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AR Decor: Decoration using markerless Augmented Reality

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Abstract: Our project is about decorating your house or any venue for your birthday event. It is very difficult to imagine decoration in the house or a venue, like whether the decoration would be nice after the completion, will it be worthy and would the decoration look good with the furniture and items in the room. So in this project, using Augmented Reality we can get the real time look of the decoration for our house or the venue selected for the event. There will be different 3D objects placed in camera view such that on users tap the objects will be viewed in real time using Augmented Reality. Currently we have objects for Birthday party decoration.

Keywords: AR, Augmented Reality, Sceneform, ARCore, AR stickers, plane detection, image projection

I. INTRODUCTION

There are Applications based on AR are already introduced for several tasks such as wall painting, home furniture selection, etc. which uses the augmented reality technology to augment an individual's requirement and imagination using mobile device. The mentioned applications are designed for home decorations, but there is no application constructed for event decorations.

At the point when occasions like birthday celebrations, office parties, etc. are hosted, the manager's imagination skills are put on test. It becomes difficult to judge how a particular setup would look after the final decoration is completed. For such instances, we require an augmented reality application which consists of stickers and tools which help and individual to implement his/her imagination into physical world with an ease.

All that needed to be done is cast stickers or 3D objects through a mobile application which can be finalized later and then implemented into real world with minimal effort and having fun during the creation.

II. LITERATURE SURVEY

There are various Augmented Reality applications already existing. Augmented Reality is upcoming technology which has several implementations in many fields. More and more AR apps have been build after the support of Google's ARCore of Android and iPhone's ARKit for iPhones. ARCore is Google's foundation for building augmented reality encounters. Utilizing different APIs, ARCore empowers your phone to detect its condition, comprehend the world and communicate with data. ARCore works utilizing Motion Tracking, Environmental Understanding and Light Estimation. Various Android applications like Augment, Aruler, etc. are present for performing several day-to-day tasks. Augment is an application that is used to cast objects in a confined detected plane. It cast simple objects like cartoons, electronic appliances, cars, but it has not many practical uses. [1]

There are various applications build for companies which help to reach out more users and help in increasing their sales. For example, Asian paints application is used to shade our wall and detect the plane and shade by using various colour provided in the app. This app provides nearly about 1800 shades of colour. It has limitations that colour might not possible in stores that user extracted in the app. Another app present is for furniture selection called Roomle 3D application used to place furniture in an appropriate place where user wants to place. Both the applications are user specific and help them to understand and feel the company's products without buying them at their home. [2]

The Augmented Reality technology can be implemented using markerless, marker based or based on location. We used markerless AR such as used can dynamically project the anchor objects when plane is detected and has not to be dependent on reference of other objects. This will provide more room for user experience and remove dependencies. Marker based AR needs to have a 2D image based on which the 3D objects will be placed. The Augmented Reality experience will lack as 3D objects cannot be placed on different 2D images then earlier created in marker based AR. A marker based AR looks for a specific image pattern in the environment and superimposes the virtual object on top of it. So the camera of the AR device will constantly scan the input. Many applications are markerless based on the needs of the application and the compatibility. In markerless AR, the virtual item is set in the geometry made by something many refer to as SLAM (Simultaneous Localization and Mapping) which takes in the camera feed

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and makes a 3 mesh of environment. So the software recollects the earth as 3d model. Subsequently when a virtual object is set in condition it is situated in its 3d model. So regardless of whether camera loses its sight on returning the virtual item will in any case be found at a similar area. [3]

Building a 3D model is a challenging task which involves knowledge of building models, providing texture, rendering, etc. If one has a big team for a project than they can hire a expert in field or buy 3D objects online in stores. For low- end developers there in Google's Poly website for browsing, distributing and downloading 3D assets. It has a free library containing many 3D objects for virtual reality and augmented reality applications. [4]

III. METHODOLOGY

We have implemented the markerless Augmented Reality experience for Android Smartphone running Android Nougat or above. The user will perform following method:

A. Start app and select event.
B. After selecting the event the camera will be deployed and visible in camera view.
C. Implementing ARCore Sceneform functionality for detecting plane.
D. After then user can simply tap to project 3D object into real world.
E. Later user can save image or clear objects on the screen.

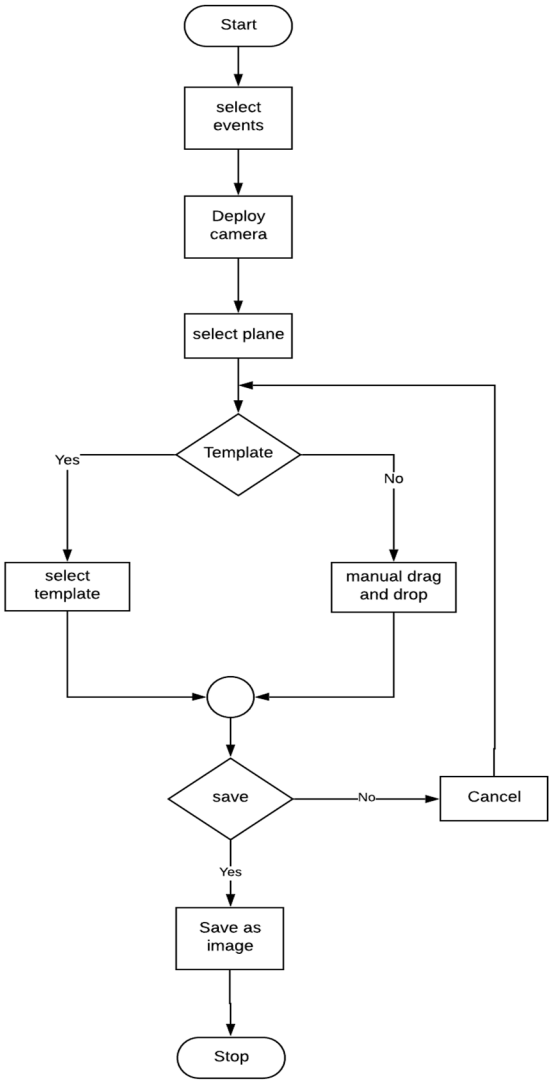


Fig. 1 System Flow

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IV. IMPLEMENTATION AND RESULT

A. System Requirements

1) Android Smartphone running Android version 7.0 or above
2) Google Play support for AR installed for better experience

B. Working

Firstly we needed to select the software and SDKs that will be used to build the markerless Augmented Reality application and will serve as base for application. We decided to go with Android Studio and build application using Google ARCore along with Sceneform Plugin.

Majority users are using Android devices. Hence, we choose Android Studio for app development. It also has good developer support and Plugin support. Sceneform makes it straightforward to render realistic 3D scenes in AR and non-AR apps, without having to learn OpenGL. Mainly Sceneform provides support for importing and rendering 3D objects in Android studio.

We first add Sceneform plugin from settings and import 3D assets. ARCore and Sceneform only support formats of .obj (object type), .glTF(Graphics Library Transmission Format), .fbx (Filmbox) along with their individual material file (.mtl).

Sceneform has build-in method for rendering and build model. The supported formats are then converted to two different files: Sceneform Binary format (.sfb) and Sceneform asset (.sfa). The Sceneform Asset Definition (*.sfa) file is easily readable of the Sceneform Binary asset (*.sfb). It builds models, material definitions, and textures for physical structure for the object

In Android Layout, we will use a Frame Layout and implement a fragment to generate camera view and Image View. The fragment will form runtime processing. We create an ArFragment and provide it the id of fragment i.e. main_fragment.

Next Build model, keep in mind we are creating multiple renderable anchors so we will have to build model for each .obj file. After building model using ModelRenderable, we will give a response for user Interaction i.e. touch, tap or drap and drop. The most important of all is to Anchor your model.

Hence we create a Anchor for model and Anchor Node along with it. There are Serveral methords in Anchor class one of which is ArSceneView. The ArSceneView is liable for playing out a few significant ARCore errands, including rendering the gadget's camera pictures, and showing a Sceneform UX activity that exhibits how the client should hold and move their gadget so as to begin the AR experience. The ArSceneView will likewise feature any planes that it recognizes, prepared for the client to put their 3D models inside the scene. The ARSceneView segment has a Scene joined to it, which is a parent-kid information structure containing all the Nodes that should be rendered. We're going to begin by making a node of type AnchorNode, which will go about as our ArSceneView's parent node.

Presently, we demonstrate support for client task like moving, scaling and rotating so we make a hub of type TransformableNode. The TransformableNode is answerable for moving, scaling and turning hubs, in view of client signals. Once made you have to connect it with Renderable hub. At last, you have to interface the TransformableNode to the AnchorNode, in a child parent relationship which guarantees the TransformableNode and Renderable stay fixed set up inside the expanded scene. Now you can run application and place objects in real time.



Fig. 2 User gesture guide



Fig. 3 Planes detected

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Fig. 4 on tap balloons places



Fig. 5 multiple balloons

V. CONCLUSION AND FUTURE WORK

In this project we have made some object for decoration of house or any other place with walls. You can just place those objects virtually and check if it has the proper combination with the surrounding or not. It will help in planning the event in better way and there will be a less wastage of time and materials. In future we have planned to make objects and new fixed templates for different events and provide a better User Interface (UI) for improved user interaction.

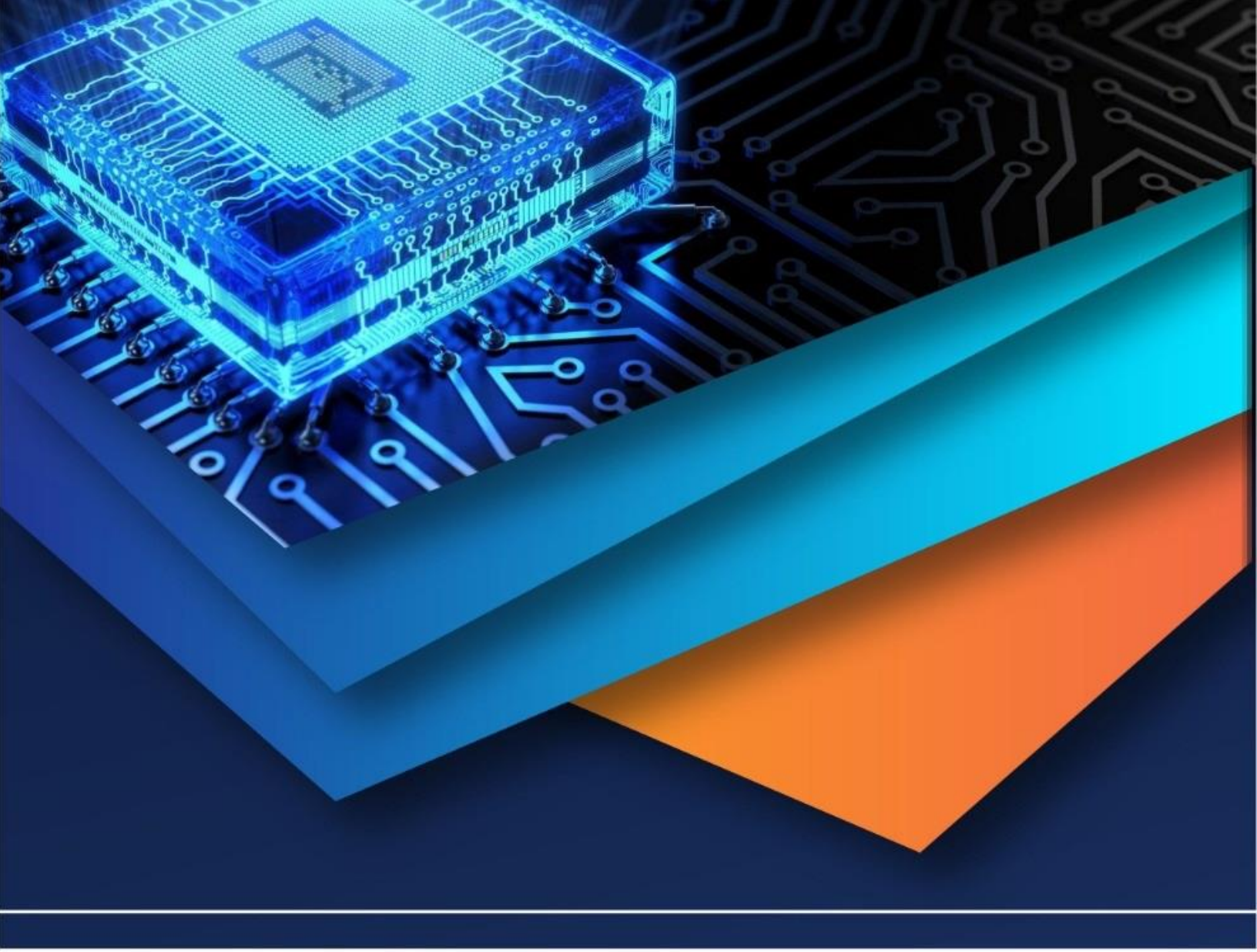
VI. ACKNOWLEDGMENT

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