

Final Project Report

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Abstract

This project has implemented an "Augmented Reality (AR) Food Menu" mobile APP based on ARKit and Unity frameworks. The primary objective of this project is to elevate the dining experience for patrons by furnishing them with a visual depiction of menu items. This innovative approach empowers customers to make well-informed and aesthetically pleasing food selections during the ordering process, thereby enhancing overall satisfaction with the culinary offerings.

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.

In the market, a multitude of applications have integrated augmented reality (AR) technology into the food ordering process [2]. 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 [6]. 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 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. [5]

ARKit, developed by Apple, is a powerful augmented reality (AR) framework for iOS devices. It enables developers to create immersive AR experiences by integrating



Figure 1. Result. Left(a): surrounding area captured by camera and detected plane which can place food. Right(b): scene after placing chosen food from the below food category buttons.

digital elements into the real world through the device's camera and sensors [4]. Many Mobile APPs use ARKit to seamlessly integrate AR experiences into iOS applications. ARKit and Unity platform enable precise tracking of the physical environment, object recognition, and interactive 3D graphics, fostering immersive interactions in various domains, from gaming to education and retail [3].

This project is built using ARkit and Unity, 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. Results and Demonstration

The "AR Food Menu" is a mobile APP built on iOS. Upon launching the App, the integrated camera of your

iPhone becomes operational, capturing the immediate surroundings. Positioned at the bottom of the screen are three distinct buttons, each corresponding to a particular type of food.

Displayed on the screen are identified planes, and by interacting with the interface, users can select one of the food category buttons. Subsequently, users can designate a specific location on the screen to place the chosen food item onto the detected plane. Moreover, users have the capability to add additional food items onto the same plane.

To illustrate, in 1(b), a Croissant, two pieces of Nigiri Sake, and a plate of Kashipan were strategically placed. The application facilitates the observation of these items from various perspectives, enabling users to visually compare their sizes. This functionality serves to enhance the authenticity of the food presentation, providing customers with valuable insights to make informed decisions when placing food orders.

3. Implementation

As for implementation details, regarding the platform and package employed in this study, Unity serves as the foundational framework, and specific software components from the Apple ARKit XR Plugin and AR Foundation packages have been utilized.

The implementation of interactive buttons is achieved through the integration of images within the canvas. The camera employed in this context is the Main Camera within the XR Origin, contributing to the immersive experience. [1] [7]

Additionally, two critical components, namely the AR Raycast Manager and AR Plane Manager, play pivotal roles in the functionality of the augmented reality system. The AR Raycast Manager class is instrumental in conducting raycasts against trackables, particularly in instances where they lack a presence in the physics world. This functionality enhances the precision of interactions within the augmented environment. Conversely, the AR Plane Manager class is employed for the creation, updating, and removal of GameObjects in response to detected surfaces in the physical environment. This dynamic capability ensures a seamless integration of virtual elements with the real-world surroundings, thereby enhancing the overall user experience.

The top script of the whole project is called "Food Placement Manager." This script, meticulously designed and implemented, assumes responsibility for the proficient management of user input within the overarching application framework. Its primary function revolves around facilitating the seamless transition and manipulation of diverse food items in a judicious manner.

4. Discussion

The project has proficiently developed a mobile application designed to showcase culinary items through AR techniques on iOS devices, ensuring consistent and reliable performance.

In the future, additional refined models may be incorporated to afford users a broader array of authentic choices.

References

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