Easy Delivery Tracking: A Centralized Delivery Tracking System

Kevin Biro, Yulun Wu, Zhao Ji Wang, Jin Ting Zhou, Yunfei Wang
CSCC10
University of Toronto Scarborough
Toronto, Ontario, Canada
{kevin.biro, yulunbblythe.wu, zhaoji.wang, jinting.zhou, yunfei.wang}@mail.utoronto.ca

ABSTRACT

Package tracking has always been one of the most critical problems of online shopping and package delivery. In today's traditional delivery tracking systems, there are two problems. First of all, there are way too many online shopping websites, and having to remember and track each of these parcels bought from different sites can be tiresome. Second of all, the tracking method can be uninformative, causing the wrong parcel to be delivered or parcels to arrive when the customer is not home. In this paper we present the Easy Delivery Tracking app, a mobile delivery tracking application that allows people to track all their parcels bought from different online shopping sites in one place, and also enhances the tracking experience by presenting the user with a number of additional features such as a map which shows the locations of the parcels being delivered. We report findings from 6 different user usability tests. Our post study questionnaires have shown that users found that features implemented in our app were extremely helpful and efficient for online shopping. Our observations during the usability tests also suggest that users are able to learn how to use the app at an extraordinarily fast speed.

INTRODUCTION

During the COVID-19 pandemic, more people prefer to do online shopping as it is more safe, convenient, and efficient than shopping in person. However, there are many online shopping websites, which makes tracking parcels from all these different websites time consuming. For example, if users make five orders from five different shopping websites, then whenever they want to track their orders they will need to open each of the websites to find their orders step by step, which is extremely tedious. Or they can choose to save the tracking numbers in one text file, then copy them into the parcel tracking website whenever they want to see the update of their orders. Although the second option may sound good enough, people will not be able to see where the orders are bought from and it is very inconvenient. Furthermore, users might want to save and track parcels from family or friends, which are not shipped by online shopping websites, and thus cannot be tracked. There is an apparent need for an app that can concentrate all parcels bought from various sources in one place, which will make it easy to track the delivery status of each order and know which online shopping site the order is bought from.

LITERATURE REVIEW

Parcu, Brennan and Glass (2018) has found that the lack of communication is a huge problem in parcel delivery. Due to the lack of communication, wrong addresses can be written down, parcels can be sent to wrong locations or arrive at the destination when the customer is not home. All these factors can be devastating blows to the reputation of ecommerce.

By conducting a research in a sample of the online shopping community, Sivanesan(2017) has found that two of the biggest problems with the delivery services of online shopping that dissatisfy the

customers are the delays in delivery and receiving the wrong product. These problems ranked third and ninth on customers' dissatisfaction factors list with online shopping respectively. Thus, Improving the delivery's correctness and promptness can significantly increase the customers' satisfaction.

Blanquart, Dablanc, Lenz, Morganti, and Seidel (2014) have analyzed the relationship between ecommerce and the final delivery. Through their analysis, they found that instead of the products themselves, most problems people have with online shopping is related to delivery. Many of the people (about 15%) have reported that they experienced parcels arriving at home when no one was there, and around 13% of the people have reported delays in the delivery process. Many also say that the quality of the delivery is a key deciding factor in determining whether the user wants to continue purchasing from an E-Retailer.

United Parcel Service (2002) has shown us how the delivery company UPS resolves the delivery tracking problem. They usually require the parcels to be scanned during the shipping process, which allows online shopping websites to display tracking information of the parcel on their website by reference number. This can reduce quite a bit of problems caused during shipping. However, not every ecommerce platform has this tracking page.

Grossnickle and Raskin (2001) provided recommended tracking metrics which could resolve many problems caused by shipping. The main idea is to build an online customer service that combines all of the information (similar to our idea), which can ensure the information flow between the third party transporters and the customers; customers will only need to check this application for the latest updates of their parcels. This design should make package tracking a lot more convenient.

PROBLEM STATEMENT/RESEARCH QUESTION

Today's delivery tracking system is very inefficient to use due to issues such as the inability to track orders from different shopping websites and the insufficient information of one's packages. These problems can ruin the experience of online shopping and can reduce its convenience by a lot.

For this reason, our group's goal of this research is to design an app that improves on the efficiency and the ease of use of today's delivery tracking system.

GATHERING OF USER REQUIREMENTS

We chose to select users that have a range of experience with online shopping, which mostly includes adults and older teenagers who can purchase and track online parcels.

Techniques Used

Survey: This consists of Likert scale questions along with some multiple choice questions and some open ended questions that review and give feedback on some baseline features that we have chosen, as well as any improvements our design is missing and any problems the participant may have with our current ideas (See Appendix A). Since the majority of our questions are closed-ended, they can be quickly analyzed to provide insight if we are on the correct path. The survey is short and is administered online, which allows us to gather a large number of responses in a small amount of time.

Interview: Based on the information we acquired from the survey, we made rough sketches of a low fidelity prototype. We then

did interviews with 2 participants, explained to them about our low fidelity prototypes and asked them open ended questions mainly about their opinions and potential areas of improvements on the app design (See Appendix B).

Results: In general, our participants voiced their frustrations with current parcel delivery systems mostly in the open ended section of the survey, which emphasizes the need for our product in today's society. The results of the Likert section also highlighted features that were a 'necessity' for our design, such as the map feature to see where the parcels are, and the notification feature to know when to pick up your package. Additionally, 70-90% of the 15 participants indicated that it would be very convenient to be able to track their packages in one centralized application, where they can manually add or remove packages and websites from the app. From the interviews, we received feedback on our low fidelity prototype. The most requested changes were to add a rating system for delivery drivers, the ability to add multiple tracking numbers at a time, and to add a way to filter accounts more effectively using a drop down list.

PROTOTYPE

We mainly designed our high fidelity prototype revolving around 3 key functionalities of the app, which are: tracking the status of a parcel, adding new parcels to be tracked in the app, and deleting currently tracked parcels.

Tracking Functions: These are functions mainly related to how to check the status of the tracked parcels. We made the main menu consisting of a list of parcels currently
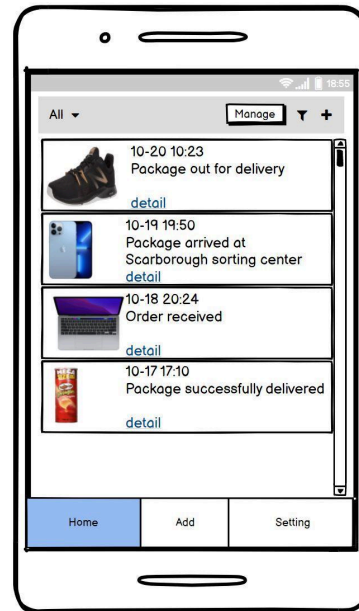

Figure 1. List of tracked parcels on the home page

Figure 2. Filtering parcels by pattern (left) and delivery status (right).

tracked by the app (See Figure 1). Each of the list item containers will contain the item's photo and basic information such as the date shipped, current delivery status, as well as a "detail" button which the user can click to see more details about the delivery status of the item. Furthermore, in order to increase the user's efficiency in finding the parcel he/she is looking for, we have added filtering functions that the user can use to filter through the parcels by the company or online shopping sites they were bought from (See Figure 2 left) or by their current
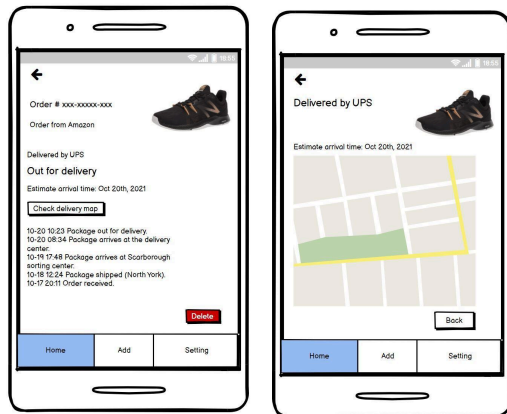
Figure 3. Detailed delivery status of a parcel (left) and map showing location of the parcel (right).

Figure 4. Screen to choose between adding parcel by adding an online shopping account or parcel tracking number

delivery status (See Figure 2 right). By clicking on "details" in a parcel's container, the user can see the delivery status of the parcel (See Figure 3 left), and by clicking "check delivery map", the user is able to see a map showing where the parcel is currently located (See Figure 3 right).

Adding Functions: These are functions used to add new parcels to be tracked. There are two ways to add new parcels: Add account or add package(s) (See Figure 4). After clicking the add button, the user can choose between two different ways to add the new parcels, either by adding the account for the online shopping site (which will add all parcels recently bought from that site) or choose add package, which will allow you to add the parcel by providing the tracking number of the parcel.

Delete Functions: The users have two ways to delete a parcel from being tracked. He/she can click on the details of a parcel and click the delete button at the bottom right corner. Or they can click the "manage" button, which will prompt the user to select the check boxes beside each package they want to delete, and then click the "Delete Selected Items" button at the bottom right corner (See Figure 5).
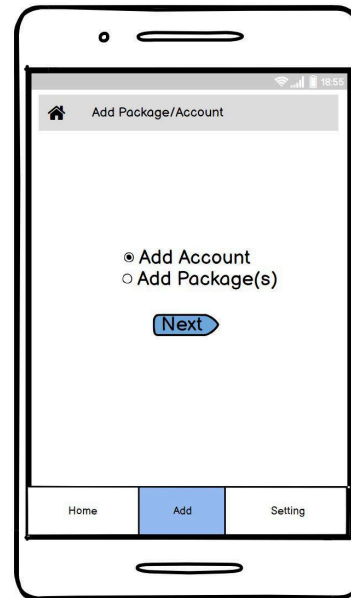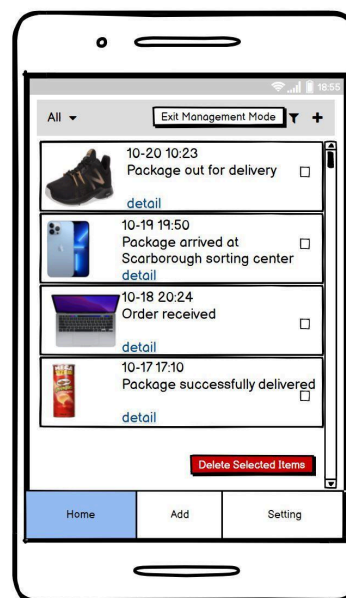

Figure 5. Management mode in which the user can select multiple parcels to delete.

USABILITY STUDY

Methods Used
Pre-Questionnaire: It consists three open-ended question to ask for the user's name and major of study and four close-ended drop down/Likert scale/multiple choice questions to ask for the user's age,

degree of proficiency with internet and online shopping, and frequency of using online shopping (See Appendix D). We use this questionnaire to gather data regarding the background of the user, and other information we want to know before observation. This questionnaire is short and the user doesn't need any knowledge about our design to answer it, but it can help us in terms of finding any patterns of the data that will be collected during observation when we analyze the results.

Direct Observation: We use Zoom to conduct direct observation. We give the user access to the prototype we made and the same tasks to complete. We ask the user to share their screen while completing the task so we can time the completion time for each task and observe their operation. The investigator notes down every action the user does to complete the task and any comments the investigator has during observation (See Appendix F-L for sample observation sheets). Direct observation helps us collect the objective data related to the use of our prototype such as where the user makes mistakes and where the user gets stuck.

Post-Questionnaire: It consists of three closed-ended Likert scale questions and three open-ended questions (See Appendix E). We use Likert scale questions to gather the user's rating towards three features they used for the task's completion during the observation. We use open-ended questions to gather the user's comment on these three features. The time to complete this questionnaire depends on the amount of comments the user wants to write. This questionnaire helps us gather the rating of user's satisfaction on our three main features and any positive or negative comments on these features. It also gives us ideas on

where to improve on our prototype in the future.

Usability Study Design
We conducted the usability study through the Zoom meeting, and the environment was not controlled. We gave the participant the link of the pre-questionnaire after the participant signed the consent form (See Appendix C for consent form). We asked the participant to share the screen after the participant submitted the pre-questionnaire. We then gave the participant the link to the prototype and one task at a time. We observed the participant's action while he/she was completing the task, and had an interview sheet behind us to write down the time the participant took to complete each task and the steps they took. We gave the participant the link to post-questionnaire after they finished all tasks, and we gave them the freedom to exit the share screen and/or Zoom meeting while filling this questionnaire.

The aim of our usability study was to test whether our prototype was easy and clear to use, to determine the error rate of our tasks, and to note the user satisfaction while using the prototype to complete the tasks. The sequence of tasks was as follows:

Task Subset 1: Track Function

Task Subset 2: Add Function

Task Subset 3: Delete Function

We chose the 'Within Subject' experiment, i.e. all participants were asked to complete the same set of tasks in the same order, for the usability study. By doing this, we can compare the actions our participants took to complete the tasks and figure out any error they made. Given that all the participants experienced the same experiment process, they all had the same knowledge about our prototype before doing each task, which

allowed for fair testing that can be compared later.

Description of Tasks
The tasks are divided into three subsets based on the three function we implemented in our prototype, and the participant will work with this prototype throughout the usability study.

Task Subset 1: Track Function
The tasks chosen for the track function are divided into two categories:

Specific information finding question:
The purpose of this type of question is to see if the user can find specific information of a package easily using the track function in the prototype. The finding question focuses on different types of information about a package. Example: find the latest update, current location, tracking history of a package. Questions 1, 2, and 3 found in Appendix F-L belong to this category.

Category filtering question:
The purpose of this type of question is to see if the user can find package(s) belonging to a certain category using the filter function in the prototype. The filtering question focuses on different types of categories about the package. Example: the pattern, i.e. the company or online shopping sites the user was bought from, of the package, the shipping status of the package. Question 4, 5, 6, and 7 found in Appendix F-L belong to this category.

Task Subset 2: Add Function
The purpose of these tasks is to test whether the participant can add an account or package easily or not through the add function. For the tasks that ask the participant to add an account, the participant was also tested on their ability to search for the right pattern they are looking for.

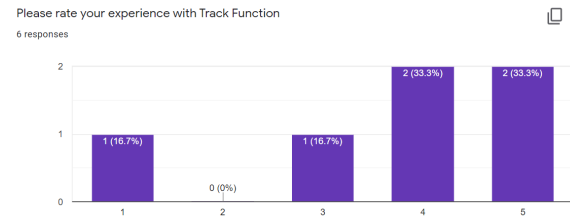**Task Subset 3: Delete Function**

Figure 6. User's overall rating of the tracking functions.

The purpose of these tasks is to test whether the participant can delete the package(s) easily or not through the delete function. One task was for testing the participant on deleting one item, and one task was for testing the participant on deleting multiple items.

Task Evaluation Method
When the participant was doing a task, we observed them through the shared screen. We, as investigators, wrote down any actions the participant took and our own comments on their performance. An action that is not necessary for completing the corresponding task was considered as an error.

The investigator started a timer at the start of each task, and stopped it when the participant completed that task. The investigator noted down the time the participant took to complete each task.

RESULTS
The following results are the results of the usability study. A small note to the results is that one of the participants gave ratings of all 1's but gave a positive response in the feedback. We believe the participant made a mistake and the true ratings of each function is higher than what we have.

Results: Ratings of Track Function
Calculate the mean from data in Figure 6, the tracking function had a satisfactory result with the overall rating being approximately 3.67/5. The participants gave
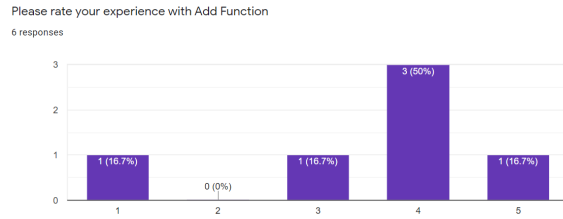
Please rate your experience with Add Function
6 responses

Figure 7. User's overall rating about the add functions.

Please rate your experience with Delete Function
6 responses
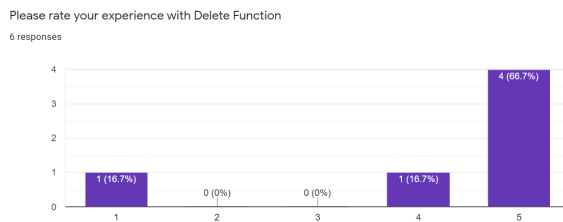
Figure 8. User's overall rating about the delete functions.

Average Time Taken vs Tasks

Figure 9. Average amount of time participants took to finish the tasks.

Figure 10. Error rate pie chart.

some positive feedback such as saying that the function was easy to use, the information is clearly displayed and being able to filter parcels is very helpful. However, the participants also brought up some issues and suggestions for the function. The participants pointed out that little bugs do exist, design is not very appealing, some buttons can be clarified, and universal accessibility can be implemented better.

Results: Ratings of Add Function
Calculating the mean from data in Figure 7, the overall rating of the add function was 3.5/5, which was satisfactory but implies that the function needs more work. The participants said the function was a good catch of the users needs but can improve on the placement of functions and highlight selected areas. Some participants said that the function was easy to use but some participants said the opposite.

Results: Ratings of Delete Function
Calculating the mean from data in Figure 8, 4.17/5 is the approximate overall rating of the delete function which is a very high rating. The only negative response for the
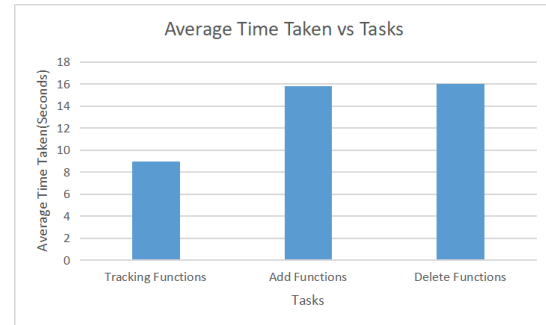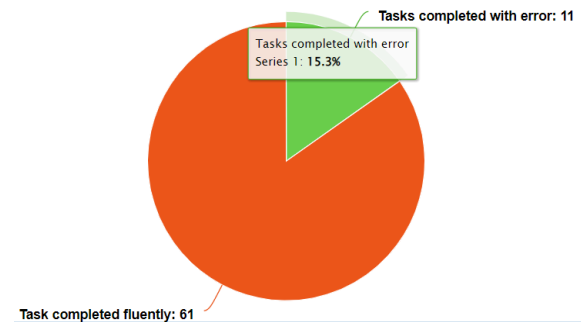
delete function was that one of the buttons, namely the "manage" button, could be clarified. Otherwise the function is easy to use, very convenient, flexible and great at error reduction.

Results: Time Taken by Participants
Referring to Figure 9, on average, participants took less than 10 seconds to complete the tasks assigned to the tracking function and less than 16 seconds to complete the tasks of the adding and deleting functions. However, since our app is purely for tracking deliveries and the main delivery tracking systems today are embedded in a shopping website, we could not find any website to compare the results. Even though we were unable to compare the numbers, the participants did comment on all of the functions and said they were efficient and easy to use.
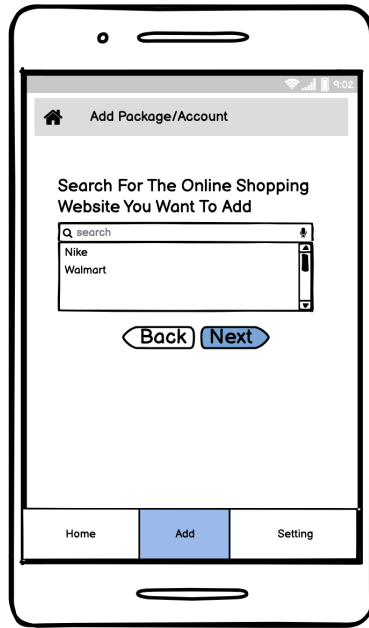
Results: Error rate of tasks

Figure 11. Unreal search function.

Refer to Figure 10, the completion rate of tasks was 100%, all the participants managed to complete all the tasks, however, there were some confusion or errors made during these tasks. We had 12 tasks for each participant and 6 participants. Therefore 72 tasks in total, and in 11 (15.3%) of all tasks, the participants got confused or stuck for a while before they realized how to complete the tasks.

LIMITATIONS

Even through the results we got from the usability study is good, there are still some limitations in our research.

We only interviewed two people when we were gathering user requirements, so the results we got from the interviews may not be relevant to the actual issue with our low-fidelity prototype. Some comments we got from our interviews may not help us move on to the high-fidelity prototype. Due to the limitation of Balsamiq, we were not able to make the search function in the Add An Account page work as the real search function (See Figure 11). The user

selects from the options we pre-defined in the drop down list instead of really typing in something and searching for a pattern. In a real search function, the user may face difficulties that are not possible to observe with a prototype.

Balsamiq is based on a website, and the user used a cursor to navigate our prototype which is designed to be a mobile APP. Therefore, the user might have more difficulties with our prototype on mobile because the mobile has a smaller screen compared to the computer, and fingers are bigger and less precise than the cursor so the button that is not problematic when using the cursor might cause difficulty when navigating our prototype with fingers. This means that even though the user feels comfortable with our UI design when testing the mobile APP with a mouse, it does not mean they will have the same feeling when testing the mobile APP on a mobile device with their fingers.

In our usability study, we were not able to set up a controlled environment, i.e. a lab, for our study due to pandemic. We also could not sit beside the participant and observe them closely for the same reason. The observations we got may not be as elaborate as they could have been in a controlled environment. The un-controlled environment might affect the result we got from the participant. For example, the reason a participant took a longer time to complete a task compared to other participants can be caused by their pet distracting them while they were completing that task. Or, the participants could have different computers with different internet speeds, and different screen quality that could affect the way they use our APP.

We didn't ask the participant to think out loud, so we may have missed some details

about the participant's performance in our interview sheet. This can affect the results we got from the usability study.

We were not able to compare the performance of the participant using our prototype with their performance on shopping websites in our usability study because we could not offer an Amazon account and an Apple account with the similar package status as in our prototype. Therefore, the conclusion we were able to conduct from the usability study is limited.

Furthermore, there was contradictory data in our usability study. In the response we got from the post-questionnaire, there is a participant who rated 1 (See Appendix J), i.e. very poor, for all functions, but left positive comments for all functions at the same time. We decided not to remove his response while analyzing the usability study result, so this did pull our average of rating of each function down.

The sample size we had for our usability study was too small. We only had 6 participants in our usability study, so the result we got from these samples may not be relevant to the population.

The participants we had in the usability study were not diverse. All of them were university students between the ages of 19 and 22, none of them rated 1 or 2, i.e. 1 is very bad and 5 is very good, when rating their degree of proficiency with the internet and online shopping, and all of them didn't use online shopping frequently i.e. a participant was considered to use online shopping frequently if they use online shopping greater than or equal to five times a week. We need participants with diverse backgrounds such as older/younger, disability, and frequent online shopping users to approximate the population better.

FUTURE WORK

In this paper, we presented the Easy Delivery Tracking App, an app that allows the user to track all his/her parcels bought from a variety of online shopping sites in one centralized app. The app design was very well received by our participants, and satisfactory comments were shown on their post study questionnaires. Furthermore, by our measurements and observations, it took only very few seconds for the participants to figure out how to complete a particular task, and they rarely got lost or did not know what to do during the process. This means that the app can largely improve the efficiency of online shopping and parcel tracking.

In future work, we plan to further improve the design of the app by taking the feedback we acquired through usability tests into consideration, especially UI designs or layout flaws that cost our participant longer thinking time to figure out where to click. First of all, we need to change the "Manage" button to a more descriptive name for its functionality, so that the users do not get confused about what it does; second of all, we need to change the tracking parcels' list so that the user can click on any place of the parcel's container to view the tracking details of the parcel as opposed to only being able to click the small link; third of all, we need to implement a feature to allow the user to delete the online shopping account he/she added; finally, we need to speed up the users' process of adding new parcels by implementing a feature that allows them to add multiple parcels by tracking number at once. We will also do a second round of usability tests after improving on our design, and this time we will be inviting more participants that not only include young people and university students, but also include an older population that have even more diverse technological backgrounds to further test our

app against universal usability. Furthermore, we plan to also port our app design onto the web browser, so that the app can not only be used by mobile users, but can also be used by users that prefer seeing things on a bigger screen.

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Appendix A
Screenshots of the Sample Survey Used in Gathering User Requirement

Easy Delivery APP Survey

Hello, we are the Easy Delivery Tracking group from CSCC10: Human-Computer Interaction. We are designing an application that concentrates package information from different websites in one place, and will give the user notifications for delivery updates. We appreciate your help if you can take 5-10 minutes to answer our survey. We will not collect any personal information in this survey.

How often do you do online shopping? *

○ < Once a week

○ >= Once a week and < five times a week

○ >= five times a week

Have you used any kind of package/delivery tracking APP? *

○ Yes

○ No

If yes, which package/delivery tracking APP(s) have you been using?

☐ Amazon

☐ UPS

☐ FedEx

☐ Parcels

☐ Other...

Tell us about the problems you have faced with the current parcel/delivery tracking APPs.

Description (optional)

How often do you receive your package incorrectly? *

	1	2	3	4	5	
Never	○	○	○	○	○	Always

How often are you required to pickup your package? *

	1	2	3	4	5	
Never	○	○	○	○	○	Always

How often do packages arrive when nobody is home? *

	1	2	3	4	5	
Never	○	○	○	○	○	Always

How often do you lose a package after being told to pick up the package? *

	1	2	3	4	5	
Never	○	○	○	○	○	Always

How often does the delivery person call before sending the package to a pick up location? *

	1	2	3	4	5	
Never	○	○	○	○	○	Always

Please rate how easy it is to track your packages with the current delivery apps you are using? *

	1	2	3	4	5	
Very Hard	○	○	○	○	○	Very Easy

Do you have any not listed problem(s) with the current package/delivery tracking APP? If so, please list any.

Long-answer text
....

After section 2   Continue to next section   ▾

How helpful do you think if a package/delivery tracking APP with the following features will be in improving your online shopping experience?

⌄   ⋮

Description (optional)

Being able to track all your packages purchased on different platforms(E.g. Amazon, newegg, etc.) by adding your account in one single APP. *

	1	2	3	4	5	
Not Helpful at All	○	○	○	○	○	Very Helpful

Being able to delete your added account. *

	1	2	3	4	5	
Not Helpful at All	○	○	○	○	○	Very Helpful

Being able to manually add a package to be tracked. *

	1	2	3	4	5	
Not Helpful at All	○	○	○	○	○	Very Helpful

Being able to delete a manually added package. *

	1	2	3	4	5	
Not Helpful at All	○	○	○	○	○	Very Helpful

Being able to sort on the packages you have regarding on their provenance (for example: Amazon, UGG, Walmart). *

	1	2	3	4	5	
Not Helpful at All	○	○	○	○	○	Very Helpful

Being able to sort on the packages you have regarding on their status (for example: out for delivery, delivered). *

	1	2	3	4	5	
Not Helpful at All	○	○	○	○	○	Very Helpful

Being able to see the picture of item(s) you have in a package besides its tracking information. *

	1	2	3	4	5	
Not Helpful at All	○	○	○	○	○	Very Helpful

Being able to locate the package on a map when it is being delivered. *

	1	2	3	4	5	
Not Helpful at All	○	○	○	○	○	Very Helpful

Notification when the package is out for delivery. *

	1	2	3	4	5	
Not Helpful at All	○	○	○	○	○	Very Helpful

Notification when the delivery person is close by. *

	1	2	3	4	5	
Not Helpful at All	○	○	○	○	○	Very Helpful

Being able to contact the delivery person directly with a chat system. *

	1	2	3	4	5	
Not Helpful at All	○	○	○	○	○	Very Helpful

Can you think of any other feature(s) that you would like to have in a package/delivery tracking APP that can improve your online shopping experience? If so, please write below.

Long-answer text

Appendix B
Sample Interview Sheet Used in Gathering User Requirement
Welcome to the interview! We are the Easy Delivery Tracking group from CSCC10 at UTSC. Our project is to design an application that allows the user to track the packages from different platforms. This interview will show you the low-fidelity prototype we drew for this APP and ask you some questions related to the prototype. Notice that all prototypes don't guarantee what the final work looks like.

1. These two pictures below are to show what the add account page looks like. Look at these pictures, imagining you want to add your Amazon account to the tracking list, will you be able to locate your target button or input box quickly? Is there any area that makes you feel confused?

Please Sign in to The Package's Online Shopping Account:

Choose one of the following ways to track the packages

○ Add an Online Shopping Account

○ I have the package's tracking number

Type here to Search for Online Shopping Company

Amazon

Apple

Bell

Dell

n in

This Box will show up as soon as you click the radio button to searh for the online shopping company name. You can click on the results popped up in the list to select which online shopping account you want to sign in with.

Please choose from the following:

◉ Add an Online Shopping Account   ○ I have the package's tracking number

Selected Company: Amazon (Click here to Change)

Please Sign in to The Package's Online Shopping Account:

Username: [   ]

Password: [   ]

[Sign in]

2. This picture below is to show what the add package page looks like. Look at this picture, imagining you want to add one package you recently have shipped by Canada Post to the tracking list, will you be able to locate your target button or input box quickly? Is there any area that makes you feel confused?

Please choose from the following:

○ Add an Online Shopping Account   ◉ I have the package's tracking number

Please Enter Your Package's Tracking Number:

[   ]

[Add Package]

3. This picture below is to show what the main page looks like. Look at this picture, imagining you want to find the information of a package you recently ordered from Amazon, will you be able to locate your target information quickly? Is there any area that makes you feel confused?

4. This picture below is to show what the edit mode looks like. Look at this picture, imagining you want to delete your Amazon account and the package from Newegg from the tracking list, will you be able to locate your target checkboxes or buttons quickly? Is there any area that makes you feel confused?
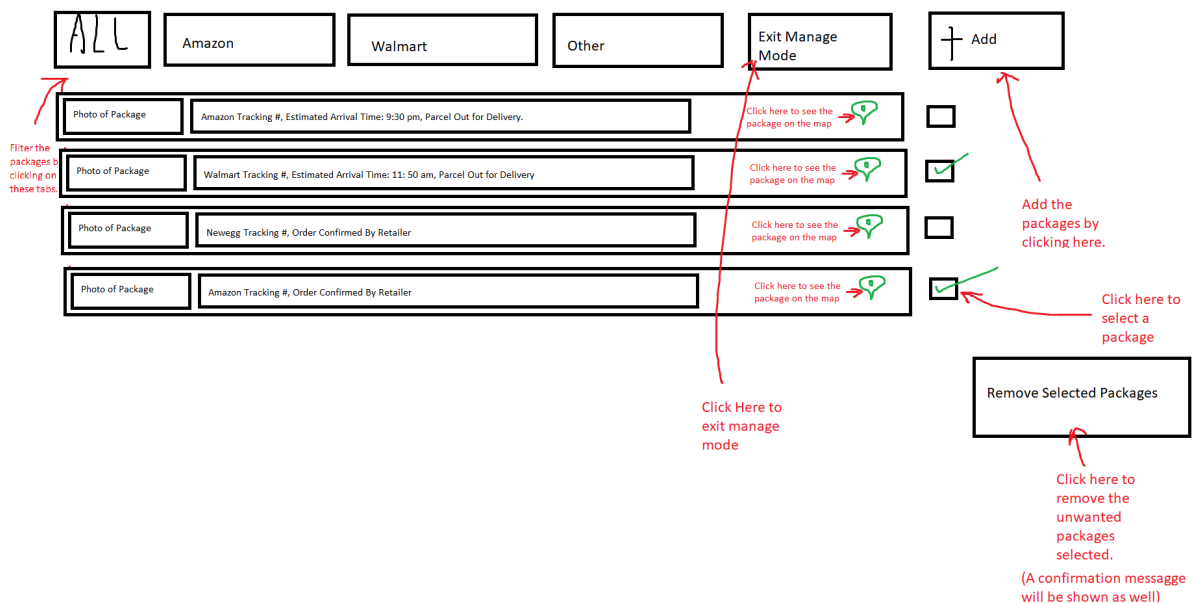
*The next three questions refer to the image below

5. This picture is to show what the detail page of a package looks like. Look at this picture, imagining you want to know what progress this package is currently in, will you be able to locate your target information quickly? Is there any area that makes you feel confused?

6. Look at this picture, imagining you want to see where the current location of your package is, will you be able to locate your target information quickly? Is there any area that makes you feel confused?

7. Look at this picture, imagining you want to contact the delivery person who is delivering this package, will you be able to locate your target information quickly? Is there any area that makes you feel confused?

Usability Study – Informed Consent Form
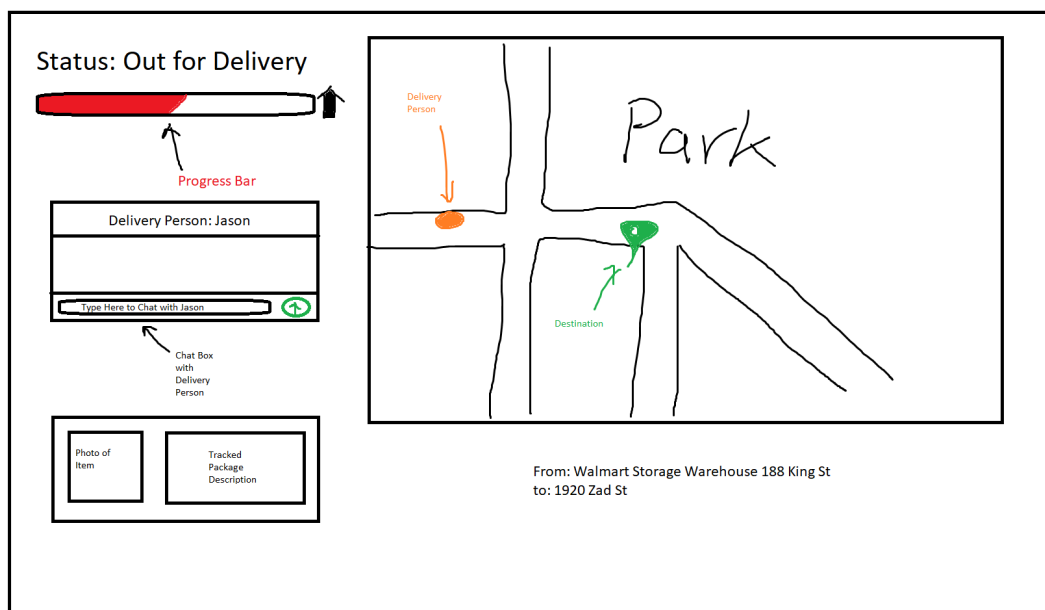
Title: Evaluate Prototype of Easy Delivery Tracking Application
Investigators: Kevin Biro, Yulun Wu, Zhao Ji Wang, Jin Ting Zhou, Yunfei Wang

I _____ hereby consent to participate in a usability study conducted by the Investigators

(listed above) as part of a Fall 2021 project for **CSCC10, Human-Computer Interaction**, a course offered by the Department of Computer & Mathematical Sciences at the University of Toronto Scarborough.

I **agree** to participate in this study and the purpose of this study is *<description of the purpose of the study>*.

I **understand** that:
- The procedures to be used are
- *The interview will be observed by Investigator(s) under administering evaluation. I will be given access to a model and asked to perform certain tasks using that model. The Investigator(s) will obeserve my interaction with the model and collect data that relate to the efficiency and accuracy of the model's design. The data collected in the interview will only be used on project-related purpose for CSCC10.*
- *I will be given two questionnaires, one at the beginning and one at the end of the interview. The first questionnaire will gather general information about myself. The second questionnaire will gather quantitative and qualitative information about my experience using the models.*

- The risks incurred by participating are
- *Slight eye strain from moderate exposure to a computer screen.*
- *Slight stress from the active engagement with a prototype model.*
- *Slight fatigue as a result of actively interacting with a web platform.*

- I will receive no compensation for my participation.

- I am free to withdraw at any time during the study without the need to give any explanation or penalty.

- All materials and results will be kept confidential, and, in particular, that my name and any identifying or identified information will not be associated with the data.

- I can contact the course instructor, Naureen Nizam (nnizam@cs.utoronto.edu) with any questions or concerns.

PARTICIPANT

Name (please print) _____

Signature _____

Date: _____

INVESTIGATOR(s)

Name _____

Signature_____

Date: _____

Easy Delivery APP Pre-Questionnaire

Questionnaire before evaluation.

Please enter your first name *

Your answer

Please enter your last name *

Your answer

Please select your age *

Choose ▼

Please enter your major of study *

Your answer

How good are you with using internet? *

	1	2	3	4	5	
Very Bad	○	○	○	○	○	Very Good

How familiar are you with online shopping? *

	1	2	3	4	5	
Very Bad	○	○	○	○	○	Very Good

How often do you do online shopping? *

○ < Once a week

○ >= Once a week and < five times a week

○ >= five times a week

Easy Delivery APP Post-Questionnaire form

Questionnaire after evaluation.

Please rate your experience with Track Function *

	1	2	3	4	5	
Very Poor	○	○	○	○	○	Perfect

Please give reason(s) of your rating on Track Function. *

Your answer

Please rate your experience with Add Function *

	1	2	3	4	5	
Very Poor	○	○	○	○	○	Perfect

Please give reason(s) of your rating on Add Function. *

Your answer

Please rate your experience with Delete Function *

	1	2	3	4	5	
Very Poor	○	○	○	○	○	Perfect

Please give reason(s) of your rating on Delete Function. *

Your answer

Easy Delivery Tracking APP Usability Study Tasks

Objective Set 1: Track Function
1. Find the latest update of the tracking of the iPhone?
2. Find the current location of shoes?
3. Find the tracking history of chips?
4. Find all delivered parcels?
5. Find all shipped parcels?
6. Find all parcels from Amazon?
7. Find all parcels from Apple?

Objective Set 2: Add Function
1. Add Nike account?
2. Add Walmart account? (Supposed to see an error)
3. Add a parcel?

Objective Set 3: Delete Function
1. Delete chips?
2. Delete shoes and chips?

Interview Data Sheet - User 1

Pre-Questionnaire

https://forms.gle/nryiRycaWeJMfpzv6

Participant name: User 1
- Age: 20
- Major of study: Civil Engineering
- How good are you with using internet? (1-5): 4
- How familiar are you with online shopping? (1-5): 3
- How often do you do online shopping? (option 1-3): 2

Direct Observation

Track Function

GENERAL NOTE:

1. **Find the latest update of the tracking of iPhone?**
   a. **Time Taken: 12.09s**
   b. **Notable Remarks+ Comments**
      User tried to click on the entire item box to get into the detail page of the item instead of clicking on the detail link.

2. **Find the current location of shoes?**
   a. **Time Taken: 6.37s**
   b. **Notable Remarks+ Comments**
      The user may have taken less time since they did the first task.

3. **Find the tracking history of chips?**
   a. **Time Taken: 5.50s**
   b. **Notable Remarks+ Comments**
      Same as task 2.

4. **Find all delivered parcels?**
   a. **Time Taken: 19.22s**
   b. **Notable Remarks+ Comments**
      User did not seem to be familiar with the filter icon. May have been a misclick to the plus icon during the task.

5. **Find all shipped parcels?**
   a. **Time Taken: 5.97s**
   b. **Notable Remarks+ Comments**

User was much faster maybe because he recognized the filter icon

6. **Find all parcels from Amazon?**
   a. **Time Taken: 4.81s**
   b. **Notable Remarks+ Comments**
   User has clicked on the drop down when doing task 4, it may have speeded up this task.

7. **Find all parcels from Apple?**
   a. **Time Taken: 4.68s**
   b. **Notable Remarks+ Comments**
   The user has done a similar task.

Add Function

GENERAL NOTE:

1. **Add Nike account?**
   a. **Time Taken: 20.56s**
   b. **Notable Remarks+ Comments**
   The user misclicked on 'walmart' when trying to search for a Nike account, there was no way for the user to reselect unless they clicked on the back button which goes back to the add page.

2. **Add Walmart account?**
   a. **Time Taken: 15.08s**
   b. **Notable Remarks+ Comments**
   The user took some time trying to type in the username and password.

3. **Add a parcel?**
   a. **Time Taken: 13.41s**
   b. **Notable Remarks+ Comments**

Delete Function

GENERAL NOTE:

1. **Delete chips?**

      a. **Time Taken: 7.92s**

      b. **Notable Remarks+ Comments**

2. **Delete shoes and chips?**

      a. **Time Taken: 12.11s**

      b. **Notable Remarks+ Comments**

      The user deleted shoes and chips in their detail page, and did not use the manage button.

Post-Questionnaire

- Rate of experience with Track Function(1-5) and reason(s): 4

  The text of tracking history can be aligned better and the current status is not very obvious to see when other texts are wrapping around it. However I do appreciate the tracking map.

- Rate of experience with Add Function(1-5) and reason(s): 4

  There was no highlight of whether I was selecting Nike or Walmart when using the search function. The add package button could be a bit higher if I am only adding one package a time.

- Rate of experience with Delete Function(1-5) and reason(s): 5

  Finding the delete function was not difficult. It was not till I deleted both items that I recalled there is a manage button but it is definitly a nice to have if I am using the app constantly.

Appendix H

Interview Data Sheet - User 2

Pre-Questionnaire

https://forms.gle/nryiRycaWeJMfpzv6

Participant name: User 2

- Age: 19
- Major of study: Computer Science
- How good are you with using internet? (1-5): 5
- How familiar are you with online shopping? (1-5): 3
- How often do you do online shopping? (option 1-3): 2

Direct Obeservation

Track Function

GENERAL NOTE:

1. **Find the latest update of the tracking of iPhone?**
   a. **Time Taken: 2s**
   b. **Notable Remarks+ Comments: participant remarked that the date and time of the packages arrived/shipped/received are in a format that is hard to understand quickly (should use Oct, 17 instead of 10/17)**

2. **Find the current location of shoes?**
   a. **Time Taken: 4s**
   b. **Notable Remarks+ Comments: the map does not show the current location (it is a generic map)**

3. **Find the tracking history of chips?**
   a. **Time Taken: 2s**
   b. **Notable Remarks+ Comments**

4. **Find all delivered parcels?**
   a. **Time Taken: 2s**
   b. **Notable Remarks+ Comments**

5. **Find all shipped parcels?**
   a. **Time Taken: 10s**
   b. **Notable Remarks+ Comments: question was hard to understand. The participant asked if they wanted to find them manually from the "all" section or if there was some sort of filtering.**

   i. **Since the filter button is small and not labeled, the participant tested out manage before clicking on the filter.**

 6. **Find all parcels from Amazon?**
   a. **Time Taken: 2s**
   b. **Notable Remarks+ Comments: the participant noted that the buttons were small.**

 7. **Find all parcels from Apple?**
   a. **Time Taken: 1s**
   b. **Notable Remarks+ Comments**

Add Function

GENERAL NOTE:

 1. **Add Nike account?**
   a. **Time Taken: 20s**
   b. **Notable Remarks+ Comments: The participant was slow because there was a lot of text to read for first time users. Speed should increase as user becomes more experienced. The participant also stopped once the parcels from Nike were displayed before asking a follow up question to add them to the overall list. The participant noted that the add all parcels button should be bigger**

 2. **Add Walmart account?**
   a. **Time Taken: 8s**
   b. **Notable Remarks+ Comments: the participant is confused because there is no functionality to add a walmart account.**

 3. **Add a parcel?**
   a. **Time Taken: 10s**
   b. **Notable Remarks+ Comments: the participant noted that the "Add Package" button should be made more visible (centered and larger button)**

Delete Function

GENERAL NOTE:

1. **Delete chips?**
   a. **Time Taken: 5s**
   b. **Notable Remarks+ Comments: the participant liked the fact that there is a confirmation screen when deleting**

2. **Delete shoes and chips at the same time?**
   a. **Time Taken: 10s**
   b. **Notable Remarks+ Comments**

Post-Questionnaire
https://forms.gle/RZJXAYHejS3KNir59

The participant filled out the form
- Rate of experience with Track Function(1-5) and reason(s): 4
  Some buttons could be bigger and well defined (filter button, add all parcels button). Some descriptions could have more accessibility/could be organized more neatly (product description page). I know this is a prototype but the map should not be generic
- Rate of experience with Add Function(1-5) and reason(s): 4
  It is unclear after adding an account (Nike) that I need to also click on "Add all recent orders" to complete the process since the button is relatively small.
- Rate of experience with Delete Function(1-5) and reason(s): 5
  Good. I like that the delete button is small so that you don't accidentally click and delete items.

Interview Data Sheet - User 3

Pre-Questionnaire

https://forms.gle/nryiRycaWeJMfpzv6

Participant name:

User 3

- Age: 22
- Major of study: Mathematics
- How good are you with using internet? (1-5): 5
- How familiar are you with online shopping? (1-5): 4
- How often do you do online shopping? (option 1-3): 2

Direct Obeservation

Track Function

GENERAL NOTE:

1. **Find the latest update of the tracking of iPhone?**
   a. **Time Taken: 3s**
   b. **Notable Remarks+ Comments**

2. **Find the current location of shoes?**
   a. **Time Taken: 3s**
   b. **Notable Remarks+ Comments**

3. **Find the tracking history of chips?**
   a. **Time Taken: 2s**
   b. **Notable Remarks+ Comments**

4. **Find all delivered parcels?**
   a. **Time Taken: 2s**
   b. **Notable Remarks+ Comments**

5. **Find all shipped parcels?**
   a. **Time Taken: 10s**
   b. **Notable Remarks+ Comments**
6. **Find all parcels from Amazon?**
   a. **Time Taken: 3s**
   b. **Notable Remarks+ Comments**

7. **Find all parcels from Apple?**
    a. **Time Taken: 2s**
    b. **Notable Remarks+ Comments**

Add Function

GENERAL NOTE:

1. **Add Nike account?**
    a. **Time Taken: 16s**
    b. **Notable Remarks+ Comments**

2. **Add Walmart account?**
    a. **Time Taken: 8s**
    b. **Notable Remarks+ Comments**

3. **Add a parcel?**
    a. **Time Taken: 8s**
    b. **Notable Remarks+ Comments**

Delete Function

GENERAL NOTE:

1. **Delete chips?**
    a. **Time Taken: 5s**
    b. **Notable Remarks+ Comments**

2. **Delete shoes and chips at the same time?**
    a. **Time Taken: 12s**
    b. **Notable Remarks+ Comments**

Post-Questionnaire
https://forms.gle/RZJXAYHejS3KNir59

The participant filled out the form
- Rate of experience with Track Function(1-5) and reason(s): 5
  The map makes it very clear and convenient.

- Rate of experience with Add Function(1-5) and reason(s): 4
  I deducted one star due to the "add account" and "add package" are a little confusing, it should be something like "add package by account or tracking number"
- Rate of experience with Delete Function(1-5) and reason(s): 5
  Convenient to use.

Appendix J

Interview Data Sheet - User 4

Pre-Questionnaire

https://forms.gle/nryiRycaWeJMfpzv6

Participant name: User 4
- Age: 20
- Major of study: Statistics and Actuarial Science
- How good are you with using internet? (1-5): 5
- How familiar are you with online shopping? (1-5): 4
- How often do you do online shopping? (option 1-3): 1

Direct Obeservation

Track Function

GENERAL NOTE:

- **Find the latest update of the tracking of iPhone?**
    a. **Time Taken:30s**
    b. **Notable Remarks+ Comments**

Participant Comments: Very Easy to do.

Observation: Participant knows about where to click immediately.

- **Find the current location of shoes?**
    a. **Time Taken:11s**
    b. **Notable Remarks+ Comments**

Participant Comments: Interaction is very smooth.

Observation: Participant knows what to do since this step is similar to step 1.

- **Find the tracking history of chips?**
    a. **Time Taken: 9s**
    b. **Notable Remarks+ Comments**

Participant Comments: Very Easy to do

- **Find all delivered parcels?**
    a. **Time Taken: 20s**
    b. **Notable Remarks+ Comments**

Participant Comments: Harder the first time around, easier after using once.

Observation: Participant took some time to figure out where to click, but overall okay.

- **Find all shipped parcels?**
    a. **Time Taken: 6s**
    b. **Notable Remarks+ Comments**

Participant Comments: Same 4th step

- **Find all parcels from Amazon?**

a. **Time Taken: 4s**
b. **Notable Remarks+ Comments**
Participant Comments: Very easy to do.

- **Find all parcels from Apple?**
    a. **Time Taken: 2s**
    b. **Notable Remarks+ Comments**
Participant Comments: Same as 6th

Add Function

GENERAL NOTE:

1. **Add Nike account?**
    a. **Time Taken: 28s**
    b. **Notable Remarks+ Comments**
Participant Comments: A little complex, but cannot do much to improve.
Observation: Participant knows what to do, followed through the steps flawlessly the first time around.

2. **Add Walmart account?**
    a. **Time Taken: 9s(Error)**
    b. **Notable Remarks+ Comments**
Participant Comments: Same as 1

3. **Add a parcel?**
    a. **Time Taken: 17s**
    b. **Notable Remarks+ Comments**
Participant Comments: Easy to do.

Delete Function

GENERAL NOTE:

1. **Delete chips?**
    a. **Time Taken: 9s**
    b. **Notable Remarks+ Comments**
Participant Comments: Very easy to do

2. **Delete shoes and chips?**
    a. **Time Taken: 33s**
    b. **Notable Remarks+ Comments**
Participant Comments: Easy. Did not know what to do right away.

Observation: It took quite a while for the participant to realize that the "Manage" button is supposed to be clicked to select multiple product or packages.

Post-Questionnaire
https://forms.gle/RZJXAYHejS3KNir59
- Rate of experience with Track Function(1-5) and reason(s): 1
  good use
- Rate of experience with Add Function(1-5) and reason(s): 1
  good catch
- Rate of experience with Delete Function(1-5) and reason(s): 1
  also very convience

Appendix K

Interview Data Sheet - User 5

Pre-Questionnaire

Participant name: User 5

- Age: 21
- Major of study: Management
- How good are you with using internet? (1-5): 3
- How familiar are you with online shopping? (1-5): 4
- How often do you do online shopping? (option 1-3): 1

Direct Obeservation

Track Function

GENERAL NOTE:

- **Find the latest update of the tracking of iPhone?**
    - **Time Taken:39s**
    - **Notable Remarks+ Comments**

Participant Comments: I was being bad at this. But the photo should be clickable. The "detail" links are not very visible.
Observation:

- **Find the current location of shoes?**
    - a. **Time Taken:7s**
    - b. **Notable Remarks+ Comments**

Participant Comments: Easy.

- **Find the tracking history of chips?**
    - a. **Time Taken: 6s**
    - b. **Notable Remarks+ Comments**

Participant Comments: Same as 1.

- **Find all delivered parcels?**
    - a. **Time Taken: 1min**
    - b. **Notable Remarks+ Comments**

Participant Comments: Filter button was hard to see. Filter button does not look like a filter.
Observation: It took a long time for the participant to realize that the filter button is clickable.

- **Find all shipped parcels?**
    a. **Time Taken: 8s**
    b. **Notable Remarks+ Comments**

Participant Comments: Same as 4.

- **Find all parcels from Amazon?**
    a. **Time Taken: 15s**
    b. **Notable Remarks+ Comments**

Participant Comments: Difficulty of this step is okay.
Observation: It did not take long for the participant to find where to filter the companies.

- **Find all parcels from Apple?**
    a. **Time Taken: 5s**
    b. **Notable Remarks+ Comments**

Participant Comments: Same as 6.

Add Function

GENERAL NOTE:

1. **Add Nike account?**
    a. **Time Taken: 33s**
    b. **Notable Remarks+ Comments**

Participant Comments: There should be a way to add individual packages. (After showing the packages in the accounts, the user should be able to choose which ones to add)
Observation: Overall the steps are quite intuitive to the participant, not much difficulty was encountered.

2. **Add Walmart account?**
    a. **Time Taken: 11s(Error)**
    b. **Notable Remarks+ Comments**

Participant Comments: Okay.

3. **Add a parcel?**
    a. **Time Taken: 24s**
    b. **Notable Remarks+ Comments**

Participant Comments: Fairly convenient. Labels beside the radio button for adding account and package should be "add packages by account" and "add packages by tracking number".
Observation: Fairly smooth, did not take too much effort for the participant to do this step.

Delete Function

GENERAL NOTE:

1. **Delete chips?**
     a. **Time Taken: 12s**
     b. **Notable Remarks+ Comments**
Participant Comments Very convenient.

2. **Delete shoes and chips?**
     a. **Time Taken: 53s**
     b. **Notable Remarks+ Comments**

Participant Comments: Did not know what to do at first, after playing around with multiple buttons finally realized that the "manage" button was what needs to be clicked.
Observation: It took the participant a long time to realize that the deleting multiple items function is invoked by the "manage" button.

Post-Questionnaire
https://forms.gle/RZJXAYHejS3KNir59
- Rate of experience with Track Function(1-5) and reason(s): 3
  Functional but with some little bugs. Overall not very good looking.
- Rate of experience with Add Function(1-5) and reason(s): 3
  A little complex.
- Rate of experience with Delete Function(1-5) and reason(s): 5
  Very good.

Interview Data Sheet - User 6
Pre-Questionnaire
https://forms.gle/nryiRycaWeJMfpzv6

Participant name: User 6
- Age: 21
- Major of study: Computer Science
- How good are you with using internet? (1-5): 5
- How familiar are you with online shopping? (1-5): 4
- How often do you do online shopping? (option 1-3): 1

Direct Observation
Track Function

GENERAL NOTE:

1. **Find the latest update of the tracking of iPhone?**
    a. **Time Taken: 10:26**
    b. **Notable Remarks+ Comments**
- Start at home page
- Click on "detail" link of iPhone (hesitate for a couple seconds)

2. **Find the current location of shoes?**
    a. **Time Taken: 06:87**
    b. **Notable Remarks+ Comments**
- Start at home page
- Click on "detail" link of shoes (learn from the last task?)
- Click check delivery map

3. **Find the tracking history of chips?**
    a. **Time Taken: 06.53**
    b. **Notable Remarks+ Comments**
- Start at home page
- Click on "detail" link of chips (learn from the first task)

4. **Find all delivered parcels?**
    a. **Time Taken: 10.26**
    b. **Notable Remarks+ Comments**

- Start at home page
- Hover through Manage button, then click the drop down menu beside "All"
- Click the drop down icon again to exit drop down menu
- Click filter icon + select "delivered"

5. **Find all shipped parcels?**
   a. **Time Taken: 04.95**
   b. **Notable Remarks+ Comments**
- Start at home page
- Click filter icon + select "shipped" (learn from the last task)

6. **Find all parcels from Amazon?**
   a. **Time Taken: 07.01**
   b. **Notable Remarks+ Comments**
- Start at home page
- Click the drop down menu beside "All"
- Select "Amazon"

7. **Find all parcels from Apple?**
   a. **Time Taken:05.66**
   b. **Notable Remarks+ Comments**
- Start at home page
- Click the drop down menu beside "All"
- Select "Apple" (learn from the last task)

Add Function

GENERAL NOTE:

1. **Add Nike account?**
   a. **Time Taken: 22.61**
   b. **Notable Remarks+ Comments**
- Start at Add page
- Select Add Account
- Click on search bar+select Nike
- Click Next (hesitate for couple seconds)
- Click Add All Recent Orders from Nike

2. Add Walmart account?
   a. Time Taken:12.78
   b. Notable Remarks+ Comments
- Start at Add page
- Select Add Account
- Click on search bar+select Walmart
- Click Next
- See error message

3. Add a parcel?
   a. Time Taken:10.40
   b. Notable Remarks+ Comments
- Start at Add page
- Select Add Package(s)
- Click Next
- Click Add Package

Delete Function

GENERAL NOTE:

1. Delete chips?
   a. Time Taken: 20.66
   b. Notable Remarks+ Comments
- Start at home page
- Go to Add page
- Go back to home page
- Try to delete chips under manage mode
- Exit manage mode
- Go to detail page of chips+click delete
- Click Yes of confirmation window

2. Delete shoes and chips?
   a. Time Taken: 11.73
   b. Notable Remarks+ Comments
- Start at home page
- Enter manage mode
- Select shoes and chip

- Click delete selected items
- Click Yes of confirmation window

Post-Questionnaire

https://forms.gle/RZJXAYHejS3KNir59

- Rate of experience with Track Function(1-5) and reason(s): 5
  The tracking is very straight-forward, easy to use and can be reached with a very few number of clicks. All the information is displayed clearly and it's easy to read. The ability to filter based on tracking status and shopping site is very useful.
- Rate of experience with Add Function(1-5) and reason(s): 5
  The add function is not complex, the information you are asked to enter is very straightforward (similar to what you'd be asked to enter in any online shopping site). There aren't too many clicks needed to accomplish the task. Adding multiple packages at once for a single shopping account is very useful.
- Rate of experience with Delete Function(1-5) and reason(s): 4
  Overall, the delete function was well done! Got a bit confused when trying to delete a single item through the "Manage" function. Giving the user the ability to delete multiple items at a time is very handy and efficient. But allowing them to delete an item while on the tracking page provides added flexibility too.