SMARTSCAN DESIGN PROJECT PROPOSAL

Executive Summary

Based on Waste360.com, nationwide we toss 103 pounds of food in the trash per year due to spoilage. Furthermore, a "food waste" study showed that the average American will throw away four spoiled perishable items every week, and based on a survey issued by OnePoll, the "average American has about $102 worth of product in their fridge at any given time…. [and] ends up chucking out $53.81 worth of spoiled food a week from their fridge, or $2,798 every year," (Staff, W, 2023).

My design will answer the call of many Americans who must constantly make the hard decision to throw away groceries that spoiled in their refrigerators because they were not cooked, prepared, or eaten in a timely enough manner. This is due, in part, to a lack of proper organization and utilization of the appliance, and simple forgetfulness that the freshness of the foods is limited to a certain timeframe. This is a widescale dilemma that costs average citizens sometimes hundreds of dollars a month and does no favors for the food shortage issue in this country. Families also sometimes suffer from foodborne illnesses due to the consumption of spoiled foods, particularly those that cannot afford to just toss expired groceries in the trash. But this new design will serve to mitigate all these issues.

The SmartScan design will be an application that can be downloaded to various Smart devices and will be synchronized with Smart refrigerators that will have a PLU code reader built into them. This will allow shoppers to scan their groceries on their refrigerator doors before storing them. The barcode will upload the pertinent information about the product, i.e. the type of food, the expiration date, and what kind of packaging it is contained in, and then provide instructions on where to store it in the fridge and send reminders to eat it when the expiration date is near. So many Americans families can benefit from this application, saving themselves vast amounts of money to allocate elsewhere.

Introduction

Most innovations in technology are derived from problems uncovered in everyday life among average individuals. From my assessment, these innovations give way to constant improvements and/or upgrades and forge ever expanding avenues down which passionate minds journey to pioneer fresh inventions, whose births owe a great debt to the revisions of pre-existing design models, all of which have improved the lives of everyday people.

Now, according to consumerreports.com, as of October 2022 about nine percent of Americans own smart appliances (including refrigerators) that connect to the internet and gminsights.com predicted that there will be a CAGR (compound annual growth rate) of 11.9% between 2024 and 2032 bringing the percentage of smart refrigerator ownership to approximately 10%. If just 10% of Americans own Smart refrigerators that include a scanner that tracks food expiration, preventing the loss of food due to spoilage (estimated above to be about $2,798/year), by 2032 the nation will have saved about $20,000 worth of food.

We need only to imagine how much more of a reduction in food waste would occur if Smart refrigerators become the standard in this country, which seems to be the current trajectory.

This project seeks to stand on the shoulders of Smart Appliance innovators and provide further improvements in day-to-day life in terms of health and economics by designing a SmartScan for Smart refrigerators that will assist shoppers with organizing their perishable groceries and keeping track of expiration dates.

Research Question and Hypothesis

Due to the food waste epidemic in this country and the amount of foodborne illness experienced by individuals who have consumed expired foods from their own refrigerators, what technological design can be rolled out to alleviate this issue?

This application has the potential to save consumers money that would be spent repurchasing groceries due to spoilage of already purchased products that have to be discarded and helps to prevent foodborne illnesses due to the consumption of expired foods.

Design Objectives:

- Install a PLU code reader on Smart refrigerators
- Synchronize Smart refrigerators with application downloaded to mobile devices such as Apple watches, mobile phones, and email accounts.
- Store product information in Smart appliance database
- Provide instructions on where (in the refrigerator) shopper should store food
- Track expiration dates of food and send out notifications with a few days of product expiration
- Send notifications once products reach expiration and make suggestions about consumption or disposal.

Proposed Research Methodology

To conduct the research necessary around the issue of food waste and foodborne illness to due poor refrigeration practices, I will complete a literature review. I will compile literature used to corroborate my claims and conduct an interview with end-users to gain insight into their personal refrigeration practices to see if these have led to food waste and/or foodborne illnesses in their households.

For the interview, participant consent has been granted they are ready to be interviewed.

The following is the plan for the interview that will be conducted to corroborate my claim that poor refrigeration practices contribute a great deal to food waste and foodborne illness.

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Setup:

This interview will be conducted using adult women (since no men were available for it) between the ages of 43 and 71 via a WhatsApp group discussion, each participant in the privacy of their own personal spaces. Since some may choose to have their cameras turned off, recorded audio will be the primary means of data collection and storage with some video recordings as a secondary mode of collection. This will be an open-ended semi-structured interview where participants will be encouraged to speak freely as they offer their responses and elaborations.

Intro & Participant Background:

Good day! As you all know, my name is Meah Hopkins, and I thank you for taking the time to meet with me today. First, I would like to know if I have everyone's permission to record this interview, as this will be my means of data collection and storage. And please be assured that you will not be asked to provide any personal information, and all the information you share will be protected and stored on my Android phone and will not be shared with any third-party solicitors. It will be strictly used for my research purposes and involving this project only. If there is anyone uncomfortable with being recorded, please understand that is ok, as your comfort throughout this process is paramount – just note that data collection will then be done via notetaking, which may prolong this interview. If I have everyone's permission to record, I want to extend my thanks, as this helps to better capture everything said here, significantly minimizing the chance that something pertinent will be missed. The purpose of this interview is to examine your refrigeration habits. But before we begin, I'd love for each of you to share some feedback as to how this research may resonate with you and what you hope to see happen because of this study. I appreciate all of your sharing, and without further ado, I'd like to commence with the interview. Everyone ok with that? Great!

Main Interview Questions:

1. Are you familiar with the issue of food waste? If so, what is your perspective on it?
2. What do you feel is the biggest contributor to food waste?
3. What are some ways you feel this problem can be solved?
4. Have any of you gotten sick from eating bad food? If so, how many times did it come from your own refrigerator?
5. What type of refrigerator do you have and how long have you had it?
6. Describe your food shopping experience. For instance, how much do you typically spend in one haul and about how many bags of perishable groceries do you leave with?
7. How is your grocery list compiled if you actually create one?
8. Do you prefer frozen foods to fresh foods? Why?
9. Does all the food purchased during a single haul usually fit easily in your refrigerator, or do you have to clean it out first? Expound on that, please.
10. How often do you clean out your refrigerator? When you do, how much food do you usually throw away, and why?
11. How do you feel when you have to get rid of food because it went bad in the refrigerator?
12. When do you usually learn that food has spoiled/expired in the refrigerator?
13. Describe how and where you place your perishables.
14. What kinds of practices do you implement to help you remember to eat foods stored in the fridge? How has this affected your food waste?
15. Finally, what are wishes that you developed due to frustrations around having to throw food away?

In Closing:

Thank you for participating in this interview. Would any of you like a copy of this interview? Would you like to receive updates as to how this interview has impacted my project? Do you have anything else you would like to share? Thank you again for your time, and as a token of my appreciation, I'd like to offer you each a gift of $25. If you spend it on groceries, try not to let it go to waste! Have a great day!

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The following is the plan for the interview that will be conducted to test the initial design proposed.

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Setup:

This interview will be conducted using adult women (since no men were available for it) between the ages of 43 and 71 via a WhatsApp video/audio group discussion, each participant in the privacy of their own personal spaces. Since some may choose to have their cameras turned off, recorded audio will be the primary means of data collection and storage with some video recordings as a secondary mode of collection. This will be an open-ended semi-structured interview where participants will be encouraged to speak freely as they offer their responses and elaborations. The purpose of the interview is to identify user needs to help design the SmartScanner application.

Intro & Participant Background:

Good day! As you all know, my name is Meah Hopkins, and I thank you for taking the time to meet with me today. First, I would like to know if I have everyone's permission to record this interview, as this will be my means of data collection and storage. And please be assured that you will not be asked to provide any personal information, and all the information you share will be protected and stored on my Android phone and will not be shared with any third-party solicitors. It will be strictly used for my research purposes and involving this project only. If there is anyone uncomfortable with being recorded, please understand that is ok, as your comfort throughout this process is paramount – just note that data collection will then be done via note-taking, which may prolong this interview. If I have everyone's permission to record, I want to extend my thanks, as this helps to better capture everything said here, significantly minimizing the chance that something pertinent will be missed. The purpose of this interview is to examine your refrigeration habits. But before we begin, I'd love for each of you to share some feedback as to how this research may resonate with you and what you hope to see happen as a result of this study. I appreciate all of you sharing, and without further ado, I'd like to commence with the interview. Everyone ok with that? Great!

TASKS:

1. User will download the app and create an account
2. User will upload their appliance
3. User will register their grocery store(s)
4. User will scan their groceries
5. User will log off

Main Interview Questions:

1. What do you hope to achieve by using this app?
2. When clicking on the app, what was your feeling about how to create an account?
3. Did you experience any frustrations while creating an account and then logging in?
4. Was there anything on your account home page you were hoping to find that you did not? If so, what was it?
5. What was your feeling about uploading your appliance to the app?
6. On the "Find your grocery store(s)" page, was your store listed? If not, did you find it easy to enter your grocery store and add it to your customized list?
7. Once your grocery store list was complete, how did you feel about the "Scan your groceries" page?
8. While uploading your groceries, how many times did you choose to manually enter your groceries? Why?
9. What was your general feeling while navigating the app?
10. After scanning each barcode, how do you feel about how the app page updated?
11. How accurate is the match between what you scanned and what the app registered onto your account page?
12. When you completed scanning, how clearly did the app show what you should do next?
13. After confirming all items had been scanned, what indication were you given that the app was now tracking your foods' expiration dates?
14. How did you feel about logging out of the app?
15. How would you gauge your future food consumption and the amount of food waste or foodborne illness you would experience after utilizing the app?

In Closing:

Thank you for participating in this interview. Would any of you like a copy of this interview? Would you like to receive updates as to how this interview has impacted my project? Do you have anything else you would like to share? Thank you again for your time, and as a token of my appreciation, I'd like to offer you each a gift of $25. If you spend it on groceries, try not to let it go to waste! Have a great day!

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Proposed Data Collection Instrument

For data collection, a document analysis will be conducted to gather information from website articles containing information relative to this study.

List of website articles researched:

1. Study Shows How Much Food Americans Waste Every Year

   A new study examining the food waste habits of 2,000 Americans found average Americans discard four spoiled items from their fridge every week.

2. Smart Appliances Promise Convenience and Innovation. But Is Your Privacy Worth the Price?

   Manufacturers collect data every time you run your dryer and open your refrigerator, but most of them don't want to talk about it

3. Smart Refrigerators: How They Work, What They Cost, and More

As indicated above the interview will be conducted by way of a WhatsApp recorded video of a group discussion fueled by questions that will be posed to the participants and that will encourage the sharing of expanded thoughts on the matter at hand.

Notes will be taken during the interview and the completed recording will be reviewed to analyze participant responses.

Project Planning Report

PROJECT PLAN & TIMELINE.pdf

Summation

This project design is one that I find myself becoming very passionate about and I hope to have much success with its design, but more importantly, I hope to see this design implemented in Smart refrigerators nationwide in the not too distant future. I look forward to working on this project despite the challenges I am sure I will face along the way.

References

Just Energy. (2024, April 9). *Smart refrigerators: How they work, what they cost, and more*. https://justenergy.com/blog/smart-refrigerators

Staff, W. (2023, December 13). *Bosch studies how much food Americans waste every year*. Waste 360. https://www.waste360.com/food-waste/study-shows-how-much-food-americans-waste-every-year

Wroclawski, D. (n.d.). *Smart appliances promise convenience and innovation. but is your privacy worth the price?*. Consumer Reports. https://www.consumerreports.org/electronics/privacy/smart-appliances-and-privacy-a1186358482