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Augmented Reality Shopping Guide: Enhancing Efficiency and Experience

by

Shengyang Luo

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

School of Design
College of Art and Design

Rochester Institute of Technology
Rochester, NY
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RIT | College of Art and Design

Thesis Approval

Thesis Title

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Abstract

Shopping is important in our life, especially food shopping. Almost every family needs to go shopping once per week and spend lots of time and energy on it. This project proposes the design of an application to help people have a better shopping experience by saving time, saving energy, and saving money. The application combines online shopping and in-person shopping in a new shopping mode. People don't need to pay the expensive delivery fee and wait a long time to get food which could be unfresh. And they also don't need to spend lots of time at the supermarket, which could cost lots of time by walking around and finding items. This application can solve all shopping problems people might face today. My design intends to help people have a better shopping experience and save precise time on weekends.

Keywords

Augmented Reality, Shopping Guide, Shopping Assistant, User Experience

Dedication

To my esteemed professors and classmates in the Visual Communication Design program, I am honored to dedicate this paper to all of you. Your contributions to my academic journey have been invaluable, and I am deeply grateful for the guidance and support you have provided along the way.

To Professors Mike, Adam, Anne, Daniel, Joe, Deborah, and Joyce, your dedication to teaching and inspiring us to think creatively and critically has helped me to grow both as a designer and as an individual. Your passion and expertise in the field of visual communication design have been truly inspiring, and I am grateful for the impact you have had on my academic and personal development.

To my classmates, I am grateful for the many ways you have supported and challenged me throughout our time in the program. From the long hours spent collaborating on projects to the insightful feedback and critiques, your perspectives and insights have been invaluable in helping me to develop my skills as a designer.

As I reflect on my time in the program, I am filled with gratitude for the many individuals who have helped me to grow and learn. Your dedication to teaching and your unwavering support has made a profound impact on me, and I look forward to carrying the lessons I have learned with me throughout my future endeavors. Thank you for all that you have done to help me become the designer I am today.

Problem Statement

We all need to go to the market every week for vegetables, food, and commodities. However, When people are shopping in supermarkets or grocery stores, they spend lots of time finding items and waiting in long checkout lines even missing items to walk around. In this way, people always waste lots of time and energy.

Solution Statement

People always have a hard time finding items, waiting in long checkout lines, and missing items they want when people are shopping. I made an AR Shopping-Guide which is an AR glass application to help people save time when they are shopping.AR Shopping Guide solves the problems by offering a shopping list before getting into the supermarket, generating the perfect route for users to find items and check out easily by application online. No more missing items will save users time, energy, and money. Also, AR Shopping-Guide's mark and avoid function solve potential problems users might have.

We all need to go to the supermarket every week for vegetables, food, and commodities. However, it could be difficult for people to find the exact item they want in a huge supermarket. According to the Time Use Institute, each food shopping trip takes about 41 minutes for a person per week(Teodora, 2021) And the trip per week average is 1.5. In this way, people always waste lots of time and energy, which means people will spend more than 53 hours each year of their lives shopping. Based on my research, most people can not find all the items they want when they are shopping. It is because people can not remember all the food or commodities they need for next week. In AR-Shopping Guide, users can make the target list before they get to the supermarkets or grocery stores. Users can make the target list by AR glass at home, in the car even in front of the refrigerator. In this way, people will not miss any items they need because they don't need to think about the shopping list in 10 minutes when they are shopping and make the list whenever they notice a shortage. In this way, people don’t need to go to supermarkets or grocery stores one more time for missing items they want, which saves people time, energy, and even money.

Macala Rose is an expert in E-Commerce Strategy, Consumer Behavior, and Google Analytics, working at the Wright Consulting Co. She argues the point that people spend more time and energy on food shopping with time going on. In the Food Shopping in America 2014 report, more than 61% of customers shop at least twice per week, and even half of them prefer to shop at more than two or more stores per trip. And customers’ spending averages out to 500$ per month. Between 2006 and 2012, the average shopper just spent under 200$ per month. [1] Food shopping becomes more and more important in people’s daily life, and how to schedule the shopping plan could be a serious question. (2021)Teodora Mitova, a human nature explorer, states that Saturday is the most popular day for grocery shopping. Based on CreditDonkey, about 41 million Americans prefer to shop on Saturday. It is because when people go shopping in a supermarket, they spend an average of 41 minutes per time, so they prefer to choose the weekend as the day for shopping.[2] In this way, we want to improve our efficiency to save precise time on our weekends. (2021) In AR-Shopping Guide, after people set the target list, AR-Shopping Guide can automatically generate a perfect route for people to grab all the items they want at one time. This route is the most time-saving, and energy-saving, and people can follow the navigation which has 3D arrows in the glass without getting lost or can not find items. Based on that function, people can save time because they don't need to walk around to find items and

spend time on repeated trips to and from the same area to grab items. In this way, AR-Shopping Guide can improve users' shopping experience by saving precise time and energy on weekends.

With my interview for 8 members from different age groups and job grocery stores and supermarket customers, I find a potential problem that users might meet when they are shopping. Sales pressure and pressure to buy unhealthy food or drinks are two common stressors when shopping in person. Salespeople may use various tactics to convince shoppers to make a purchase, including offering discounts, promoting limited-time offers, or suggesting complementary products. This pressure to buy can be stressful, especially for individuals who are on a tight budget or have difficulty making decisions. Additionally, stores often place tempting, unhealthy snacks and drinks near checkout counters, which can make it difficult for individuals to resist the temptation to indulge in these items. To minimize these stressors, it's important to have a clear idea of what you want to buy before entering the store and to stick to your list, which can be solved by the AR-Shopping Guide's target list function. For the temptation in supermarkets or grocery stores, AR-Shopping Guide can also solve it easily. In the AR-Shopping Guide, people can put a sign on the map to avoid or mark a place. In this way, if users want to remember this place and return in five minutes to compare two products, they can come back by the navigation based on the sign here. Also, if users want to avoid a place due to temptations like unhealthy snacks and drinks, users can put the sign on the map so that the navigation they get will automatically avoid the place they don't want to pass by. This function reduces users' stressful shopping experiences and helps users save money without buying unnecessary items. [7] Although online shopping is convenient and time-saving, customers also have to face some problems like delivery fees, fresh material enough, and waiting time. (2021)Kimberly L. Jensen, an expert in Agricultural, Agribusiness, and Bioenergy Markets, states that although online shopping is popular and convenient these years, in-person shopping is still the first choice for shoppers. He used the data of Reasons for not shopping for groceries online in June 2020 to show that 73% of personal preference shopping in-store and 9.64% for expensive delivery fees. [8] In AR-Shopping Guide, users can also check out easily in a short time without waiting in a long line. Users can check out directly by the application with a credit card or PayPal because the application has the target list and what items are in your shopping cart. Based on that, AR-Shopping Guide can automatically send the bill to users, so that users can check out without working on self-check or waiting in a long line. For this function, AR-Shopping Guide saves users precise time and shopping experience again by online check easily. (2021)Angella Daniel, CEO of Bridge Outdoor Adventures, states that outdoor activities are very important for human physical and mental health. When people take part in outdoor activities, they can breathe fresh air, unplug from the daily grind and have a better body. Outdoor activities offer humans the benefits of muscular and cardiovascular as well as functioning immune systems. [10]

As we can see, no matter in-person or online shopping is not convenient enough to save time and energy in today’s market and situation. In this situation, I make a new solution for food shopping by designing the AR-Shopping Guide that matches the exact supermarket. Based on the situation, people prefer in-person shopping because they don’t have to wait and pay the expensive delivery fee from online shopping. I designed the AR-Shopping Guide application that has functions to preview the items in the supermarket, locate the exact item you want and make a navigation route to guide people to find all items they need at one time. So before people go to the supermarket, they can check the app to see if the store has the commodity or items they need. After checking, people can realize if they want to shop in that store. Based on this checking, it will save customers time by helping them make the perfect shopping plan. After they check all the items they want, AR-Shopping Guide can automatically generate the shortest and time-saving route to grab all items with the navigation. With

this navigation, people don’t need to walk around and spend lots of time finding different items. In this route, the AR-Shopping Guide can navigate with AR, so the customers can go with the clear notification and animation in the application and user interface. Also, users can check online and mark or avoid a place by AR-Shopping Guide. In this way, AR-Shopping Guide reduces the time users stay in supermarkets by waiting in long lines to checkout and the pressure people might face when they are shopping. In conclusion, the design is based on the shopping experience and research on US shopping mode. Based on three specific problems in people's shopping experience, AR Shopping-Guide solves the problems by offering a shopping list before getting into the supermarket, generating the perfect route for users to find items and check out easily by application online. No more missing themes will save users time, energy, and money. Also, AR Shopping-Guide's mark and avoid function solve potential problems users might have. AR-Shopping Guide will help shoppers to improve their efficiency. Different classes, different professions, and the aged can save precious time with the better and more efficient shopping mode supported by this design. Students don't need to spend lots of time shopping per week with this application, so they get more time to study and exercise. Parents can also save time to relax after a busy week with this application. Also for the aged, this application will help them to avoid viruses and get fresh food at the same time during the COVID-19 pandemic. The AR-Shopping Guide combines online shopping and in-person shopping appropriately with the application. With this application, people not only can finish shopping efficiently without wasting time, but also they can get fresh food immediately without paying an expensive delivery fee. And most importantly, this application will reduce the time people stay in the grocery or supermarket, and people can spend time on more meaningful things they want.

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Presentation

AR-Shopping guide

AR Shopping-Guide

The application combines online shopping and in-person shopping in a new shopping mode. This application can solve all problems people might face today. AR-Shop intends to help people have a better shopping experience and save precise time on weekends.

Designer: Shengyang Lan

Committee: Mike Brisbert, Adam Smith

Tools Used: After Effects, Figma, Cinema4D

Abstract

Shopping is important in our life, especially food shopping. Almost every family needs to go shopping every per week and spend lots of time and energy on it. This project proposes the design of an application to help people have a better shopping experience by **saving time, saving energy,** and **saving money**.

Problem

We all need to go to the supermarket every week for vegetables, food and commodities. However, it could be difficult for people to **find the exact item** they want in a huge supermarket. Besides that, **it is also difficult** for us to plan a perfect route **to pick all the items at one time**, so we need to walk around in a huge supermarket several times in order to get all the things we need.

Current Solution

#1. Shopping or ordering online

Weakness: Transportation Fees, Labor costs and Food quality problem

#2. Shopping in person

Weakness: Waste time, Miss items and stressful shopping experiences by queuing up.

Quantitative Research

According to research conducted by Drive Research, They surveyed over **1,100 consumers across the U.S.** to look at the current landscape of grocery shoppers and identify underlying consumer segments. I made three statistical charts and visualized them. Based on the data, most people prefer to shop in person, **as in-person shopping is the main current shopping mode**. And also, we can find that the **target user is aged from 18 to 50 years old**. Reducing shopping time is also the main goal for most people shopping time from **30 minutes to 50 minutes** or more.

Shopping Mode

According to a survey, 69% of monthly grocery shopping was completed in a physical store across the total sample. 16% of people said they get their groceries delivered, while even fewer said they get their groceries through a curbside or pickup service (6%)

Age Group

42% of the supermarket customers are in the 24-35 age group while 31% of them are between 35 and 50 years old. The proportion of the 18-24 age group is 13%, only larger than 50+ (7%), and 13-18 age groups (1%). As can be easily guessed, the female is the dominant gender with 61%.

Time

In terms of grocery shopping time, 36% of people spend less than 30 minutes per trip, another 34% spend 30 to 44 minutes, and 28% spend 45 minutes or more

Qualitative Research

I used one on one interview method for my qualitative research where I interview 8 members some directly & others remotely, people who often do food shopping online/ food shopping in Grocery. I learned a great deal about the individual's **pain points** below based on my own observations.

Shopping online

* Expensive transportation fee
* High service charge
* Can't make sure food or materials' quality

Shopping in Grocery

* Wasting time looking for items
* Long checkout line
* Missing item they want

Narrow down scene

Problem 1: People must prepare a shopping list when they try shopping. However, people always **miss items** if we don't take note of them. In this case, people need to go to the supermarket one more time or impact the life quality a week.

Set target list before getting into supermarket

My solution: Before people getting into supermarket or grocery, they can **choose items** and **make shopping list** by AR-Shopping Guide. People can make the list at home, in front of refrigerator or wherever they want. By this way, people will **not miss any item** they need.

Problem2: When people grab items in supermarkets and grocery, they always walk around and **spend lots of time finding items** they need. Also, it might be difficult for people to find the exact item position if it is not popular or selling well.

Follow the navigation to get them!

My solution: After people make a shopping list in AR-Shopping-Guide, they can click guide in the application, and VR Shopping-Guide can automatically generate **a perfect route for grabbing all items at one time**, which is **efficient, time-saving and energy-saving**.

Problem3: After shopping, people always need to **wait in a long line to check** out no matter the check-out counter or self-check. People need to **stand for a long time**, which definitely wastes time and energy

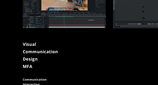
Check out easily by AR-Shopping-Guide

My solution: When people are ready to check out, they can use VR Shopping-Guide to **check out directly** by card or paypal, instead of waiting in a long line and a long time.

Potential problem: When people shop in a supermarket or grocery, they need **to mark a place to remember an item** before a comparison of the items they are thinking of. Also, they might want to **avoid a place** when they are shopping. For example, when you are losing weight, you don't want to pass by the dessert part of the supermarket

Put a sign to mark or avoid a place

Solution: In AR-shopping-Guide, the user can put **a sign to mark a place**. Based on that, people can remember this place and return to this place **by navigation**. Also, if they don't want to pass by some area, they can put a sign **to avoid them by navigation**.



Conclusion

Based on three specific problems in people's shopping experience, AR Shopping-Guide solves the problems by offering a shopping list before getting into the supermarket, generating the perfect route for users to find items and check out easily by application online. No more missing themes will save users time, energy, and money. Perfect route and navigation to grab all items at one time to avoid users walking around several times. Online authorization checks also improve shopping experience quality without waiting in long lines. Also, AR Shopping-Guide's mark and avoid function also solve potential problems users might have.

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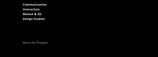
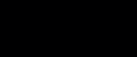


The arrow in AR Shopping-Guide is totally 3D so that users can easily follow the direction from **every perspective**.



In AR Shopping-Guide, users can see some **interesting, interactive motion** and animation to improve the quality when people are shopping. For example, users can see "Thanks" when the sensor door is open.

Design System

Icons

Color

Font

Futura
Roboto

3D Icons

3D Element

Charts

Design Porcess

User Flow

Start
Start page
Start
Shop
Search bar
Navigation
Map
Scan
Shopping list
Scan
Scan
Scan