Virtual and Augmented Reality: Final Project

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Abstract

This project is to implement an "AR Food Menu" mobile APP based on ARKit and Unity, aiming to enhance dining experience by providing customers with a visual representation of menu items, enabling them to make more informed and visually appealing food choices when placing their orders.

1. Introduction

In recent years, augmented reality (AR) technology has transcended its novelty status and is now making significant inroads into various industries. One of the most exciting applications of AR technology is in the realm of dining experiences, where it has the potential to revolutionize how we interact with restaurant menus. This project aims to explore and implement a mobile APP "AR Food Menu" – a cutting-edge fusion of digital technology and culinary arts that promises to elevate the dining experience to new heights.

2. Related Work

ARKit, developed by Apple, is a powerful augmented reality (AR) framework for iOS devices. It enables developers to create immersive AR experiences by integrating digital elements into the real world through the device's camera and sensors [3]. Many Mobile APPs use ARKit to seamlessly integrate AR experiences into iOS applications. ARKit enables precise tracking of the physical environment, object recognition, and interactive 3D graphics, fostering immersive interactions in various domains, from gaming to education and retail [2].

In the market, a multitude of applications have integrated augmented reality (AR) technology into the food ordering process [1]. Notably, KabaQ distinguishes itself by providing users with immersive 3D visualizations of the dishes available on a restaurant's menu. This innovative feature allows customers to preview their meals in a visually engaging manner before placing an order [5]. Similarly, Just Eat Takeaway has introduced an AR ordering feature that immerses customers in a virtual restaurant environment, enabling them to explore menu items through interactive 3D

Figure 1. Example image.

representations and place orders with a heightened sense of engagement. Besides, industry giants like McDonald's have recognized the potential of AR, utilizing it to offer interactive promotions to their customers. For instance, the McDonald's AR app introduces users to captivating experiences such as scanning a cup to unlock hidden content or access food-related games, thereby enhancing the overall dining experience. [4]

3. Design and Implementation

The "AR Food Menu" APP is planned to be developed on Unity Hub and deployed on IOS platform.

The APP is designed to capture the surrounding environment and intelligently detect horizontal planes for placing virtual food items. Users have the flexibility to choose their desired dishes from a selection widget and position them onto the detected surface. Furthermore, users can interact with these virtual dishes by zooming in, rotating them to different angles, and observing them from various perspectives. This immersive experience is enhanced by the incorporation of realistic shadows, which are projected onto the detected surface beneath the virtual food items.

The food models are anticipated to be sourced from the internet. In the implementation, ARKit will be used for the purpose of identifying flat surfaces within the physical environment. A visual placement indicator will then be integrated to visualize the detected plane. Furthermore, a script will be developed to identify user interactions, specifically touch input on the screen. [6] Lastly, appropriate shadow settings will be configured within the Unity project environment [7].

4. Demonstration Plan

The project need an IOS device with "AR Food Menu" APP for demonstration. The iOS device should be equipped with a camera capable of capturing the surrounding environment, and the resulting augmented reality output will be displayed on the device's screen. This application can be demonstrated in a variety of everyday settings, including classrooms, homes, and restaurants.

5. Timeline

- By Oct 29: design workflow and APP UI.
- By Nov 2: learn Unity ARKit XR Plugin.
- By Nov 7: get food assets and load in Unity.
- By Nov 14: implement visual placement indicator, physical raycast.
- By Nov 21: implement food selection widget.
- By Nov 27: implement user interaction (rotate,zoom), add shadow.
- By Dec 02: deploy on IOS device and test.
- By Dec 09: test and prepare for demonstration.

References

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