Easy Food Share

ITIS6400 - Human Centric Interaction | Group 12: P3 Final Report

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Introduction

In today's world, a lot of decisions are made based on analyzing predictions. For example, a restaurant owner predicts the amount of food to be prepared to serve the customers for the day depending on whether the day is a weekday, weekend or holiday. But sometimes due to unpredictable circumstances, for example, a massive change in weather or any event involving the cancellation of orders by a customer can lead to wastage of food prepared by the cooks and chefs by trashing the excessive food items. This trashing does no good for both humans and the environment, on the contrary, it gives rise to wastage of food. So we decided to encounter this problem by developing an application which combines the people who need food- the Consumer (for example, people who can't afford food, poor or homeless people, people living on budgets like a student), people who can donate food- the Producer (for example, restaurant owners or food providers) and people who can act as a volunteer between the Consumer and the Producer like NGOs, all under one umbrella. The application will provide a common interface for all producers, consumers, and volunteer to manage the availability, listing, and logistics of food item so that the consumers can be ensured of easy and efficient means of obtaining food from the right producers and volunteers and satisfy their hunger needs. It is dependent on the producers to provide the food either for free or for a minimal charge.

Problem statement

Our primary motto is to help people who can't afford food, poor or homeless people getting proper and viable access to free food or availing food at a minimal cost so that they can satisfy their hunger. This, in turn, will help us to reduce the food wastage in different restaurants and other locations by re-utilizing the same food. By trashing the unspoiled food, we don't know if the trash management company employs any policy to differentiate and process trash related to food items, thereby, increasing the overhead operational cost as well as an increase in landfills. We aim to establish a community of food banks and associated people by bringing them under one umbrella and establishing a common channel between them to manage the excess food, to reduce food wastage, to ensure that the food is accessed by people in dire need, and to contribute a small effort towards the betterment of humanity.

Design goals

- The users/ consumer should be able to quickly choose the type and select available free food located within minimum distance shown or to opt for delivery option for food.
- The consumers can rate the food provider and the quality of food by rating system with minimal ambiguity.
- The donators or producers should be able to upload details of excess food without any hurdle.
- The volunteers should be able to choose whether they want to help financially, packing or delivering food item.

Usability goals

- **Learnability:** The user should be able to learn or understand based on text or description as to what (s)he is expected to do.

- **Efficiency**: Once the user has learned to operate one option, (s)he should be able to operate the working of another option quickly without putting a lot of thinking when performing actions.
- **Memorability**: The user should be able to remember the interfaces so that even if the functionality is different the interface should remain same.
- **Errors:** There should be minimum number of errors faced during the operation of the application and the severity of error if any faced should be minimum. The impact of the error should not disturb the overall navigation.
- **Satisfaction:** We are aiming a high satisfaction level from users and we hope to cater most of the needs while keeping the user satisfied.

Design Rationale

Demo link: https://pr.to/EDWGKC/

- The best conceptual design which satisfies our design and usability goals is a mobile application. Smartphones are always readily available on the go and requires a cheaper setup cost. Many users are already familiar with the instruction set of the smartphone, thereby minimal or no training required to use the application.
- A user will not require to re-login if (s)he has already logged-in once on the device, improving the efficiency in usage and saving time.
- Since each step in each feature has its own screen, the user has the utmost flexibility to go to the previous step to make any corrections.
- The mobile application can be made for both iOS devices and Android devices, thereby ensuring the application remains a cross platform and it proves to be highly portable in case a user decides to switch from Android to iOS or vice-versa.
- A mobile application can take other forms of cognitive input, for example, voice enabled input to fill out the details of food item or search for location.
- A user can easily turn on the GPS of his/her mobile phone (if not in use already) to locate the nearest food provider, to calculate the time required to reach a food provider.
- A rating system to rate the food and service will act as a feedback system, boosting the morality of producers as well as identify and analyze the trends involving food item to improve the services. The last step also asks the user to
- Only a mobile application will allow the user/ donator to take photo of food and upload quickly. A mobile's camera will aid in taking good resolution pictures for the user to select the food.
- A volunteer can choose the precise option (s)he wants to choose from the type of volunteering.

Design Description

Screen Navigation Overview

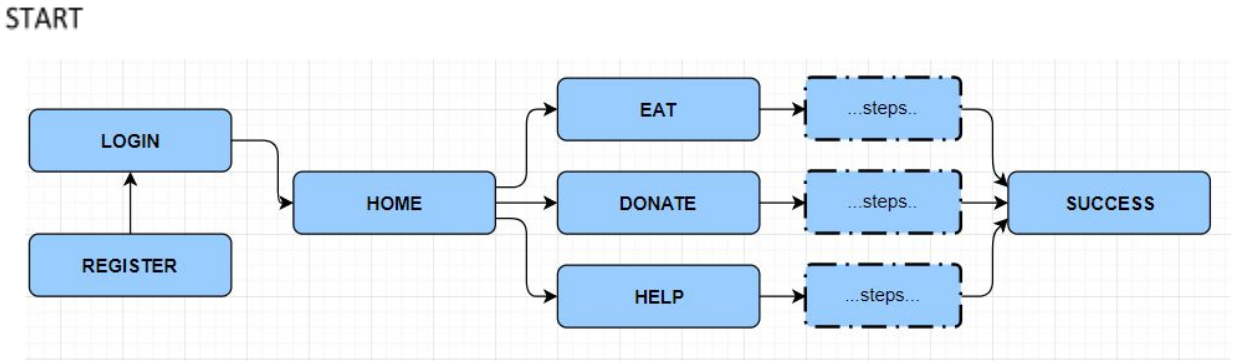

Figure 1

UI Screens and navigation

The following images of different screens provide information about the features and other functionalities of the application and each image designed according to our design goals. To maintain the consistency here we used a single column grid structure, and we used the same typography, color, and contrast themes, as well as incorporating positioning and hierarchy guidelines for the information on the page. We incorporated the logo and the name of application in maximum possible pages. All the buttons used throughout the application have a follow a single-color code and shape to remain at par with design and usability goal. And when the user is on the home page the possible options are arranged with one-line description in such a way that a user can easily understand when he selects the desired option.

Login and Signup Screens

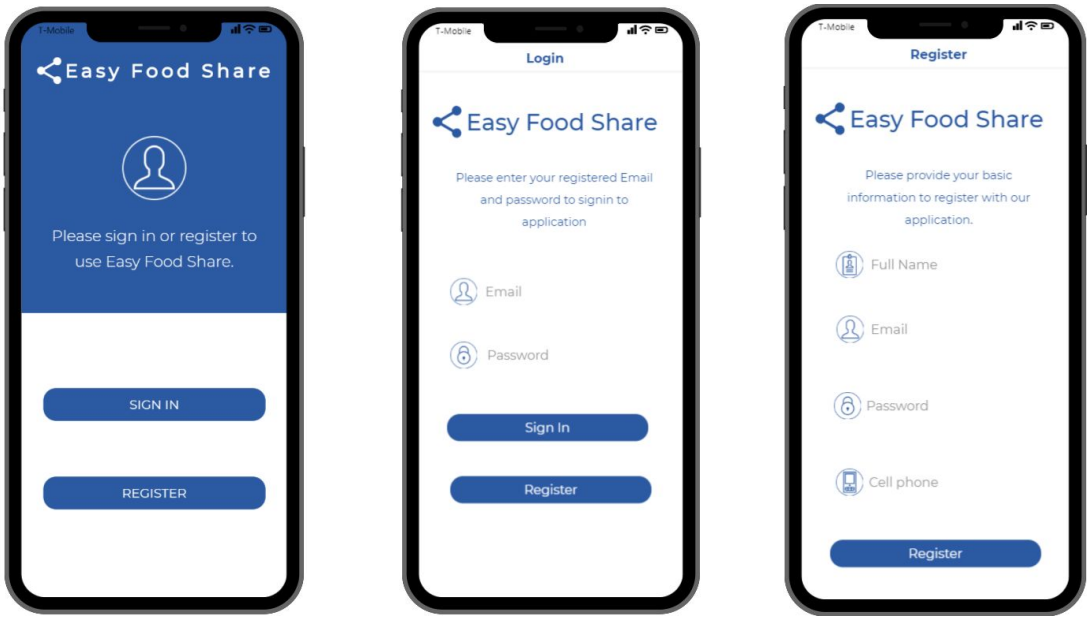

Figure 2

The above screens show the UI layouts when the user opens the app for the first time. The option to register is present on both landing page as well as Sign-in page. The app is common for all the users so the login and sign up pages are also common.

Home Screen

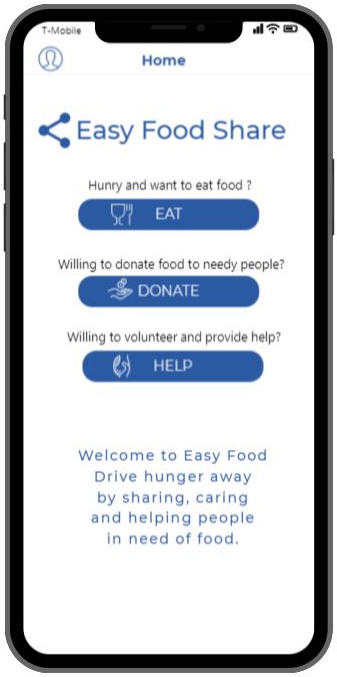

Figure 3

The home screen is presented after the user signs in. This page allows the user to select one option out of the 3 options listed. Each option has a one-line description associated with it. Each option is a button, which navigates to its own step 2 screen respectively.

Eat Option

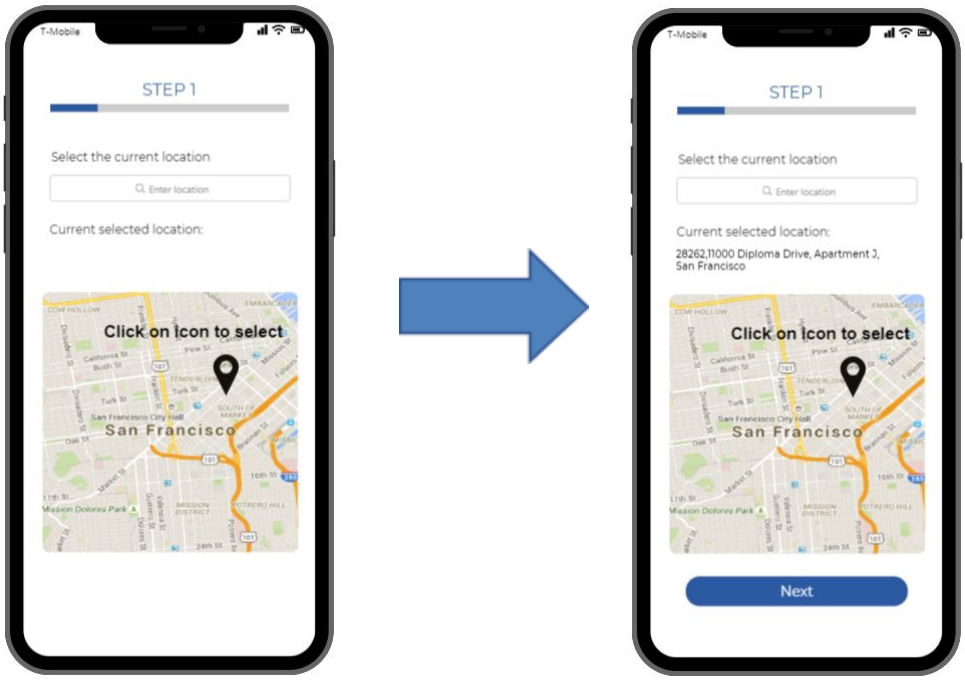

Figure 4

This screen is the step-1 screen for both Eat option and Donate option. This screen allows the user to select the location and proceed towards next step by clicking ‘Next’ button.

EAT Option- Step 2 screen

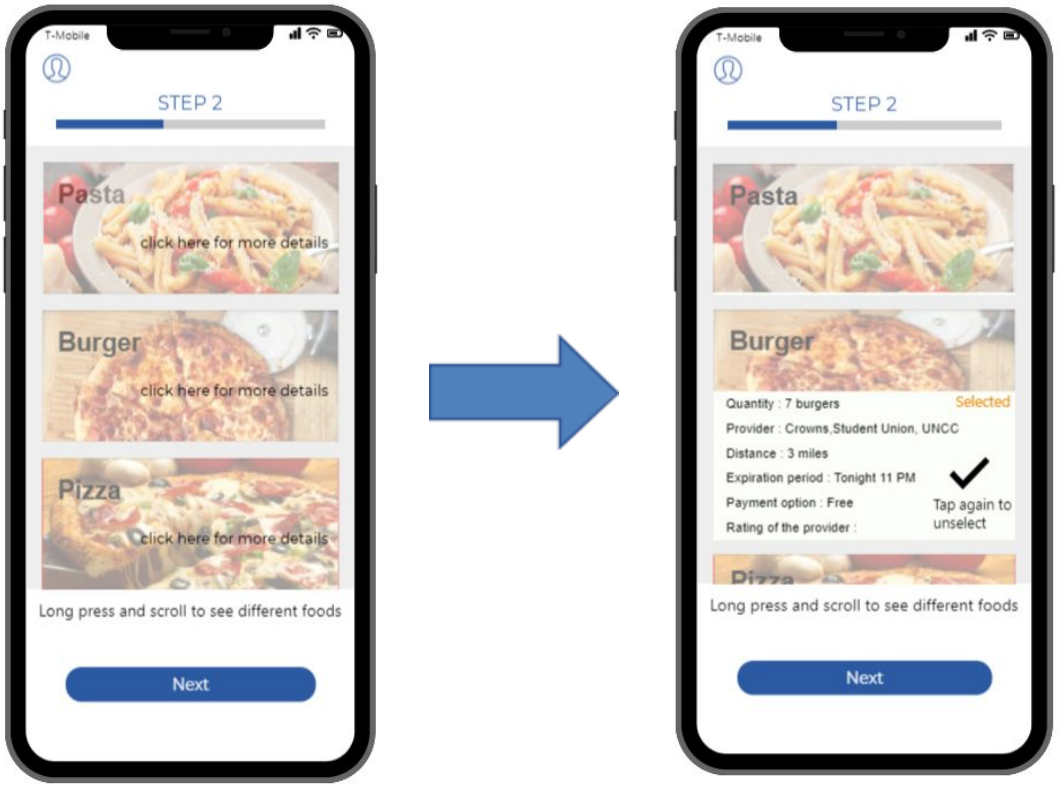

Figure 5

The Eat option shows the type of food items available for the user to select. The user needs to drag upwards to see the remaining options. To select a food type, the user needs to tap on the type of food item and the details will be shown in a small box. The user needs to click on 'Next' button to proceed.

Eat option- Step 3 screen

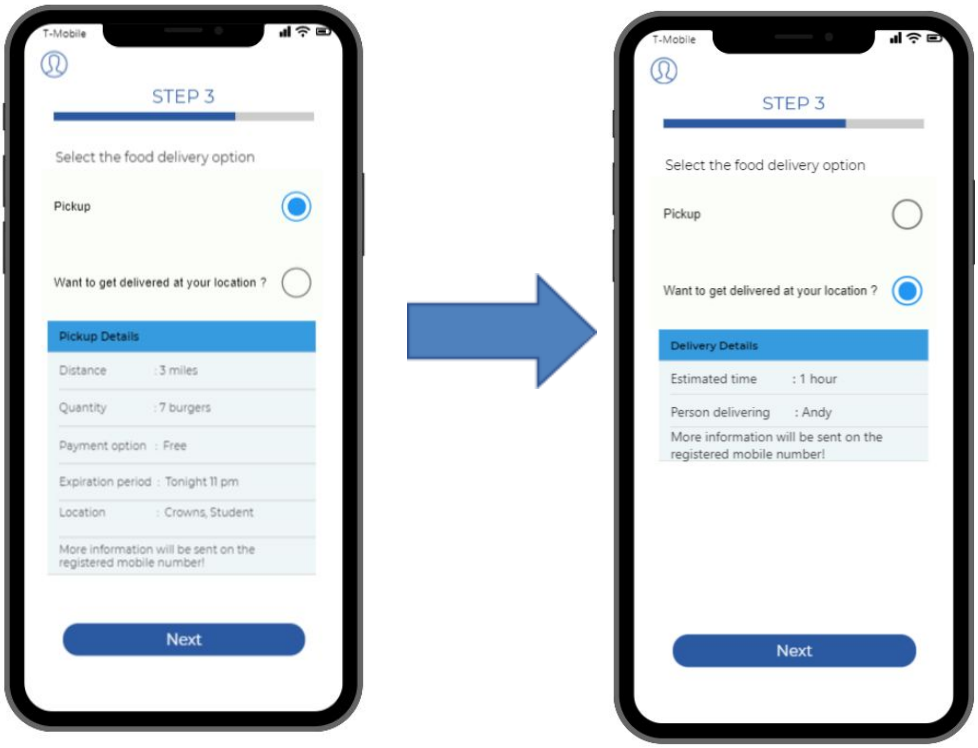

Figure 6

This screen allows the type of food delivery a user wants to select. The choice is designed by radio button. The pickup option details or the delivery details are shown in blue box below, changing according to the radio button selected by the user.

Donate option- Step 2

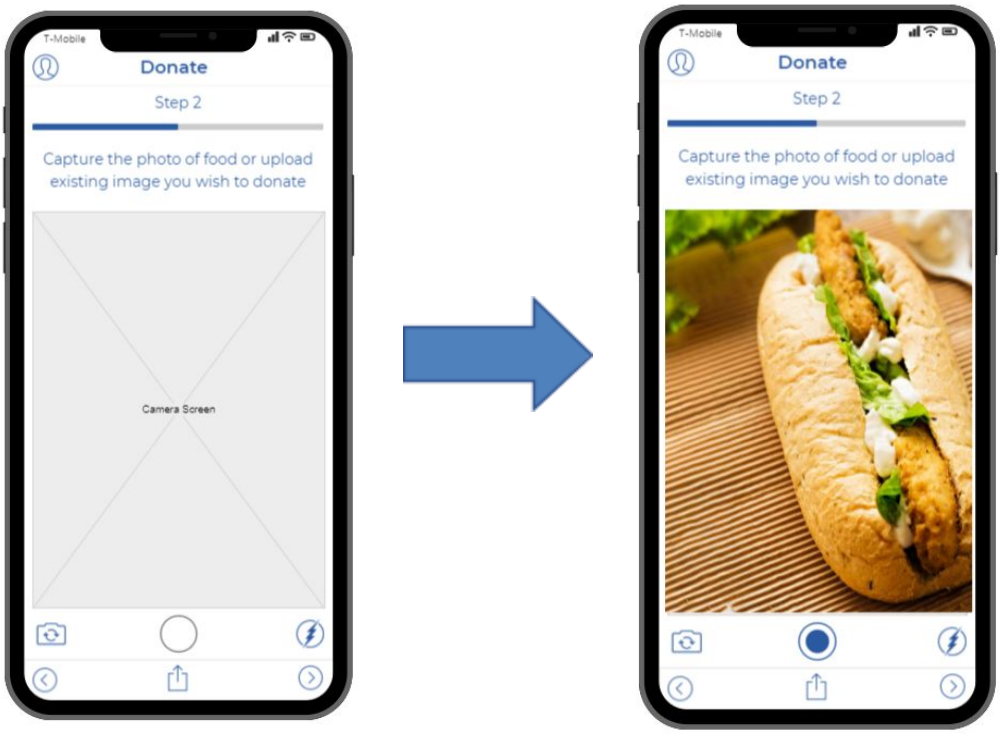

Figure 7

This screen is shown when the user chooses the Donate option. After selecting the location (quote figure number) the device camera can snap the photo of the food item the device is pointed at. The camera UI is similar to the default UI of almost all mobile camera-based devices.

Donate Step 3

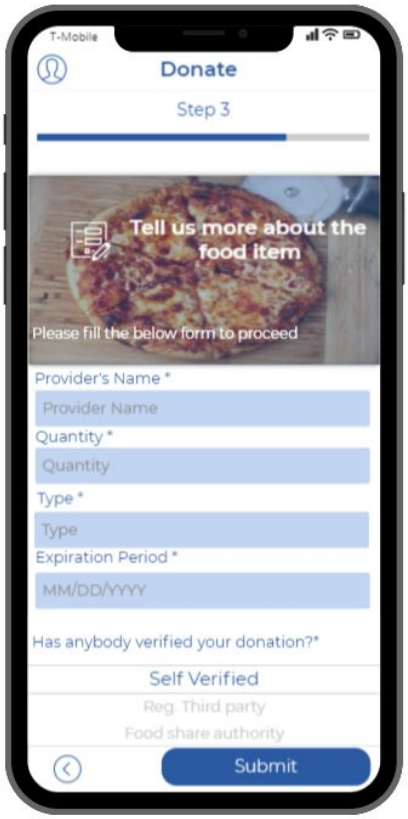

Figure 8

This option shows the step 3 screen once donate option is selected. The user is asked to fill the details of food such as Provider's name, Quantity of available food item Expiration period of the food item and details of verification of donation item. User can click 'Submit' button once completed to proceed further.

Help option

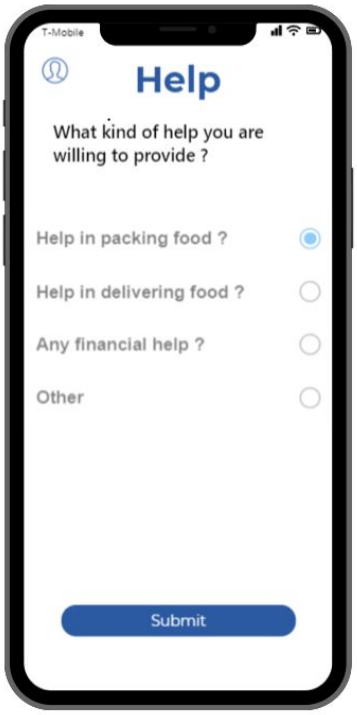

Figure 9

This screen shows the UI when the user selects Help option. The screen shows options to choose the type of help. The screen has radio buttons listed to enforce only one option.

EVALUATION METHODOLOGY

Hypothesis for evaluation

Once completing our initial solution prototype, we created a set of hypotheses before taking our prototype through any type of structured evaluation activities. Hypotheses would help us to keep our evaluations and resulting design changes closely tied to the desired usability goals and design goals which we have identified for our project. This is a very important factor for our team to ensure that this solution would be adoptable and provides value for the Easy Food Share system and must be able to deliver on the usability and design goals that we have found out during our need finding process.

The hypothesis which we came up is: Our application should be understandable, simple reachable for all kinds of people to improve the community spirit of food sharing and food donation.

How the participants were chosen and interviewed?

We chose a restaurant manager, a homemaker, a chef, NGO member and few students to conduct the usability study. We also asked our friends in student community to behave as a poor person or as a restaurant manager to carry out this study. Overall 10 users participated in this study and

they all were able to complete the evaluation successfully. We conducted the interviews based on scheduled time and place of convenience. For example, we went to food dining service provider in our university to conduct interviews from restaurant manager and chef, we interviewed a neighbour who is a homemaker, we scheduled an interview with one of the NGO member who was kind enough to come to university, and we interviewed few students in university library.

Apart from the cognitive walkthrough, we used both interview and participant observation methodology, followed by series of open-ended and close- ended questions to all the participants. We examined the end user reactions while performing tasks and noted down the list of problem areas they chose to discuss openly. We kept count of user metrics based on time, taps and error rate and measured it for each task. We interviewed each user after they performed tasks, asked open ended questions and took note of it, questions like how did they find the overall application usage, how satisfied they were while using the application, how did they find the UI screens, their reviews about the color scheme, what changes and new features would they like to be included in future versions etc. After open-ended questions, we asked them scale based questions once they had finished executing the tasks, and took note of their responses.

Tasks Chosen

Below tasks were given to the users to conduct the usability testing

a. Find a food item to eat.
b. Add a food item to donate.
c. Find out how you can volunteer yourself.

Planned Measurements and Metrics

To evaluate the tasks in cognitive evaluation, we defined 2 metrics to quantitatively analyze the result: Success rate and Error rate. We define success rate as the percentage of people who were able to perform a task successfully without any errors. We define error rate as the percentage of people who completed a task with errors.

Also, we asked the participants to rate their experience on a scale of 1-5 based on below factors:

a. How easy was the application to use?
b. How effective and efficient did you find to use the application?
c. How would you rate the visibility of the features throughout the application?
d. How easy was it for you to learn the application?

We measured and calculated the time taken by the users and the number of taps to complete the tasks.

Discount Evaluation

We have utilized two discount evaluation techniques: cognitive walkthrough and heuristic evaluation. We concluded that these 2 techniques would help us to best understand behavior, experience, problems if any faced by user. Also, heuristic evaluation will enable us to classify design flaws that might impact usability, allowing us to correct them in the next version.

Cognitive Walkthrough

The first type of discount evaluation which we performed was cognitive walkthrough on the mobile application. To achieve the walkthrough, we identified 3 tasks to evaluate from the perspective of the user, as well as set of questions to answer related to each task:

Task 1: User wants to avail the eat option to eat food

• ***Will the user know what to do to achieve the task?***

Yes, it's the first option on home page after user logs into application. The user will know that they must tap on 'EAT' in order to access it.

• ***Will the user notice that the correct action is available? Do they see a button or menu item that they should use for the next action?***

Yes. All the available options have one-line description written above it which helps user to identify the correct action. They will see a blue button named 'EAT' with logo making the user understand that this is the correct option.

• ***Once found, will they know it is the right one for the desired effects?***

Yes. The user will know it is the right option since it is the only one option that says, 'EAT'.

• ***Will the user associate and interpret the response from the action correctly? Will users know from the feedback that they have made a correct or incorrect choice of action?***

Yes. When user taps 'EAT', the next screen will show the next step which asks the user to select his/her current location by entering the name of place. After the details of location appear on screen, the 'Next' button is activated. This lets them know that the user will be able to proceed to next step only after providing location.

Task 2: A person wants to upload the photo of a food item he wants to donate to the needy people

• ***Will the user know what to do to achieve the task?***
Yes. After he taps on 'DONATE' button, and selecting his/her location, he will be able to see the Step 2 screen which allows the user to capture the photo of food item (s)he is willing to share.

• ***Will the user notice that the correct action is available? Do they see a button or menu item that they should use for the next action?***

Yes. On the screen showing step 2, the user needs to tap the circular shaped icon to snap the photo using mobile camera.

• ***Once found, will they know it is the right one for the desired effects?***

Yes. The user will know it is the right option since this screen has an almost similar looking interface when a user snaps a photo using the in-built camera application of his mobile.

• ***Will the user associate and interpret the response from the action correctly? Will users know from the feedback that they have made a correct or incorrect choice of action?***

Yes. After tapping the circular shaped icon, the mobile will capture the photo of the food item the device was pointed at.

Task 3: A person wants to volunteer towards the cause

• Will the user know what to do to achieve the task?

Yes. After login, he can tap on 'HELP' button which is provided as the third option on the homepage.

• Will the user notice that the correct action is available? Do they see a button or menu item that they should use for the next action?

Yes. All the available options have one-line description written above it which helps user to identify the correct action. They will see a blue button named 'HELP' with logo making the user understand that this is the correct option.

• Once found, will they know it is the right one for the desired effects?

Yes. The user will know it is the right option to tap since it is unique in nature.

• Will the user associate and interpret the response from the action correctly? Will users know from the feedback that they have made a correct or incorrect choice of action?

Yes. After tapping on the button, the user will be presented with a question and list of options as radio button. Once a radio button is selected, the 'Submit' button is already enabled to take him to the next step.

Heuristic Evaluation

After the cognitive walkthrough, we took feedback in the form of comments, suggestions, potential improvements from the users who used the prototype. Below we have summarized the result table containing heuristic the feedback violates, feedback classified according to the UI screen in the application and rated each feedback according to the severity level as mentioned below.

1. Not a problem
2. Cosmetic issue, only fixed if extra time
3. Minor usability problem, low priority
4. Major usability problem, high priority
5. Usability catastrophe, must be fixed

Heuristic Violated	Feedback/ comment/ suggestion/ improvements	Rate of severity
On Landing page		

Match between system and the real world	A picture depicting food can be shown instead of human logo icon	2
Match between system and the real world	Shift the sign in, register button towards bottom of the screen placed side by side.	2
Aesthetic and minimalist design	Sign in, Register buttons are too big.	3
On Register page		
User control and freedom	Absence of icon or button to go back to landing page	3
EAT Option- STEP 2 screen		
Flexibility and efficiency of use	The food items pictures can be made more visible when that food item is selected.	3
Consistency and standards	The text 'Click here for more details' can be shifted more towards lower right side with decrease in font size.	2
Error prevention	Modify text 'Long press and scroll to see different foods' to 'Drag screen upwards' to remove scrolling confusion.	4
EAT Option- STEP 4 screen		
Match between system and the real world	Increase in font size to make the rating number more visible	3
Recognition rather than recall	Logo/ icon used on 'submit' button not understandable	3
DONATE option- STEP 3 screen		
Visibility of system status	Options for question 'Has anybody verified your donation?', when scrolled up, the text does not correctly overlap with the text of question making it unclear.	3
For All pages		
Flexibility and efficiency of use	Home button to be placed in each screen	4

Changes Incorporated after Heuristic Evaluation

After completing heuristic evaluation, based on the user feedback, we did some modifications to alignment of buttons and improving their working based on the tap action.

Evaluation Results and Implications

The table below summarizes a quantitative result for number of taps and the time taken to complete the tasks.

Task	Task Description	Average taps	Median taps	Average time (seconds)	Median time	Error rate

					(seconds)	
1.	Find a food item to eat.	5.5	5	30	28.03	13%
2.	Add a food item to donate.	7.7	6.9	29.78	29	21%
3.	Find out how you can volunteer yourself.	4.2	4	8.96	8	2%

Table 1

Below we have plotted a box plot depicting the results for time taken and number of taps taken by the user.

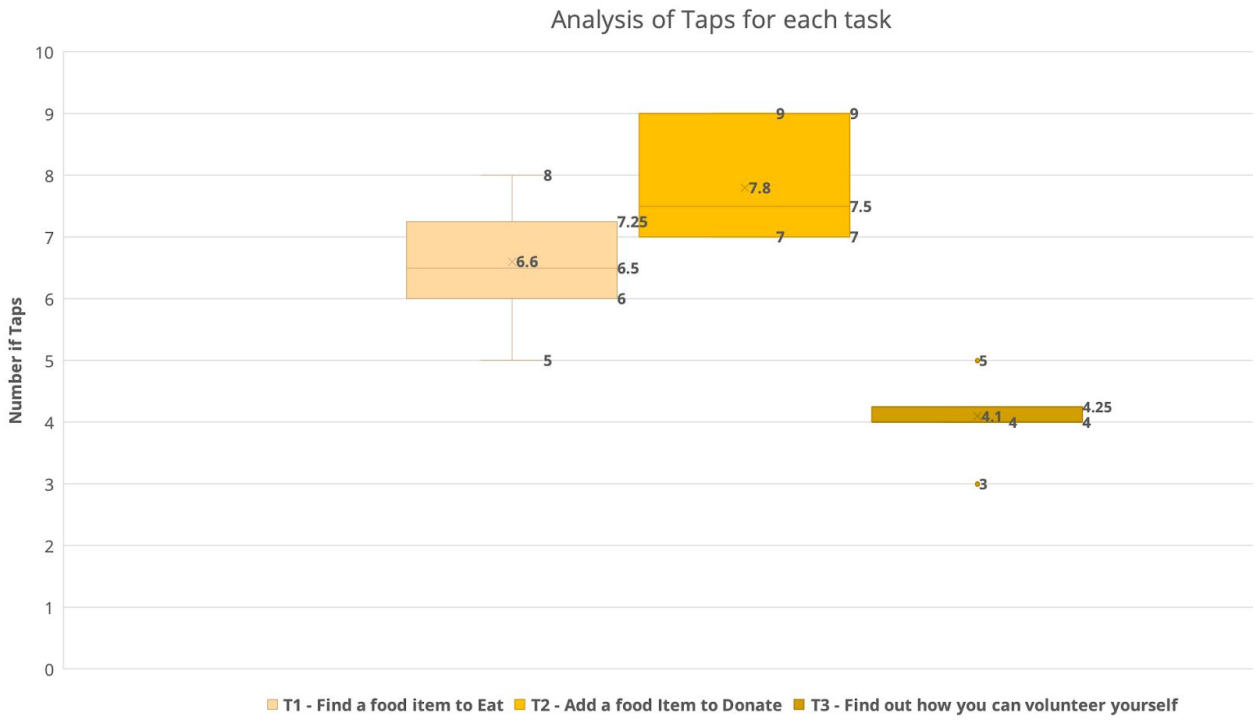

Figure 10

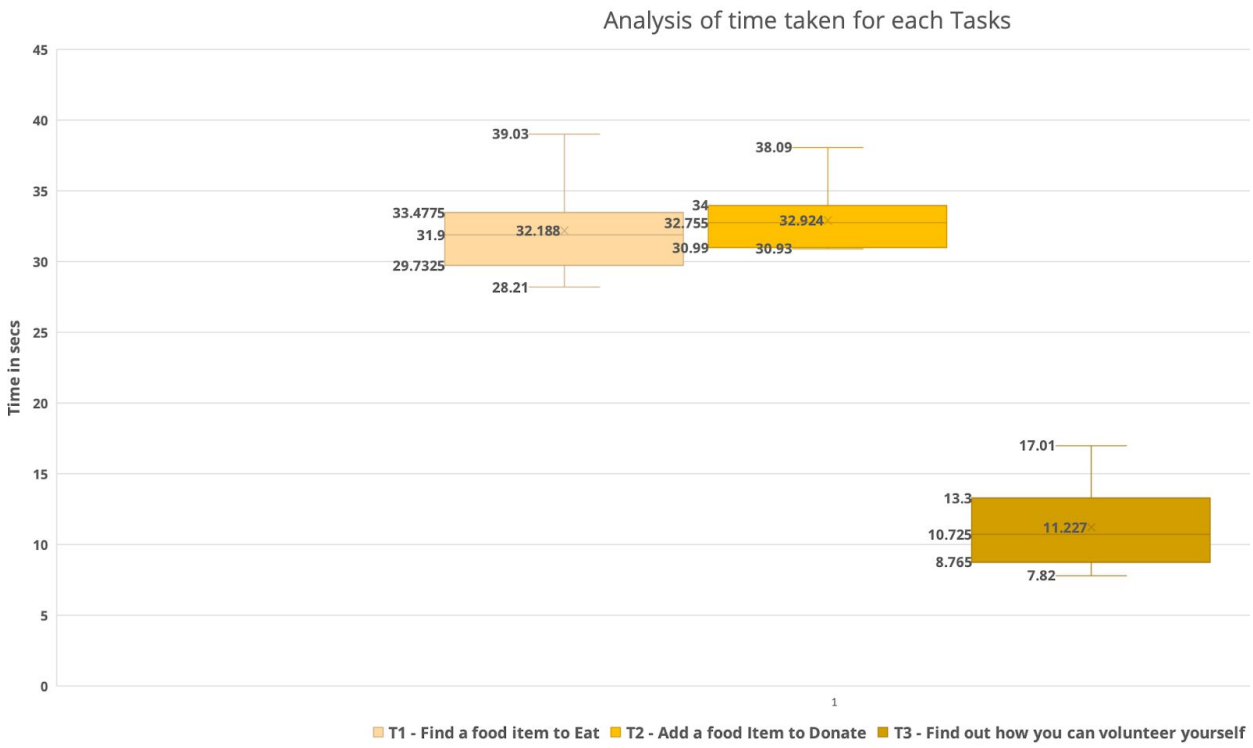

Figure 11

The first 3 pie-charts present the results of User Evaluation for each task expressed in terms of success rate and error rate. For the task-1, the error rate was primarily due to the user not able to scroll properly in the screen. The error rate for task 2 was primarily due to the inconvenience faced by user to select the answer for the question asked in step-3 screen. Task-3 had the minimal error rate since the help option was easily available and the users did not face any issue in choosing and selecting the options available on the screen. We can interpret that the efficiency in completing a task correctly was 87% which is not bad keeping in mind this was the first prototype created. We can improve the efficiency with future versions once all the feedback has been implemented.

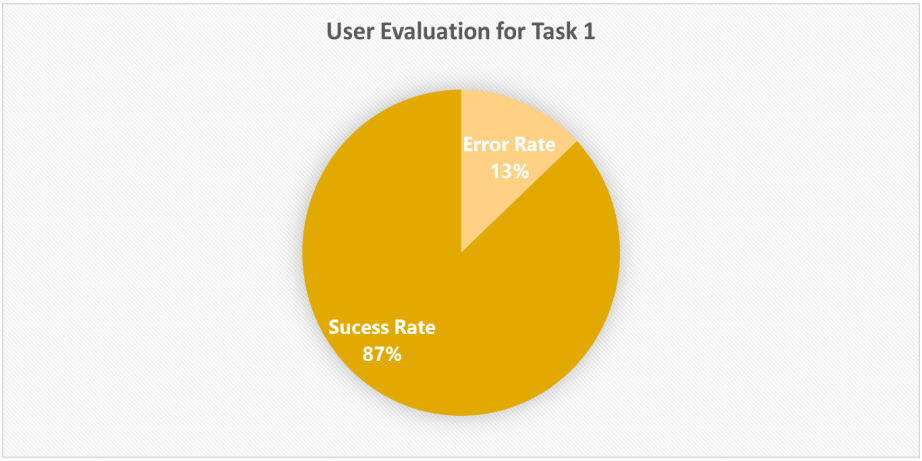

Figure 12

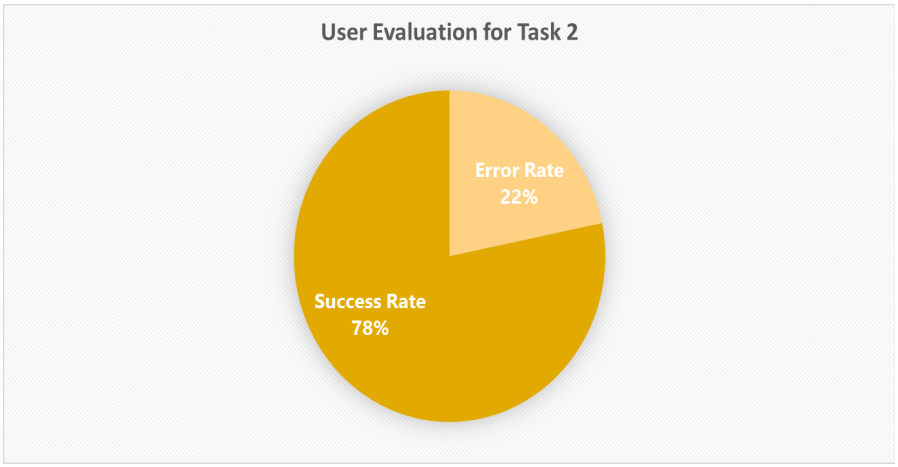

Figure 13

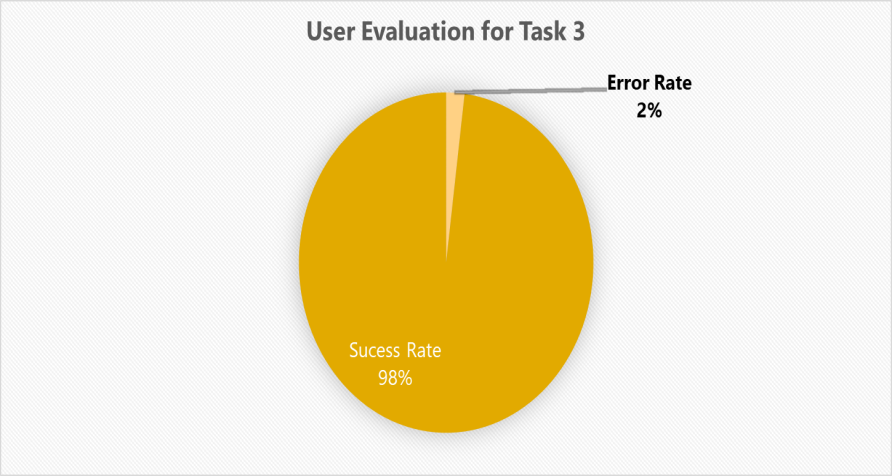

Figure 14

The below figure shows the summary results of Heuristic Evaluation plotted as a bar graph between the number of feedback responses recorded and the Rate of Severity rated in heuristic evaluation. As we can see most of the responses prove to be a minor usability problem, which satisfies closely our usability goal of minimum errors recorded while creating a high satisfaction level.

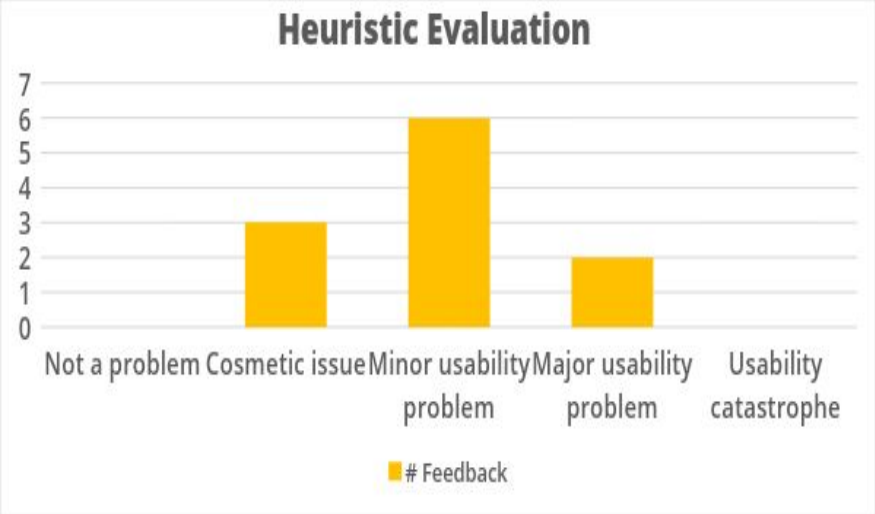

Figure 15

Below we have plotted a bar graph to measure the average rate of feedback out of 5 against the type of measure. As we can see in the bar graph, the highest average has been recorded for the measure ‘Easy to Learn’ which ties with our usability goal learnability.

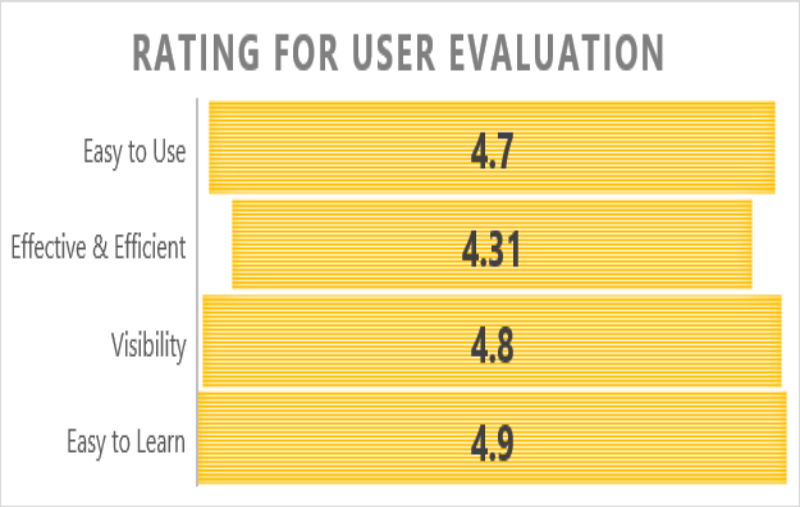

Figure 16

Based on the feedback responses received, we plotted a graph between the number of users who were interested in either functional improvements or interface improvements. We can find most of the users wanted improvements in interface which signifies that there may be some incompleteness between the navigation flow which can be improved later.

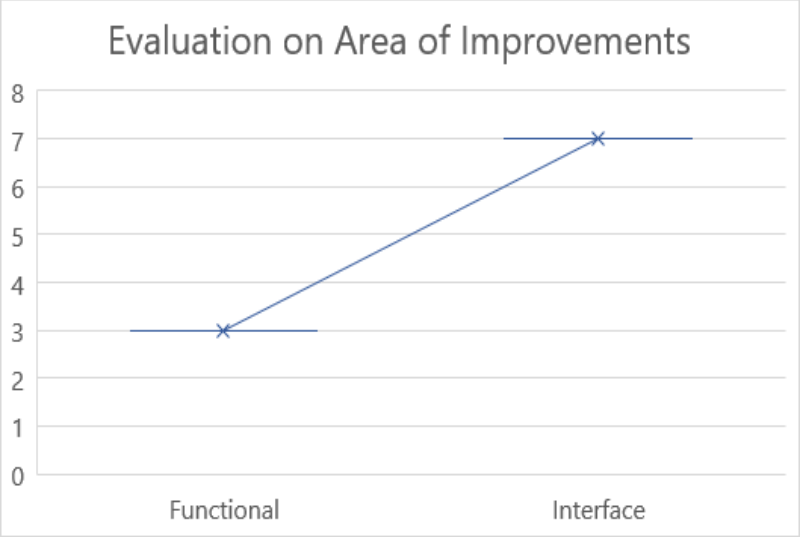

Figure 17

Evaluation conclusion and next steps

Analysis of the evaluation results has helped to determine our commitment towards the usability goals and design goals. It can be implicated that the interfaces were implemented and given to different users for evaluation. The analysis provided for different solutions provided in terms of "easy food share app" focuses towards a simple design, improving efficiency of the existing process and providing a helping hand towards the society to solve the problem of poor people

using technology. Therefore, to conclude, below are the design and usability goals which were initially focused upon and its status currently:

Usability goals

- Learnability: **Strongly supports**
- Efficiency: **Strongly supports**
- Memorability: **Strongly supports**
- Errors: **Strongly supports**
- Satisfaction: **Strongly supports**

Design goals

- The users/ consumer should be able to quickly choose the type and select available free food located within minimum distance shown or to opt for delivery option for food - **Strongly supports**
- The consumers can rate the food provider and the quality of food by rating system with minimal ambiguity - **Strongly supports**
- The donators or producers should be able to upload details of excess food without any hurdle - **Strongly supports**
- The volunteers should be able to choose whether they want to help financially, packing or delivering food item - **Strongly supports**

The evaluation results shown above provides a strong support towards the given usability and design goals. Reviewing the scale based open ended questions, we were able to conclude that there are some features which needs to be re-factored in terms of visibility in the interface and some part of functionality. During the re-factoring, we focused on improving the missing functionality and visibility of some features. For example, we added the option for the user to provide the food type while donating a food item. This will help to synchronize the process where a user who wants to eat the food has been given option to select different food based on the type provided in the list scrollable view. Regarding the visibility of some features, we changed the food items list view allowing the user to tap on the image to see more information.
Along with, we have listed out some of the future enhancements based on the evaluation results which needs to be achieved.

Following is the list of features which needs some improvements in order to increase the reachability towards good user experience.

- Increasing the font size on EAT option-step 4 to make the rating more visible.
- Donate option-step 4, the scroll list for ‘Has anybody verified your donation’ overlap the other input fields which should be fixed.
- Shifting the sign and register button towards bottom of the screen place side by side in the landing screen.
- EAT option - step 2, the food items pictures can be made more visible when the food item is selected.

Therefore, our results and observation tasks strongly support the utility and value that out solution provides, when evaluated against our given usability and design goals. Thereby, we believe this solution could primarily be used for the people who are hunting for food in free or at an affordable cost in order to save the food waste.