAL FURNISHING FOR ANDROID USING AR

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**Abstract:** *We have developed an AR based furniture application for android. You can make your own interior design using this app. We have a catalogue of furniture from which we can select multiple combinations to design our home. There is a direct need to have an app like this in today's market. There is lot of time and energy which every individual invests when they try to buy furniture. Also there is a constant itching of not getting the best suited furniture for our house or can we have all of these things just by seating in our house and get the best perspective of every detail which we would get the same by travelling miles to a particular store. The answer is yes and augmented reality has given you the leverages of making this dream come true. This application wish to serve the society by providing a solution to this problem. We also try to deliver more by using other technologies like AI that would broaden the scope of this paper. It will be just a matter of time when this new technology would be a day to day part of our lives. This paper gives the detail information about the application developed and its usability.*

**Keywords:** *AV, Real Time, Android, AR based furniture*

### 1. INTRODUCTION

Today almost all services are becoming mobile. From shopping and travelling to dining and dating there is a app in hand for everything. However there is still no single app for simulating furniture in real time.. We need a solution which is instant, precise and reliable. We have directed our motive to make an app which solves the above stated problem. Since 3D visual gives us a better perspective than a 2D image, we have used augmented reality for providing a better solution. This solution would not only save the time and efforts of the consumer but

would also help him make a better decision The catalogue which is provided by the interior designer, all the models will be available in that app, giving a quick access to go through all the options. The size of the furniture can be scaled to fit the dimensions of the room in case the user wants to have the furniture specially designed for himself/herself.

### **1.1 Ease of use :**

**1.1.1 One stop for your furniture:** We will be integrating the catalogues of all the standard brands of furniture. So that we can easily compare the rates and looks of all the brands under one app. Also since this would result in an open market for furniture developers, customers can get better deals and won't have to compromise on what they want.

**1.1.2 Better Perspective:** Since 2D images of the objects cannot help you visualize your product. A better and a more efficient way would be to make a 3D model of the same to get a better perspective. In this case we are using google poly to import 3D models created using Tilt Brush. Once the anchor of the model is set on the screen we can then scale the object according to the surroundings. Once the furniture is placed we can view it from all directions so that we can rectify any shortcoming before we actually place the real furniture. Also it allows to try out different arrangements of the furniture in the room which in real life would be an extremely painstaking and tiresome task.

**1.1.3 Ease of access:** All of your content would be available on the app and you can make speedy changes in your decisions while choosing your furniture and finalizing it. It eventually will save you a lot of time. All those long hours of discussions with your interior designer can be solved which will be a few clicks away We have also implemented a tab at the bottom of the screen where user can scroll for objects making them accessible. Also previous room designs can be saved for reference in graphic form so that user can try and compare several furnishing designs.

**1.1.4 Abbreviations and Acronyms :** graphic form so that user can try and compare several furnishing designs AR is referred to as augmented reality. ARCore stands for Augmented Reality Core. glTF (derivative short form of Graphics Library Transmission Format or GL Transmission Format) is a file format for 3D scenes and models using the JSON standard. sfb stands for Sceneform Binary asset . sfa stands for Sceneform Asset Definition file( a human-readable description of the Sceneform Binary asset ,sfb ).

## **2. WORKING**

First the OBJ,fbx,glTF files of the models are converted into sfa and sfb files by the sceneform android studio plugin. The sfa files is the human readable version of the sfb binary

files, we can change the attributes of these files according to our requirement based on how we want our model to look. Once the model or the asset gets compiled into the sfb file we can then render our model through the `ModelRenderable.builder()` method in `Sceneform`. The rendered model can then be attached to a node in the scene or the screen. We did this by setting an anchor at the coordinates where the user taps the screen once the coordinates are fetched our rendered model is attached to this anchor.

Code for setting the anchor and rendering the model to it:

```
. private void placeObject(ArFragment fragment, Anchor anchor, Uri model){
    ModelRenderable.builder()
        .setSource(fragment.getContext(), model)
        .build()
        .thenAccept(renderable -> addNodeToScene(fragment, anchor, renderable))
        .exceptionally((throwable -> {
            AlertDialog.Builder builder = new AlertDialog.Builder(this);
            builder.setMessage(throwable.getMessage())
                .setTitle("Error");
            AlertDialog dialog = builder.create();
            dialog.show();
            return null;
        }));
}

private void addNodeToScene(ArFragment fragment, Anchor anchor, Renderable
renderable){
    AnchorNode anchorNode = new AnchorNode(anchor);
    TransformableNode node = new
TransformableNode(fragment.getTransformationSystem());
    node.setRenderable(renderable);
    node.setParent(anchorNode);
    fragment.getArSceneView().getScene().addChild(anchorNode);
    node.select();
}
}
```

The user can also select the models from the menu at the bottom of the screen which are placed in a linear layout.

**Code for menu generation:**

```
private void InitializeGallery(){
    LinearLayout gallery = findViewById(R.id.gallery_layout);
    ImageView chair = new ImageView( this);
    chair.setImageResource(R.drawable.chair_thumb);
    chair.setContentDescription("chair");
    chair.setOnClickListener(view -> {selectedObject = Uri.parse("chair.sfb");});
    gallery.addView(chair);
    ImageView couch = new ImageView( this);
    couch.setImageResource(R.drawable.couch_thumb);
    couch.setContentDescription("couch");
    couch.setOnClickListener(view -> {selectedObject = Uri.parse("couch.sfb");});
    gallery.addView(couch);
}
```

A screen recording feature is also provided to the user which starts capturing the scene once the red button at the right bottom of the screen is pressed.

#### **Screen recording code:**

```
protected void onPause() {
    if (videoRecorder.isRecording()) {
        toggleRecording(null);
    }
    super.onPause();
}
private void toggleRecording(View unusedView) {

    boolean Recording = videoRecorder.onToggleRecord();
    if (Recording)
    {
        recordButton.setImageResource(R.drawable.round_stop);
    }
    else
    {
        recordButton.setImageResource(R.drawable.round_videocam);
        String videoPath = videoRecorder.getVideoPath().getAbsolutePath();
```

```
Toast.makeText(this, "Video saved: " + videoPath,
Toast.LENGTH_SHORT).show();
Log.d(TAG, "Video saved: " + videoPath);

// Send notification of updated content.
ContentValues values = new ContentValues();
values.put(MediaStore.Video.Media.TITLE, "Sceneform Video");
values.put(MediaStore.Video.Media.MIME_TYPE, "video/mp4");
values.put(MediaStore.Video.Media.DATA, videoPath);
getContentResolver().insert(MediaStore.Video.Media.EXTERNAL_CONTENT_
URI, values);
}
}
```

partial code of .sfa file designed and generated for chair :

```
model: {
  attributes: [
    'Position',
    'TexCoord',
    'Orientation',
  ],
  collision: {},
  file: 'sampledata/chair/model.obj',
  name: 'model',
  recenter: 'root',
  scale: 0.86328400000000005,
},
version: '0.54:2',
}
```

### 3. CHALLENGES FACED

We faced many challenges during the development of our application. Since this is a niche technology the objects that are seen in the app do not completely resemble the actual objects. It works very efficiently in open spaces but in closed spaces it is having difficulty to find location for particular furniture to be placed. We are not able to change the orientation of objects. The shadow effects of the object were not precise as that of the actual surrounding as the module which configured the amount of sunlight present is not accurate enough.

We also wanted to integrate custom designs for the furniture. When we tried to integrate complex architecture design in a closed space we were not able to clearly place the furniture according to proportions. This was mainly due to the fact that these complex curves could not be precisely integrated in our app which leads to these 3D images being not proportionately fitting in the real time environment.

#### 4. RESULTS



*Fig.1: The user can also select the models from the menu at the bottom of the screen which are placed in a linear layout.*



*Fig.2: A screen recording feature is also provided to the user which starts capturing the scene once the red button at the right bottom of the screen is pressed.*



*Fig.3: A chair*

## **5. CONCLUSION & FUTURE SCOPE**

Our app can thus help better visualise the actual perspective of the furniture that we are going to buy. This comes with a variety of inbuilt features such as we can select already available furniture available from the catalogue as well as custom furniture which will be added in the app. We have also integrated the video feature which will allow the user to take a video of the actual furniture. Our app will take the furniture and render 3D model which can be viewed by other users to whom the video is shared there by reducing time, energy and cost which we invest while buying furniture.

We can use Artificial intelligence so that the mobile application would suggest the type of furniture that would suit our house. The various disciplines and themes of furniture can be used to train the module. A particular compact size house would have a different set of combinations than a mansion. We can also add a platform where the interior designers can show their sketches of the images of houses they are designing so that people can choose different designs from the given set. We can also build an open source community where different designers can contribute to specific architectures. we can also build modules to integrate these complex architecture to get a perspective of how the theme based furniture would look like.

We are also trying to integrate this stand-alone app as a plugin for other types of apps like pepper fry, eBay, urban ladder and Flipkart. Where the seller will make a video of that furniture and can upload on these platforms these furniture can finally be downloaded and tested for your own place. This will not only save a lot of time in physically going through all the stores and checking for the furniture as well as the ever non satisfaction of maybe there

might be a better choice, also the amount of energy you invest all can be saved using this app. All this pros result in a very effective in using an app like this.

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