**Augmented Reality (AR) Tap-to-Place App Implementation**

**REPORT**

**Introduction:** This report details the development of an Augmented Reality (AR) application focused on tap-to-place functionality using AR Foundation 5 in Unity. The goal was to create a user-friendly experience for placing virtual objects in the real world through tapping gestures. And use this app for interior designing purposes such as placing furniture, decorative items or toys etc. using our AR camera and use it for decorating our room or any space beautifully.

**Prerequisites:** We must install Unity 2023 or 2022. A reference to a basic setup guide for those who haven't configured their AR scene.

**Key Components:** We have implemented the foundational components necessary for AR using AR Foundation 5, including the ARPlaneManager and ARRaycastManager. We then created a prefab that represents the virtual object to be placed in the AR scene.

**Tap-to-Place Mechanism**: We have developed a tap-to-place interaction, allowing users to spawn and position virtual objects in the real environment.

We then designed and implemented scripts to facilitate tap-to-place functionality using three distinct solutions:

• Old input system implementation.

• New input system with script.

• New input system implemented in the Unity editor.

Then we have adjusted the orientation of the placed objects to enhance the user experience by ensuring they face the camera.

**Multi-Object Placement:** Then we have extended the tap-to-place functionality to support the placement of multiple objects for a richer AR experience.

**Implementation Variations:**

Old Input System: We detailed the steps to implement tap-to-place using the old input system.

New Input System with Script: And have introduced a new input system and provided a script-based approach for tap-to-place functionality.

New Input System in Editor: Then demonstrated an alternative solution using the new input system directly in the Unity editor.

**Additional Resources:** Further we have shared the source code for reference and further exploration. Recommended resources for basic setup and XR simulation for testing AR projects in Unity.

**Video:** In the video which we have demonstrated, we opened our AR Unity app which was basically an apk module which can be generated by unity and can be downloaded into our mobile and can be used. Then when we scanned the place, we got the plane surfaces which was shown in the video. We can tap and insert the asset (our object) on to the planes which were captured. When we tap on other surfaces, we cannot get any object placed. This shows us the whole demonstration of identifying the planes which suits for the objects to be placed and by the initiation of the tap we can insert multiple images on the plane. We can modify this into multiple different objects such as furniture, decoration items, toys etc and use this app for interior designing purposes

**Conclusion:**

This AR application offers a versatile tap-to-place feature, allowing users to seamlessly integrate virtual objects into their real-world environment. The use of AR Foundation 5 in Unity, along with the three different implementation solutions, ensures flexibility and accommodates developers with varying levels of expertise. The project encourages experimentation and further customization based on the provided code and resources.  
  
**NOTE:** apk file is not attached in the zip folder which we have submitted because of the 10MB constraint. So we have uploaded apk along with all the necessary files in the GitHub. Please check for apk file over there