University of Southern California
CSCI 588 - Specification and Design of
User Interface Software

Intelligent Multi Chain Retail Shopping Assistant

Assigned Team Number : 13

Project status change:
Nothing has changed from our original proposal.
Yes, we have finished all the targeted tasks as in our original project proposal.

Team Members:	Last Four Digits of USC ID
Gaurav Shenoy	6699
Presha Thakkar	3417
Pramod Nagarajarao	9300

1. Project objectives

To explore the integration of NLP/AI agent in a classical User Interface to enhance user experience.

2. Problem statement

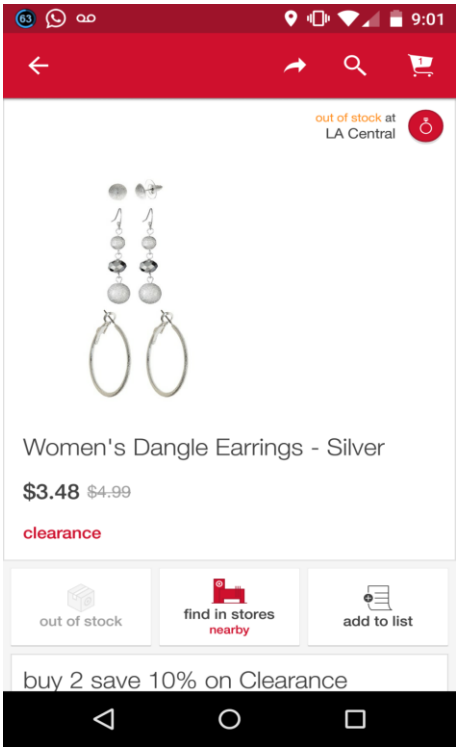
To build a prototype of a mobile application for multi chain retail brand which has a NLP/AI agent which would learn from customer interaction and provide a customized user experience. The application would track the user activities and would provide user with suggestions corresponding to his requirements.

3. System analysis, design, and development

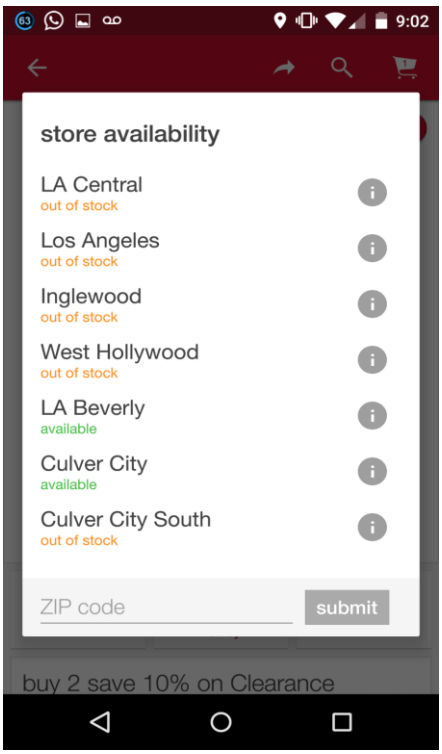
3.1. System Analysis

3.1.1 Existing System Study

Forever21: The app doesn't show the items which are available in the nearest stores in the first go. The user first chooses the item he/she wants to shop, then an option of choosing a store comes up. In most of the cases, the Item the user wants to shop won't be available in the store near them and requires the user manually go through each and every store and check if the item to be shopped is available or not. An overhead to the User in terms of memory load is present in this feature. In the application we have designed, the user's frequently visited stores and nearest location captured by the Global positioning system (GPS) of the mobile is taken into account and then list the items present correspondingly.



Target Corporation: In this app the items the user wants to shop can be realized by an online option and an purchase in a store option. When the user chooses "Purchase in store" option, a list of stores is rendered in the UI. The problem associated with this is, it is not sorted according to the store nearest to the user. The user manually has to scan each and every store, check the item is present or out of stock and then make a final payment. The above mentioned feature has an overhead associated with it. In the app we are designing, the user will be presented with the stores nearest to him and also the user's most frequently visited store is presented.



3.1.2 Problem and weaknesses of the current systems.

Out of the vast majority of the apps that are there in the market including the ones explained above has some of the features which doesn't uphold the eight UI design golden rules. The problems and its weaknesses are explained as below:

1. Most of the apps which has online shopping and store shopping options does not filter the items which are available or not. User after navigating from selecting an item to the page where an option to choose the item from various locations is done, the list presented is not sorted and presented according to a combination of user's most frequently visited store and stores physically nearest to him.
2. The user has come to look into stores just to check whether the item is present in that chosen store or not manually. It increases the load of memory of the user's using the app which is against the 8 User Interface golden rules.

3. Most of the current app's doesn't have personalized recommendation system in place. There is a unique and simplistic way of presenting the personalized data to the user which can enrich the shopping and user experience.

3.1.3 Proposed New System

In "Intelligent multi chain retail shopping assistant" app, the drawbacks present in the apps that are currently in the market and also the apps presented above has been overcome by giving out new features as explained below:

1. Using "KRUG", the NLP/AI agent present in our system would have data about the user shopping behavior helps in easy navigation from the time the user chooses an item/'s to shop to payment stage through voice commands. This drastically reduces the memory load on the user.

2. The Store listings are presented in the user interface by taking two things into account. The proximity of the store to the user's current location and the high frequency of stores the user has visited previously. This feature helps the user in making smart and time-efficient shopping experience.

4. Design Considerations

4.1 Designing the app for iOS platform :

Apple provides "Human Interface Guidelines", a set of recommendations to improve the experience for the users by making application interfaces more intuitive, learnable, and consistent to the application developers. iOS embodies the following the following themes:

- Deference. The UI helps people understand and interact with the content, but never competes with it.
- Clarity. Text is legible at every size, icons are precise and lucid, adornments are subtle and appropriate, and a sharpened focus on functionality motivates the design.
- Depth. Visual layers and realistic motion impart vitality and heighten people's delight and understanding.

Some of the design decisions to be considered while developing the User Interface are:

- To elevate the user functionality, the user's content should be at the heart of each and every screen design.
- Providing clarity is another way to ensure that content is paramount in our app.
- Using depth to communicate.

4.2 Designing the app for Android Platform :

Android design principles continue to underlie the more detailed design guidelines for different types of devices which runs Android mobile operating system.

- Subtle animation effects contribute to a feeling of effortlessness and a sense that a powerful force is at hand. This increases the user experience in many delightful ways.
- Using short phrases with simple words for text labels etc.
- Things has to be done by the application to the user but the final say has to be given to the user.
- A picture speaks louder than words. Using pictures to explain a process/functionality.
- Avoid modes, which are places that look similar but act differently on the same input.
- Like a good personal assistant, shield people from unimportant minor details.
- If something goes wrong, give clear recovery instructions but spare them the technical details.

- Break complex tasks into smaller steps that can be easily accomplished. Give feedback on actions, even if it's just a subtle glow.
- Important actions have to found faster and performed faster to make it easy for the user.
- Hide options that aren't essential at the moment, and teach people as they go.
- Break complex tasks into smaller steps and provide feedback constructively.
- If something goes wrong, give clear recovery instructions but spare them the technical details.

4.3 Task Analysis

Task analysis is the process of understanding the user's task thoroughly enough to help design a computer system that will effectively support users in doing the task. By task is meant the user's job or work activities, what the user is attempting to accomplish. Important tasks involved in our app is:

- Location based shopping.
- Generic online based shopping experience.
- Barcode/ RFID based scanners to scan the items to be shopped.
- Voice based navigation with a complete shopping experience powered by KRUG, the NLP/AI based agent.

4.4 Usability Analysis

At the end of task analysis stage, the main tasks were realized. We have simple master-detailed based application that helps the user of the app with simple navigation provided between various views associated in the application. Most of the data is the application has simple table-view with scrollable option. The footer of each view will contain the KRUG NLP/AI agent at all times until and unless the user disables it.

4.5 Low-Fi Prototyping

The wire-frames for the application were created using Balsamiq software. Various UI components were designed and developed in an agile format.

4.6 High-Fi Prototyping

For high-fi prototyping of the application on iOS platform is done using Storyboards available in iOS SDK and XCode. The application on Android platform is built using each activity class which has a corresponding UI view associated with it which is in the form of XML.

4.7 Usability Evaluation

The design considerations considered for the design of the application is using a master-view based for the main view. The user has a feature of accessing the important features available in the app at ease with this design. The NLP/AI agent, KRUG is consistently shown across all the views in the application.

5 Systems Functionality

5.1 Adherence to the 8 Golden Rules :

"KRUG" has been designed keeping 8 Golden User Interface design guidelines in mind.

(i) Strive for Consistency
The views presented in the application are not cluttered with much information. The color's, gradient and text are consistent among all the views in the "KRUG" application.

(ii) Cater to Universal Usability
The application's design has been created keeping simplistic design in mind. Different demographic users can easily use this application without any hassles. "Tutorials" feature has been provided with short videos associated with it so that the user's can learn the usability in a much faster format.

iii) Offer Informative Feedback
Informative feedback has been provided for the actions performed by the user.

iv) Design Dialogs to Yield Closure
A sequence of tasks performed by the user finally ends in displaying of appropriate messages.

v) Prevent Errors
Various tools such as a pictorial view of the calendar has been provided to prevent the errors done by the user.

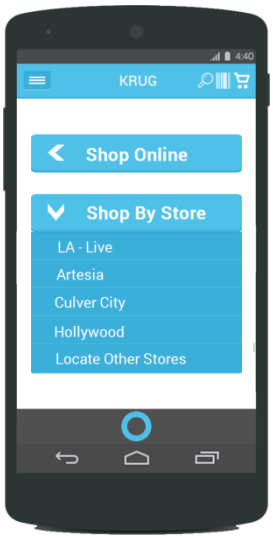
vi) Permit Easy Reversal of Actions
The application has been provided with various actions such as "Undo" where the user can easily reverse the action is applied it wrongly.

vii) Support Internal Locus of Control
The user has been given necessary and full control of the application. In payment's screen, the user has been given with option of manually typing the PIN number and CVV number.

viii) Reduce Short Term Memory Load
The NLP/AI agent helps in reducing the memory load on the user by assisting the user in shopping making way to experience shopping to a whole new dimension.

5.2 System Functionality

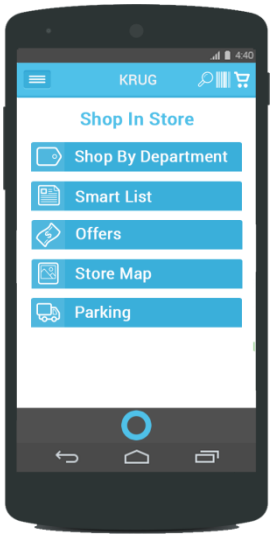
1. Location Screen



Location Screen:

Shop online and shop by store option is given to the user of the application. The location services enabled by the user captures the GPS location of the user and corresponding stores nearest to the user will be presented. An option where user can choose locate other stores to manually choose other locations has been provided.

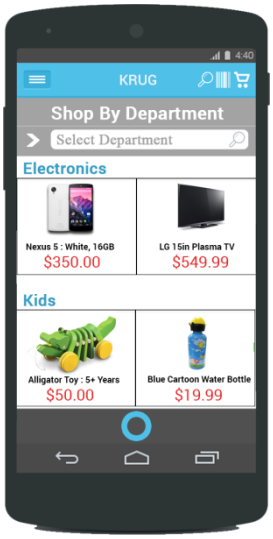
2. Home Screen



Home Screen:

This is the main screen and one stop for the main features available to the user in this application. Shop by department, smart list, offers, store map and parking features for the corresponding store location is rendered. The menu screen helps the user to easily navigate between any screens and comes handy for easy navigation.

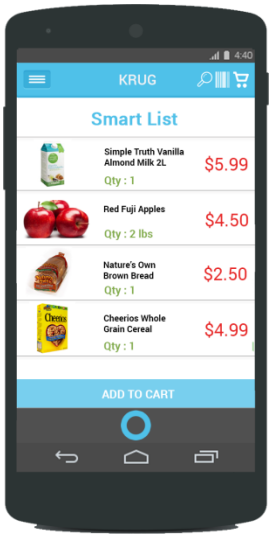
3. Shop by Department



Shop by department:

The user can search for various departments from which he/she can shop from the store. An extended list containing the items corresponding to a particular department has been provided.

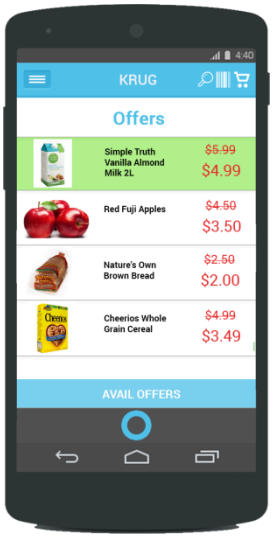
4. Smart List



Smart List:

This list is calculated based on the user's previous purchase behavior. The application learns from the user's interactions with it and generates a probabilistic model. The smart list is generated referring to this probabilistic model and other features depending on the date and location.

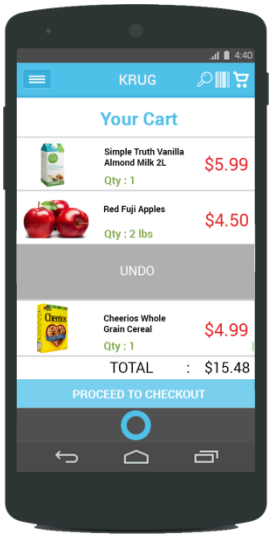
5. Offers



Offers:

Offers page shows the present day deals to the user depending on the user's preferences and store location. In both the smart list and offers page, user can select an item by tapping on it. On tapping the corresponding item changes it's color implying that it has been selected by the user.

6. Cart



cart:

Each page of the application has been provided with cart feature. Tapping on it the user is navigated to the cart page. In the cart page, all the items selected by the user for purchase is displayed. The user can remove an item, by swiping it to the left. The user has the control to reverse the action by clicking on the undo button. The user can also change the quantity of any purchased item in this screen.

7. RFID Scanner

RFID Scanner:

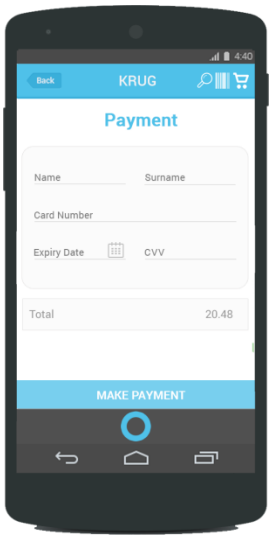
Each and every page of the application has been provided with RFID scanner feature. Tapping on it, the RFID scanner is launched. Then the user can scan the desired shopping items and get more information such as price, Manufacturing date, expiry date etc about it. Further from the details screen, the user can add the items to the cart.

8. Store Map

Store Map:

Store map feature is provided in the application. This would be useful to the customer to quickly navigate to the desired section in the store. On selecting on a particular section in the store, the user is provided with the detailed route map to navigate to the location. On double tapping on to the particular section, the detailed map of the section is displayed.

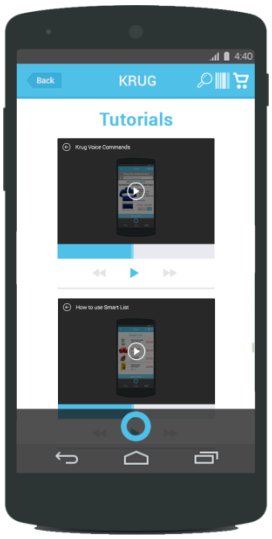
9. Payment Screen



Payment:

Payment screen provides an option to the user to quickly associate the card details required for payment. The user is prompted to key in the PIN number to proceed with the authentication process. Attention to details has been imposed so that only number's can be inputted in the fields such as Card Number, CVV. Also a drop down calendar has been provided to prevent manual errors committed by the users.

10. Tutorials Screen



Tutorials Screen:

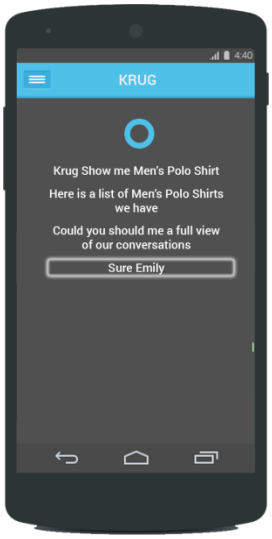
The user has been provided with tutorials screen to help him with getting accustomed to the usage of the application when in need of help. Various videos has been provided to the user pertaining to the features present in the application. The user can easily understand and can utilize the necessary application features.

11. Parking

Parking:

The user has been provided with the parking feature associated with a store he is in. Disabled people has been provided with separate parking spaces so that all kinds of user's can have a single access point to look on to the parking spaces available in real time.

12. NLP/AI Assistant modes of Operation



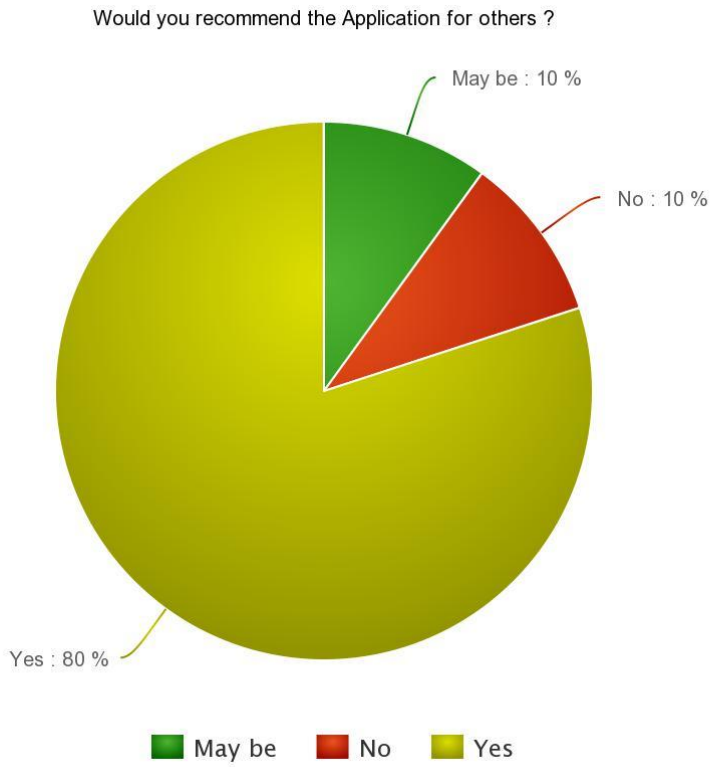
NLP/AI Agent (KRUG):

There are three modes of operation of the NLP agent incorporated in the application. Full mode with voice navigation， Hybrid mode and Normal mode. The entire shopping experience can be achieved the user using the NLP agent. Hybrid mode contains the NLP agent with all the conversations available as texts along side with the traditional user interface. Normal mode consists of the Agent without the conversation box.

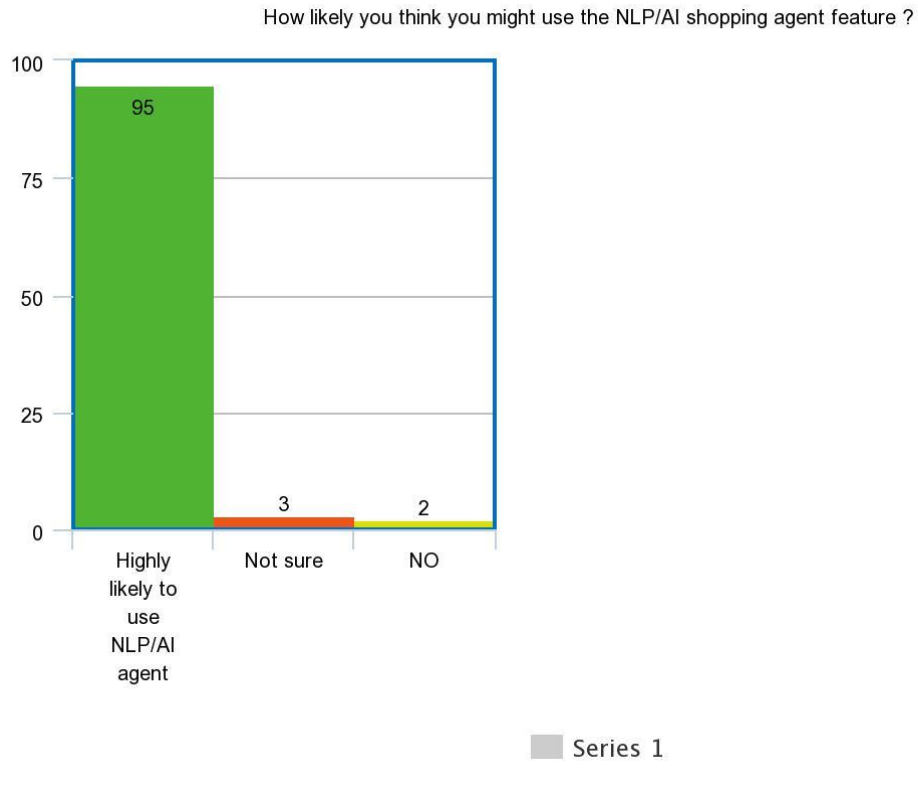
6. Results and Evaluations

We surveyed people with different cultural backgrounds for the usage and adaptability of the application. Below are the results of the survey made.

1. Would you recommend the application for others ?



2. How likely do you think you might use NLP/AI agent feature ?



7. Conclusion

"Krug", the shopping assistant which can understand the users shopping behaviour creates a unique and personalized shopping experience which satisfies the needs of the user.

7.1 **Future Enhancements**

- Detection of user sentiment and context based response.
- Integration with the restaurants and café’s present in the retail outlet.