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The Future of Bubble Tea Shops:
Bridging 3D Visualization and Technology for Immersive Experiences

by

Xiaohe Zhang

A Thesis Submitted in Partial Fulfillment of the Requirements for
the Degree of Master of Fine Arts in Visual Communication Design

School of Design
College of Art and Design

Rochester Institute of Technology
Rochester, NY
July 24, 2023

Committee Approval

We, the undersigned committee members, certify that we have advised and/or supervised the candidate on the work described in this thesis. We further certify that we have reviewed the thesis and approved it in partial fulfillment of the requirements of the degree of Master of Fine Arts in Visual Communication Design.

Mike Strobert Date

Graduate Director of the Visual Communication Design, Undergraduate Director of the New Media Design / Associate Professor / Thesis Advisor

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Adam Smith Date

Graduate Director of the Visual Communication Design, Undergraduate Director of the New Media Design / Associate Professor / Thesis Advisor

Abstract

College of Arts and Design Rochester Institute of Technology

Degree: Master of Fine Arts
Program: Visual Communication Design
Authors Name: Xiaohe Zhang
Advisors Name: Mike Strobert; Adam Smith
Thesis Title: The Future of Bubble Tea Shops: Bridging 3D Visualization and Technology for Immersive Experiences.

The contemporary beverage landscape is brimming with a plethora of choices, and among them, bubble tea stores have become highly popular among today's youth. For this generation, indulging in the delightful experience of bubble tea brings moments of happiness and contentment. Unlike coffee, bubble tea offers a remarkable variety of nearly a hundred flavors, derived from diverse ingredient combinations, allowing individuals to discover and embrace their unique style. Despite the current maturity of bubble tea shops, my role as a designer is dedicated to continuously enhancing the consumer experience. Thus, my primary focus lies in envisioning the future and exploring ways to craft an immersive consumer journey that leverages advanced technologies. Central to this endeavor is the unwavering commitment to elevate consumer joy and satisfaction. This paper serves as an exploration of my thesis design, as I present several open-ended 3D design proposals for the future of beverage experiences, with a specific emphasis on bubble tea shops. Through the incorporation of innovative design concepts, my ultimate goal is to revolutionize beverage consumption, elevating the joys of bubble tea to unparalleled heights and setting new benchmarks for immersive and enriching consumer enjoyment. By fostering an emotional connection between consumers and their cherished bubble tea experience, I seek to create an everlasting impact, redefining the very essence of pleasure and satisfaction in the realm of beverage consumption.

Keywords

3D Visualization, Consumer experience, Interactive Design, Envisioning the Future

Problem

In the post-pandemic era, we have witnessed significant changes in people's consumption habits, with a growing number of individuals embracing online shopping amidst the wave of technological advancements. It's undeniable that online shopping offers a more efficient and convenient consumer experience. Even with milk tea shops experiencing thriving business, providing the option for online orders would spare customers the need to physically visit the store for a cup of milk tea that costs only about five or six dollars.

Survey findings reveal an average waiting time of approximately five to ten minutes from placing an order to receiving their cup of tea in-store. Unfortunately, during this period, customers often feel bored due to the lack of interactive experiences and the interior design failing to align with the brand image. Consequently, their initial enthusiasm and interest in the drink may dwindle. This situation presents a challenge for traditional bubble tea stores, leaving shoppers eager for fresh and engaging ways to interact with their favorite establishments. Moreover, it is worth noting that many beverage establishments still adhere to the traditional sales model, where beverages are prepared on-site by employees upon receiving customer orders. Unfortunately, this approach often leads to a lack of consistency in beverage quality. Additionally, the constraints posed by limited human resources impede overall production efficiency, making it challenging to effectively handle the influx of high customer footfall. Hence, the paramount issue at hand revolves around designing immersive and captivating shopping experiences to entice customers into revisiting the bubble tea store. This matter demands urgent resolution.

Solution

In traditional perspectives, the relationship between the audience and exhibits is considered "static," characterized by inherent barriers. However, in the future era, there is a stronger emphasis on "interactivity." The future of retail stores is built upon experiential elements. Therefore, designing an interactive space that offers a sense of immediacy can effectively address current challenges. Through 3D modeling, I will construct a virtual interactive scenario, envisioning the feasibility of integrating 3D virtual visuals into the offline shopping experience with the aid of future technologies. Customer engagement within the store will no longer be a mundane waiting process; instead, it will be an immersive involvement in the environment, thereby enhancing the sense of consumer participation and strengthening the connection with the brand.

Specifically, incorporating 3D virtual interactive installations entails that whenever a customer engages in a step of the ordering process, corresponding 3D elements will grow, enriching the amusement of real-life interactions. Purchasing bubble tea will no longer be a singular transaction of buying and retrieving; instead, it will evolve into an enthralling respite from the complexities of daily life, transforming into an entertainment hub! The interactive scenes enveloped by 3D virtual elements offer audiences a

comprehensive elevation in artistic aesthetics and cognitive experiences. The integration of technology and art within these interactive installations, in an unprecedented manner, elicits spontaneous admiration from the spectators during the experiential journey. Concurrently, the virtual 3D interactions also serve to compensate for the limitations of physical space, allowing everything to become tangible.

Main body

Based on the envisioned future of milk tea shops, I have employed 3D design to visualize interactive experiences that enhance consumer enjoyment. The focal point of my design revolves around the interactive ordering process. As customers step into the store and position themselves at specific locations, a vast virtual interface materializes and surrounds them. This interface empowers customers to freely select their desired ingredients to be incorporated into their milk tea. Upon confirming each ingredient, a corresponding virtual 3D element springs forth from the ground. For instance, if a customer opts for green tea as their base, a colossal 3D leaf resembling green tea foliage emerges from the store's ground. Likewise, the same principle applies to other toppings, such as various fruit pieces and pearls, each accompanied by a matching cartoonish 3D element. As customers proceed with their orders, these virtual 3D elements multiply exponentially, creating an enchanting and immersive milk tea wonderland that surrounds them as if they were truly transported into a dreamlike 3D world of milk tea delights.

During the design process, I meticulously conducted numerous tests exploring various 3D design styles. Ultimately, I opted for a delightful and flexible aesthetic that exudes a sense of cuteness. This carefully selected style aims to create an inviting and relaxed ambiance for consumers. Despite the elements being exaggerated and enlarged, the design deliberately avoids any jarring or unsettling feelings. The harmonious collision of colors enhances the overall visual experience, providing a pleasant and enjoyable atmosphere. In terms of composition, I adopted a creative approach for the storefront design, fashioning it in the shape of a bubble tea cup, evoking curiosity and inspiring a desire to explore the diverse world within the shop. The tea leaves, serving as the primary 3D elements, were artfully simulated to exhibit upward growth, strategically occupying the majority of the vertical space within the store. This decision not only emphasizes the significance of tea as the core ingredient but also heightens the visual impact and overall ambiance. Additionally, the milk tea toppings were thoughtfully arranged at the bottom of the composition, gracefully encircling the base of the tea leaves. This placement adds a touch of whimsy while ensuring visual balance and coherence in the overall layout. The amalgamation of these elements fosters a delightful and captivating atmosphere, aiming to offer customers an unforgettable and immersive milk tea experience.

Last but not least, to provide individuals with a distinctive interactive experience and foster long-term customer loyalty, the store interior is designed to accommodate a one-on-one ordering process. Each

time, the store welcomes only one customer, enabling them to fully immerse themselves in the interactive environment. Moreover, the milk tea production process is fully automated by machines positioned at the top of the space, while customers engage from below. Multiple machines operate simultaneously with swift efficiency, seamlessly generating the milk tea, which is then conveyed through a massive pipeline resembling a milk tea straw. This design not only optimizes the efficiency of milk tea preparation but also liberates substantial indoor space on the ground level. Just as desired by young consumers, the exhilarating and extraordinary retail experience allows them to fully indulge in interactive engagements with 3D elements, immersing themselves in the visual spectacle of the 3D world.

Conclusion

Currently, the medium of interactive visual arts is evolving towards diversification. Avant-garde and originality are emerging as new trends for future offline experiences. The creation of an experience that is both aesthetically pleasing and recognizable becomes crucial through the interactivity and visually stimulating aspects of 3D elements and scenes. The thesis project will ultimately revolve around the core objective of designing in-store experiences, presenting a comprehensive array of interactive scenarios within the envisioned future landscape of bubble shops, achieved through the utilization of 3D modeling, material rendering, and visualization technologies. However, due to current technological limitations, it remains challenging to realize the presentation of the interactive processes between consumers and the envisioned scenarios. Nevertheless, the static three-dimensional (3D) rendering concepts offer a glimpse into the immense potential of future operational paradigms for physical stores. From the automation of milk tea machines to the distinctive aesthetics and textured compositions of 3D elements, and even the intricate spatial relationships between characters within the virtual environment, these visually striking representations evoke awe and engender novel expectations and prospects for forthcoming interactive encounters. We fervently anticipate technological advancements, envisioning a future where innovation and entirely novel marketing strategies for offline store design become achievable. Through bespoke differentiation and personalized allure, deftly distinguishing the realm of in-person consumption from its online counterpart shall be within reach. Consequently, amidst the digital era, preserving consumers' curiosity and quest for knowledge, enticing them to explore the boundless joys of offline retail, actively engaging and seamlessly immersing themselves in a unique tapestry of blissful experiences, remains paramount.

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Appendix B: Thesis Defense Presentation

VCD Thesis Project

Xiaohe(Hailee) Zhang

The Future of Bubble Tea Shops

"The Future of Bubble Tea Shops" is the title of my thesis project, which revolves around enhancing the shopping experience for bubble tea stores by leveraging more 3D visualization and advanced technology to create an immersive visual environment.

01

Situation

Xiaohe(Hailee) Zhang

- **Situation**
- Problem
- Solution
- Define
- Design Process
- Final Deliveries

Today, offline consumption is being challenged as we enter the post-pandemic era. People's desire to spend has declined and there is no incentive to shop at physical stores anymore. The convenience of smartphones has also exacerbated the problem as all the necessities of life can be easily purchased online.

02

Problem

Xiaohe(Hailee) Zhang

Situation
- **Problem**

Solution
Define
Design Process
Final Deliveries

Particularly in the bubble tea store, there is a lack of unique shopping experiences, leading people to prefer the convenience of placing orders online. Meanwhile, on-site production by staff also contributes to low productivity and inconsistent drink quality, posing challenges in managing high customer traffic efficiently.

03

Solution

Xiaohe(Hailee) Zhang

Situation
Problem
- **Solution**

Define
Design Process
Final Deliveries

Immersive Space

Digital 3D Visualization

Consumer Interaction

Define

Xiaohe(Hailee) Zhang

Situation
Problem
Solution
▸ **Define**
Design Process
Final Deliveries

The ultimate goal of this project is to provide people with an exceptional shopping experience through an immersive, interactive, and three-dimensional environment. To achieve this, the final project will incorporate three key features. The first is 3D elements growing with every action on the platform. Second, automated machines will keep producing bubble tea. Third, an exclusive ordering platform will ensure that people get a unique and marvelous experience.

3D Elements Grow

01.

Automated Machine

02.

Exclusive Order Platform

03.

Define

Xiaohe(Hailee) Zhang

Situation
Problem
Solution
▸ **Define**
Design Process
Final Deliveries

3D Elements Grow

01.

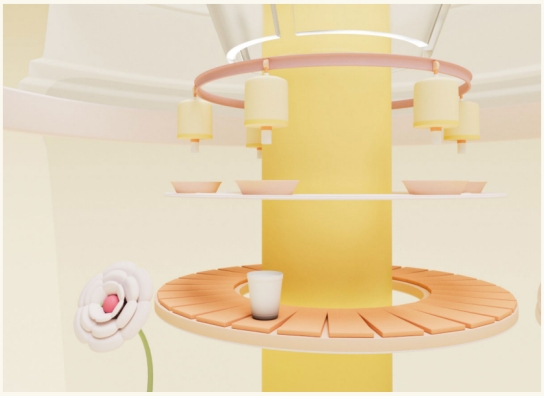
Define

Xiaohe(Hailee) Zhang

Situation
Problem
Solution
▸ **Define**
Design Process
Final Deliveries

Automated Machine

02.



Define

Xiaohe(Hailee) Zhang

Situation
Problem
Solution
▸ **Define**
Design Process
Final Deliveries

Exclusive Order Platform

03.

Design Progress

Situation
Problem
Solution
Define
▸ **Design Process**
Final Deliveries

Sketches

01.

Design Progress

Xiaohe(Hailee) Zhang

Situation
Problem
Solution
Define
▸ **Design Process**
Final Deliveries

White Model

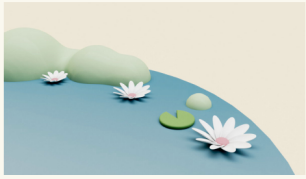
02.

Design Progress

Situation
Problem
Solution
Define
▸ **Design Process**
Final Deliveries

3D Elements

03.



Design Progress

Situation
Problem
Solution
Define
▸ **Design Process**
Final Deliveries

Color Palette

04.

Pink	Blue	Yellow	Green
#EDACB3	#C4DDE2	#F7D787	#91B478

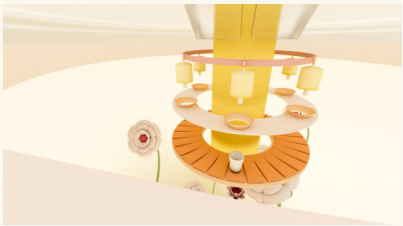
I've chosen a color palette for the 3D rendering that incorporates fresh, vibrant, and high-contrast colors. The intention behind this selection is to attract a more people and evoke feelings of happiness.

Final Deliveries

Xiaohe(Hailee) Zhang

Situation
Problem
Solution
Define
Design Process
Final Deliveries

While the technology may not currently allow us to bring this project to life, I would like to let my imagination run wild with this project. Through this endeavor, I aim to provide a visionary blueprint that could potentially serve as a valuable reference for future bubble tea store.



Final Deliveries

Xiaohe(Hailee) Zhang

Situation
Problem
Solution
Define
Design Process
Final Deliveries

Final Deliveries

Situation
Problem
Solution
Define
Design Process
▸ **Final Deliveries**

Final Deliveries

Xiaohe(Hailee) Zhang

Situation
Problem
Solution
Define
Design Process
▸ **Final Deliveries**

Appendix C: A full-page screen capture of your thesis website

https://designed.cad.rit.edu/vcdthesis/project/futuristic-milk-tea-store

VCD Thesis Project

Xiaohe(Hallee) Zhang

The Future of Bubble Tea Shops

"The Future of Bubble Tea Shops" is the title of my thesis project, which revolves around enhancing the shopping experience for bubble tea stores by leveraging more 3D visualization and advanced technology to create an immersive visual environment.

Situation

Today, offline consumption is being challenged as we enter the post-pandemic era. People's desire to spend has declined and there is no incentive to shop at physical stores anymore. The convenience of smartphones has also exacerbated the problem as all the necessities of life can be easily purchased online.

Problem

Particularly in the bubble tea store, there is a lack of unique shopping experiences, leading people to prefer the convenience of placing orders online. Meanwhile, on-site production by staff also contributes to low productivity and inconsistent drink quality, posing challenges in managing high customer traffic efficiently.

Solution

Immersive Space

Enjoy immersive personal virtual reality and become part of the store environment.

Digital 3D Visualization

Leveraging 3D technology enables users fully enjoy the unprecedented visual feast.

Consumer Interaction

Let customers interact with different elements in the store and feel happy.

Define

The ultimate goal of this project is to provide people with an exceptional shopping experience through an immersive, interactive, and three-dimensional environment. To achieve this, the final project will incorporate three key features. The first is 3D elements growing with every action on the platform. Second, automated machines will keep producing bubble tea. Third, an exclusive ordering platform will ensure that people get a unique and marvelous experience.

3D Elements Grow 01.

Specifically, when a person clicks a button on the order platform, 3D elements symbolizing the tea's ingredients grow gradually from the ground into the air.

Automated Machine 02.

The entire production process of bubble tea is completely controlled by automated machines, which ensures consistency in drinking quality.

Exclusive Order Platform 03.

This is an app exclusive to assigned to accommodate only one person or family at a time, ensuring a private and personalized visit.

01.

3D elements grow

Specifically, when a person clicks a button on the order platform, 3D elements symbolizing the tea's ingredients grow gradually from the ground into the air.

02.

Automated machine

The entire production process of bubble tea is completely controlled by automated machines, which not only ensures consistency in drinking quality, but also increases the efficiency in the process.

03.

Exclusive order platform

This is an app exclusive to assigned to accommodate only one person or family at a time, ensuring a private and personalized visit. This ultimate setting enables individuals to fully enjoy their time and engage physically with the 3D elements.

Design Process

01. Sketches

After thorough research and finding visual inspiration, I embarked on the design process, moving from initial sketches to 3D renderings. First, I created the illustrations as sketches that vividly show the ideas and inspirations in my mind. These sketches depict the relationship between the consumer and the space.

First, I created the illustrations as sketches that vividly show the ideas and inspirations in my mind. These sketches depict the relationship between the consumer and the space.

02. White Model

I crafted a 3D white model, constructing an entire city around the bubble tea store. This model accurately depicts the relationship between the city and the bubble tea store, can see at a glance.

03. 3D Elements

And thus, I created 3D tea ingredients, each representing different choices and flavors. The chosen style aims to convey a playful yet cute ambiance, making it feel more lively and inviting.

04. Color Palette

Pink	Blue	Yellow	Green
#FDDAE5	#C4DDE2	#F7E7B7	#D8E8C8

You chosen a color palette for the 3D rendering that complements the overall theme. The pink, blue, yellow, and green hues harmonize seamlessly, creating a cohesive and visually appealing ambiance. The selected palette aims to evoke a sense of calm and tranquility, and evoke feelings of happiness.

Final Deliveries

While the technology may not currently allow us to bring this project to life, I would like to let my imagination run wild with this project. Through this endeavor, I aim to provide a visionary blueprint that could potentially serve as a valuable reference for future bubble tea store.