

# CS5551 Advanced Software Engineering

## Project Final Report

Spring2018 CS5551: Advanced Software Engineering  
Department of Computer Science Electrical Engineering  
University of Missouri-Kansas City

Project Title: DealSuperior

Project Members:

CS 5551 Team 13-1

John Goza, Hongkun Jin

GitHub URL: [https://github.com/spexican924/CS5551\\_team13\\_Project](https://github.com/spexican924/CS5551_team13_Project)

YOUTUBE LINK: <https://www.youtube.com/watch?v=5t1vuCwuVXc&feature=youtu.be>

## **Project Deployment**

User Manual

User Guide PDF link:

<https://drive.google.com/file/d/1x1YHaXH-CAgDG058os53mM38C9i4Qjww/view?usp=sharing>

## **Project Management documents**

Contribution

50% for each member in team13-1

Final project evaluation

How well your project satisfies your original requirement specifications

Very satisfied

Were you satisfied with your design process?

Yes, we were.

Did you have any problems getting each member to do his/her share of the work?

Not at all.

## **Presentation Slides Link:**

[https://docs.google.com/presentation/d/1qETHU6rixbNttkzFiLo-ZUY-pQ-oplS\\_deLuXwJOGqw/edit](https://docs.google.com/presentation/d/1qETHU6rixbNttkzFiLo-ZUY-pQ-oplS_deLuXwJOGqw/edit)

# Project Proposal

## Introduction

With the advent of online shopping and the rise of E-Commerce giants such as Amazon, Walmart, Ebay et al., modern consumers have many choices when shopping. This helps drive prices down through competition, but researching prices across different websites is time consuming. We propose to create an application that can identify a given product from a user provided picture, and present the user with competing offers from different online retailers. This system could be tailored to compare many different sources, and potentially could include local retailers with the product as well.

## Motivation

The motivation for this project is both technical and user oriented. As a team, we believe the proposed project provides significant exposure to career relevant ideas such as interfacing with third party APIs, image processing and serialization, user driven front end experience, and machine learning. From a user perspective, this project fills a void in the current market; most applications with functions similar to the ones described in this proposal are owned by specific E-Retailers and do not provide the user competing offers. To be able to identify and immediately shop for an item provides high utility for any given user. To suggest the user the best time to buy the product based upon the upcoming offers. Also, when customers search the products, they may in a grocery store, shopping mall or even at home, then they would like to know when could get the products delivered based on the recommendation the application give to them.

## Proposed features

- Image uploading/camera usage
- Item identification and name make model return
- Integration with 2-3 e-commerce apis
- Comparison of prices for given item with data returned from 3rd parties
- Suggesting the right time to buy the product
- Information of delivery and time estimate
- Ability to launch 3rd party website from application and land user on page for item under consideration
- Recommendation of local retailers likely to have product in stock (if time allows)

## Related Work

For item identification we have found strong examples in both the Google Lens application found on many Android phones, as well as the Amazon extension for Google chrome.

## **Bibliography**

Amazon Assistant for Google Chrome:

<https://chrome.google.com/webstore/detail/amazon-assistant-for-chro/pbjkboenpfhbbbjgkoklgkhjpfogcam?hl=en-US>

Google Lens:

<https://www.digitaltrends.com/mobile/how-to-use-google-lens/>

Documentation for the Google Cloud Vision API:

<https://cloud.google.com/vision/overview/docs/>

Documentation for Amazon Search Products by Keyword API

[https://docs.aws.amazon.com/AWSECommerceService/latest/DG/EX\\_SearchingbyKeyword.html](https://docs.aws.amazon.com/AWSECommerceService/latest/DG/EX_SearchingbyKeyword.html)

## **Project Plan and Codebase**

We plan to have three main project iterations. The first iteration will focus entirely on integrating components into a central code base. These components will be proof of concept integrations (Figure 1), with actual logic and routing to be implemented in iteration two.

Iteration two will focus on service level logic and communication between components. We will work on connecting item identification through Google Vision API to our e-commerce APIs so that prices and locations are returned to the application for the item searched. Preliminary work in this iteration will also include documenting and transforming returned objects from our third party integrations (Figure 2).

Iteration three will focus heavily on bugfixes/process improvements, as well as UI rework to ensure a user friendly application. We are intentionally leaving iteration three open so that work that reveals itself during the previous iterations can be allocated to this iteration. Stories will be created as opportunities arise.

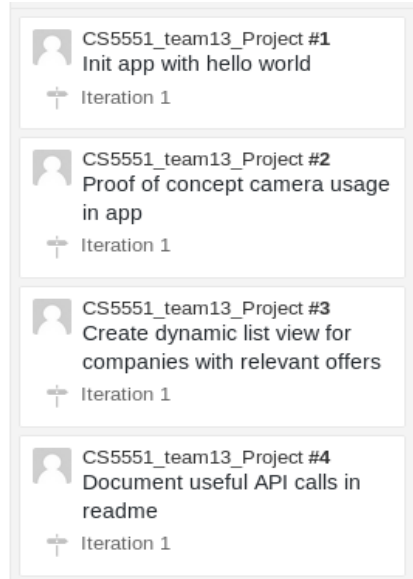


Figure 1) Stories intended to capture the work of simply placing components in the same application and ensuring they work individually.

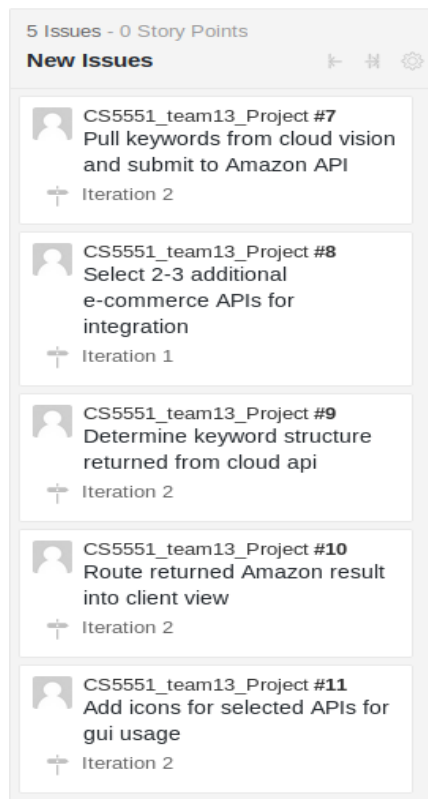


Figure 2) Stories regarding the inner communication between application components

Code will be located at [https://github.com/spexican924/CS5551\\_team13\\_Project](https://github.com/spexican924/CS5551_team13_Project). All code will go through proper VCS procedure; new development will be placed on a

branch apart from the master branch of the code and will require a pull request with review to merge. Semantic versioning will also be required.

# First Increment Report

## I. Introduction

With the advent of online shopping and the rise of E-Commerce giants such as Amazon, Walmart, eBay et al., modern consumers have many choices when shopping. This helps drive prices down through competition but researching prices across different websites is time consuming. We propose to create an application that can identify a given product from a user provided picture and present the user with competing offers from different online retailers. This system could be tailored to compare many different sources, and potentially could include local retailers with the product as well. What's more the information we provide to users also include recommendation from other customers. Then the users also can create their recommendation and experience for others. The app will create the sharing community gradually.

## II. Project Goal and Objectives (Revision of your Previous Report)

- **Overall goal**

The goals for this project are both technical and user oriented. As a team, we believe the proposed project provides significant exposure to career relevant ideas such as interfacing with third party APIs, image processing and serialization, user driven front end experience, and machine learning.

To be able to identify and immediately shop for an item provides high utility for any given user. To suggest the user the best time to buy the product based upon the upcoming offers. Also, when customers search the products, they may in a grocery store, shopping mall or even at home, then they would like to know when could get the products delivered based on the recommendation the application give to them.

- **Specific objectives**

Our project is not only providing the price, delivery info, time to buy, location, and return policy, reviews from third parties. we also provide customer sharing info. If the customers searched the product, from the info I got and local store, them will make an optimal decision, and upload their choices, then someone else will share the choice when they interested the product or similar product buying recommendations from other customers.

Also, our app will have the sharing community based on the customers. Even someone just search around, and they will find some products they may interested in and get the best price (Best options to buy)! And, the customers who recommend product info, they will get credits when someone else take the recommendation.

- **Specific features**

- Image uploading/camera usage
- Item identification and name make model return
- Integration with 2-3 e-commerce APIs
- Comparison of prices for given item with data returned from 3rd parties
- Suggesting the right time to buy the product
- Information of delivery and time estimate
- Ability to launch 3rd party website from application and land user on page for item under consideration
- Recommendation of local retailers likely to have product in stock (if time allows)

- **Significance**

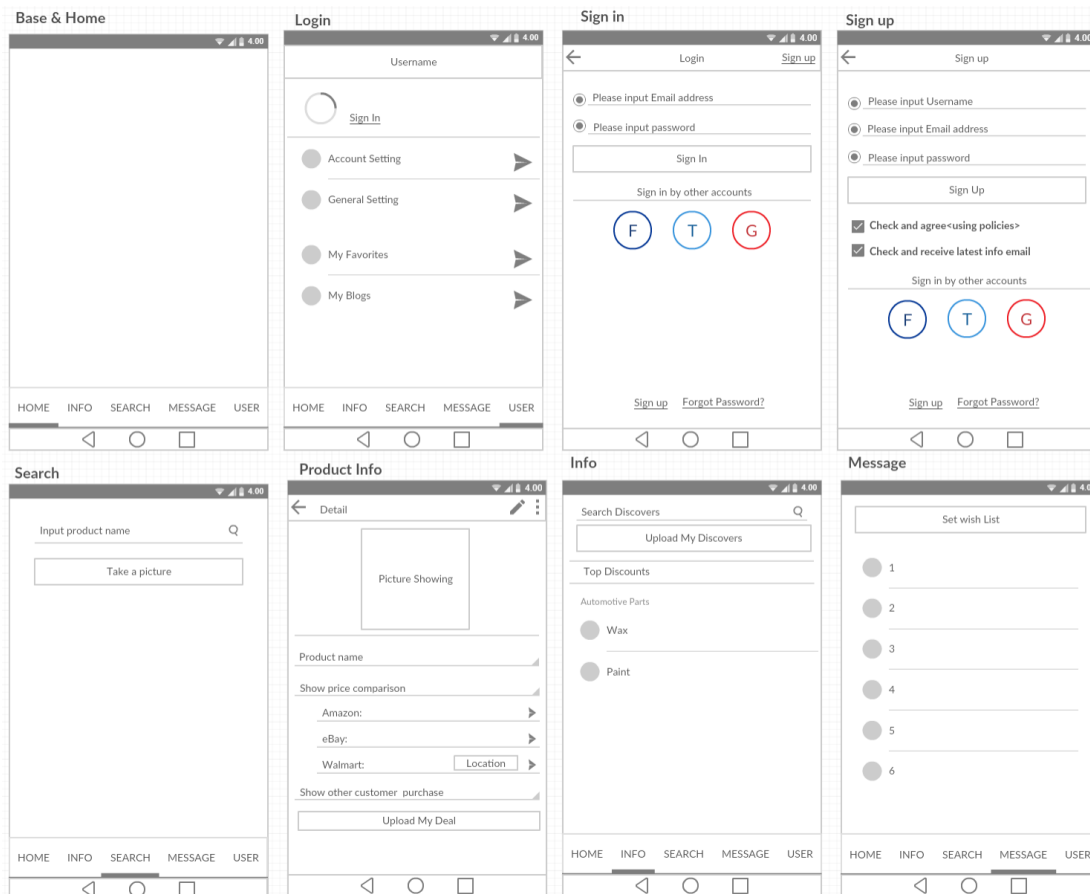
From a user perspective, this project fills a void in the current market; most applications with functions like the ones described in this proposal are owned by specific E-Retailers and do not provide the user competing offers.

### III. Project Plan

- **Schedule for the four different increments** (for each increment, do the following tasks)
  - 1) Stories (Issues): Scenario & Use case specification
  - 2) Service Design (detailed service design, unit test design)
  - 3) Service Implementation (implement and testing)
- **Project Timelines, Members, Task Responsibility**
  - 1) Timelines
  - 2) Members
  - 3) Task Responsibility
- **Burndown Chart**

## IV. Work Report

- **Existing Services/REST API**
  - 1) Local registry of new users/local login
  - 2) Google OAuth integration
  - 3) Routing for multiple app pages complete with transitions back to home state
  - 4) Native Camera integration with local storage of captured images
  - 5) APIs from different shopping sites like amazon, Walmart and eBay are obtained and are integrated together.
- **Detail Design of Features (using tools)**
  - 1) Wireframes and Mockups

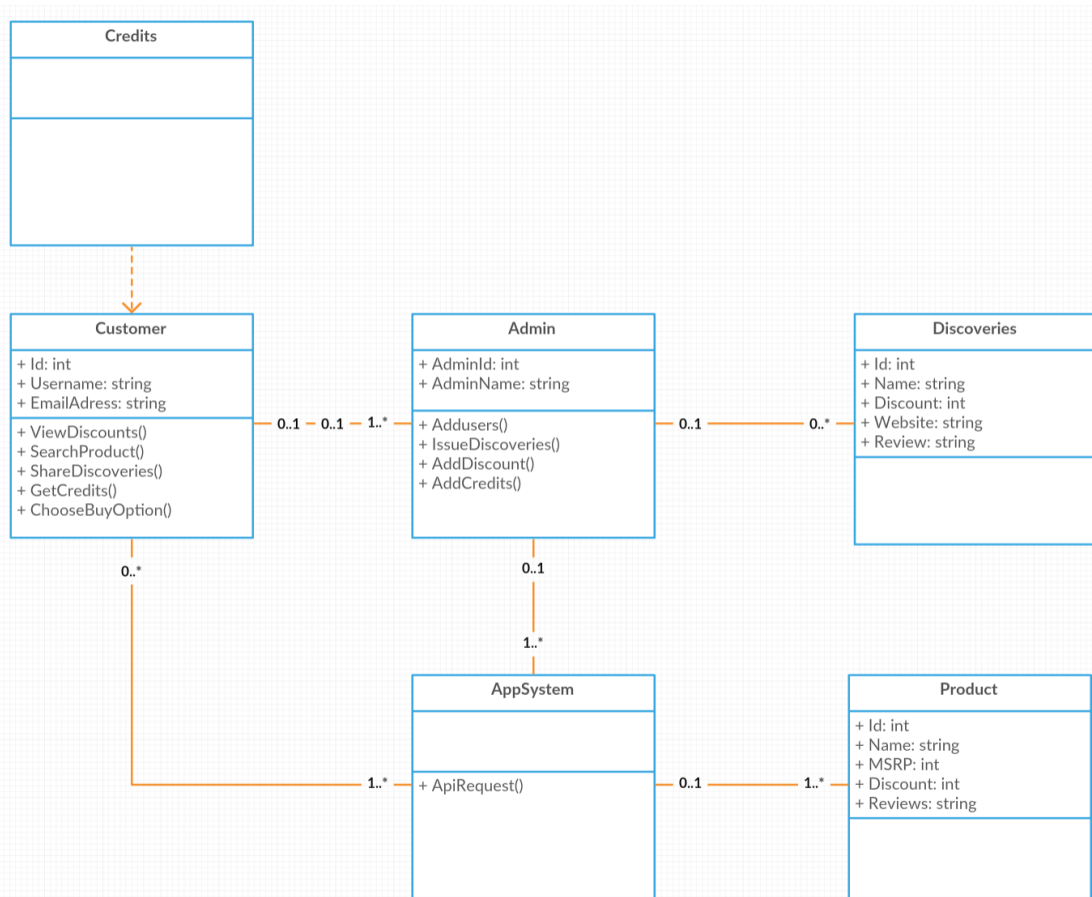


This is our Wireframes and Mockups, in the main page, we have 5 tab pages, Home, Info, Search, Message and User.

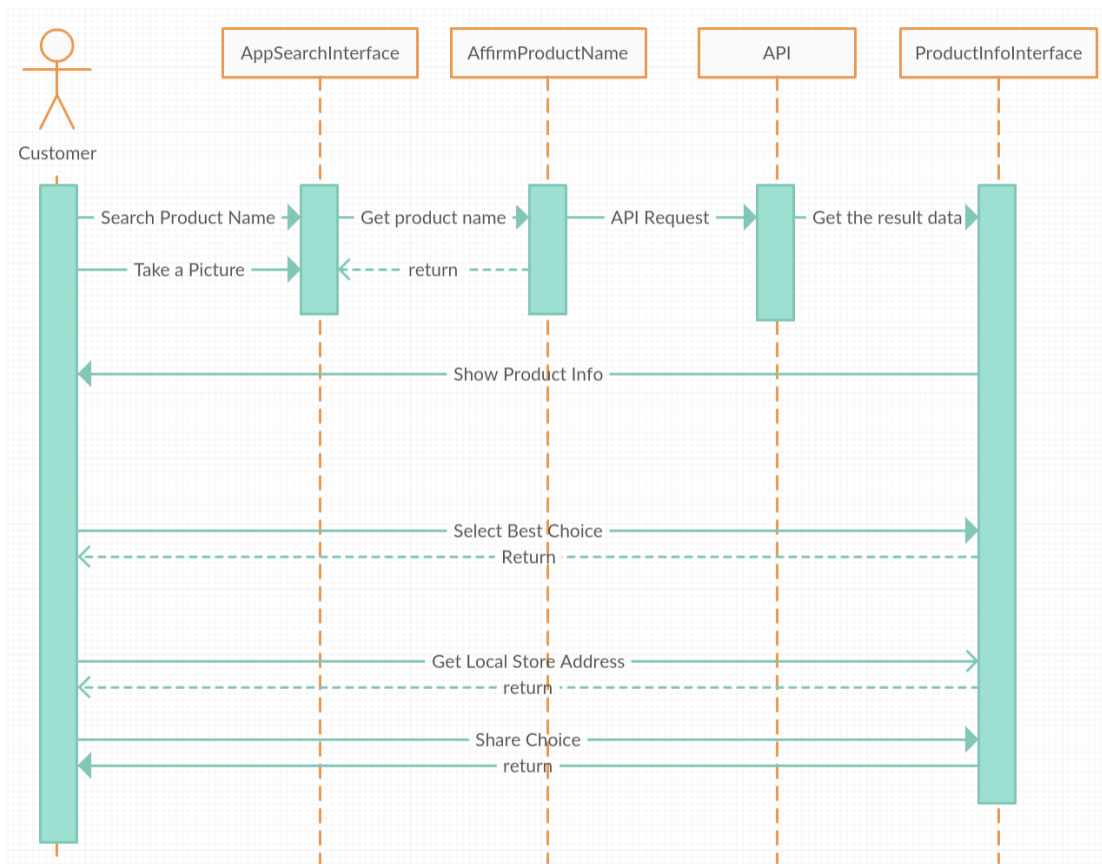
- a) Home: Showing the main app information and top best deal or coupons.
- b) Info: This page is design for user can upload their discoveries of deal or new product. It is a sharing tab. Also, users can view best discoveries from others.
- c) Search: User can upload picture of product or take a picture of product in this page, and they will get the information showing.
- d) Message: Users can set their wish list of products, and the page will show them the product deal or recommendations based on the wish list.
- e) User: Account settings and general settings, etc.



## 2) Architecture diagram/Sequence diagram/Class diagram



This is the Class Diagram for Search Function (The main part).



This is the Sequence Diagram for Search Function.

### 3) Write User Stories /Use Case/Service description

The most important parts for this app are product recognition, information from third retail companies and source from the app community, and they all be integrated in the search page above.

Then the use case will be like this:

1. Customer 'Joe' is shopping at "Xstore", and he notice a product "A" he wants to buy; however, the price of the "A" is not what Joe expected, he wants to know more about the price.
2. He login the APP, and click the search page tab, then he takes a picture of the "A" which right in front of him in the store, or he just type the product name "A". And click the search button.
3. The page will be loading, then it shows the price, msrp, discount, delivery policy, reviews from third companies like eBay, Amazon, Walmart etc. And, the other users' buying choice or suggestions. So, many information be provided to Joe.
4. Like every customer, Joe will take look at the price and discount at first and decide which way is the best for him. Then, this is not the end. For some store info, they may have the local store near Joe, so Joe can select the address when he chooses the that store. Also, he can share his decision for buying "A", and he will get credits. If he uses other customer chooses, there is credits for those customers too.
5. Joe is very satisfied for the app and find out more about "A", not just the price. And "Xstore" has the best discount for "A", he is the first guy knowing that, he may upload the information in community and he will earn credits.

6. Community is getting bigger, app is getting more useful, people is getting more satisfied,
7. The end.

- **Testing, Implementation and Deployment**

- GitHub Wiki link:
  - Deploy your mobile app to smartphones and describe it including the screenshots
  - Post your report to the GitHub **Wiki**
  - Post your first increment report and source code to your GitHub site and include the Wiki URL to the report.

## **V. Project Management:**

- **Implementation status report**

- **Work completed:**

- 1) Description

- We have completed the base App UI design for our application. And draw the wireframes and mockups.
- Searched the existing services/REST APIs for our project
- Started an ionic app for project and add the UI design in the app
- Added OAuth login in the app
- Added price API request in the search page
- The UML for the main part of the app
- Unit Testing for the app
- Deployed the app in android/web/iOS

- 2) Responsibility (Task, Person)

- Hongkun Jin-
  1. App UI design, wireframes and mockups
  2. Started an ionic app for project and add the UI design in the app
- John Goza
  1. Added OAuth login in the app
  2. The UML for the main part of the app
- Anusha Jasti and Joshmitha Tammareddy
  1. Searched the existing services/REST APIs for our project
  2. Added price API request in the search page
  3. Unit Testing for the app
  4. Deployed the app in android/web/iOS

- 3) Time taken (#hours)

- Around 40 hours

- 4) Contributions (members/percentage)
  - Hongkun Jin  
25%
  - John Goza  
25%
  - Anusha Jasti and Joshmitha Tammareddy  
50%

- **Work to be completed**

- 1) Description
    - More details and functions adding in APP
    - More researches for API request
    - Sources of Picture recognition
    - Unit testing for more functions
    - Create Sharing Community prototype
    - Deploy app in android/web/iOS
  - 1) Responsibility (Task, Person)
    - Hongkun Jin-
      1. More details and functions adding in APP
      2. Create Sharing Community prototype
    - John Goza
      1. Sources of Picture recognition
    - Anusha Jasti and Joshmitha Tammareddy
      1. More researches for API request
      2. Unit testing for more functions
      3. Deploy app in android/web/iOS
  - 2) Time to be taken (estimated #hours)
    - 40 hours
- Issues/Concerns

- **Related Work**

For item identification we have found strong examples in both the Google Lens application found on many Android phones, as well as the Amazon extension for Google chrome.

- **Bibliography**

Amazon Assistant for Google Chrome:

<https://chrome.google.com/webstore/detail/amazon-assistant-for-chro/pbjikboenpfhbbejgkoklgkhjpfogcam?hl=en-US>

Google Lens:

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Documentation for the Google Cloud Vision API:

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Documentation for Amazon Search Products by Keyword API

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# Combination of Second Increment Report and Third Increment Report

## I. Introduction

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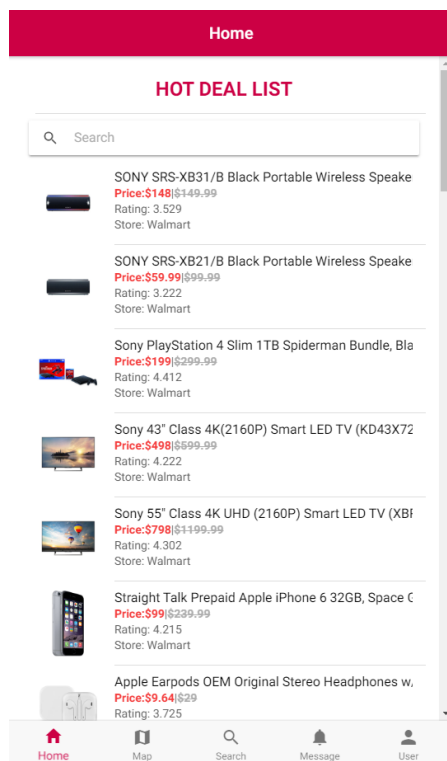
To be able to identify and immediately shop for an item provides high utility for any given user. To suggest the user the best time to buy the product based upon the upcoming offers. Also, when customers search the products, they may in a grocery store, shopping mall or even at home, then they would like to know when could get the products delivered based on the recommendation the application give to them.

- **Specific objectives**

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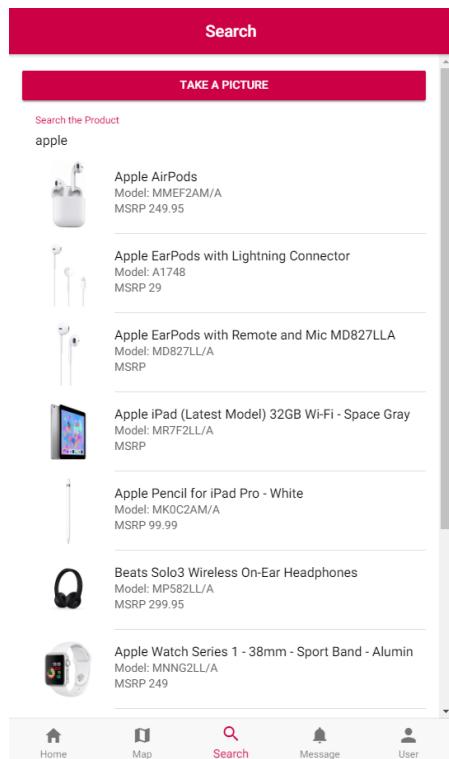
- **Specific features**



All the deals in community will show to the user.

Search the hot deal in search bar

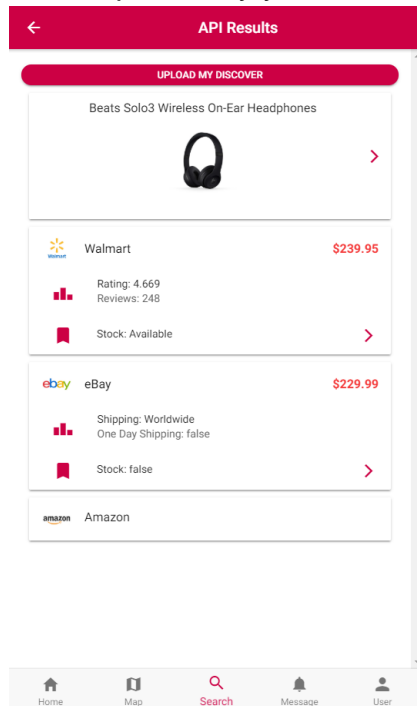
➤ Search product by typing



The api will give customer info depend on the word be typed.

➤ Image uploading/camera usage

Take a picture by your camera or from your gallery for product searching

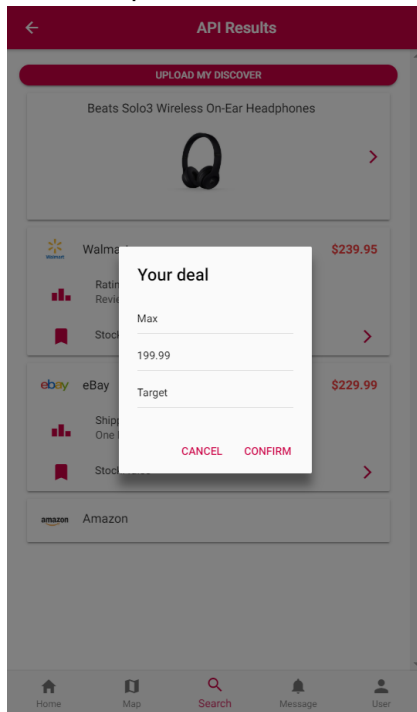


➤ Integration with 2-3 e-commerce APIs

Look at the price from Walmart and eBay, compare them and make right choice.

If you have better deal then the price showing in this image, you can upload your deal.

For example, this Beats Solo3 headphone is on sale in target, and the price is 199.99, then you



can upload the deal in DealSuperior community.

➤

We already had the Walmart lab api and eBay api, and Amazon is on the way.

➤ Comparison of prices for given item with data returned from 3rd parties

See the image above, we show the price and lots of information for the product

➤ Storage of searched or favorited products

The time parameter could get from api, and we still working on hwo to give the customer best recommantation based on these information.

➤ Recommendation of product based off peer purchasing habits

From the image above, we could get the shipping info from eBay, and we could optimize better in the future.

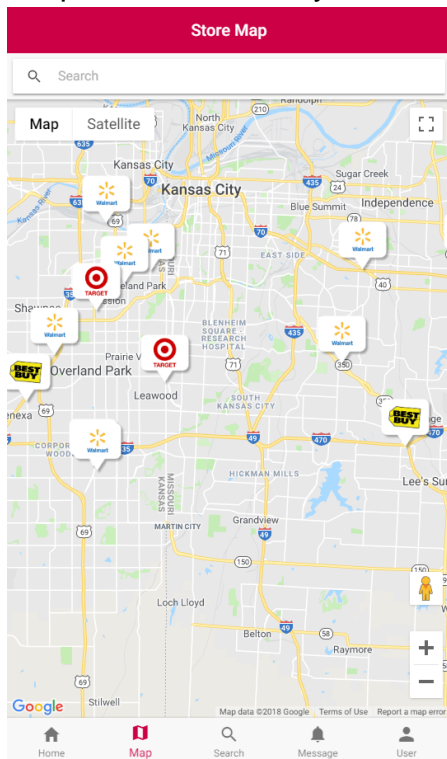
➤ Ability to launch 3rd party website from application and land user on page for item under consideration

We get the url for products from api, and we install the “InWebBrowser” in IONIC to complete this goal.

➤ share in the community



We could click the button share, then this product info will be upload to firebase, and we will provide community service based on the info in firebase.



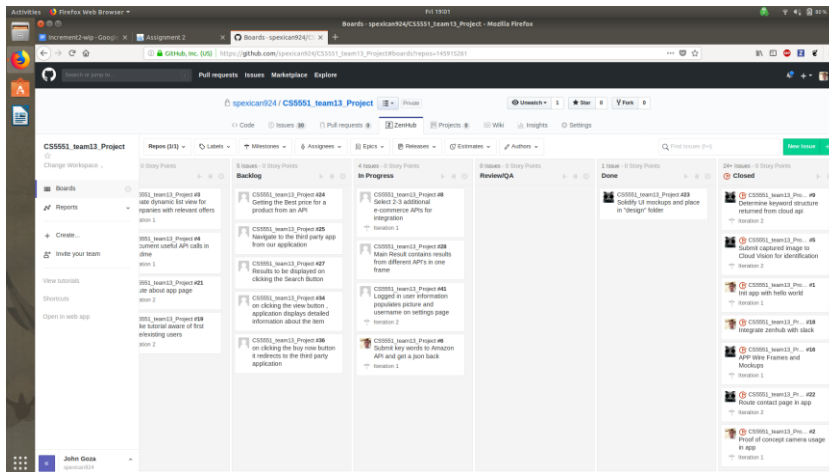
In Map page, there are some store locations shows around the user. Click the marker can get that store address also.

- **Significance**

From a user perspective, this project fills a void in the current market; most applications with functions like the ones described in this proposal are owned by specific E-Retailers and do not provide the user competing offers. Additionally, by storing user's searches, favorites, and local reviews, we create utility for the user and facilitate discovery of similar items or stores.

### III. Project Plan

- Current story progress:



## IV. Work Report

### New work this iteration

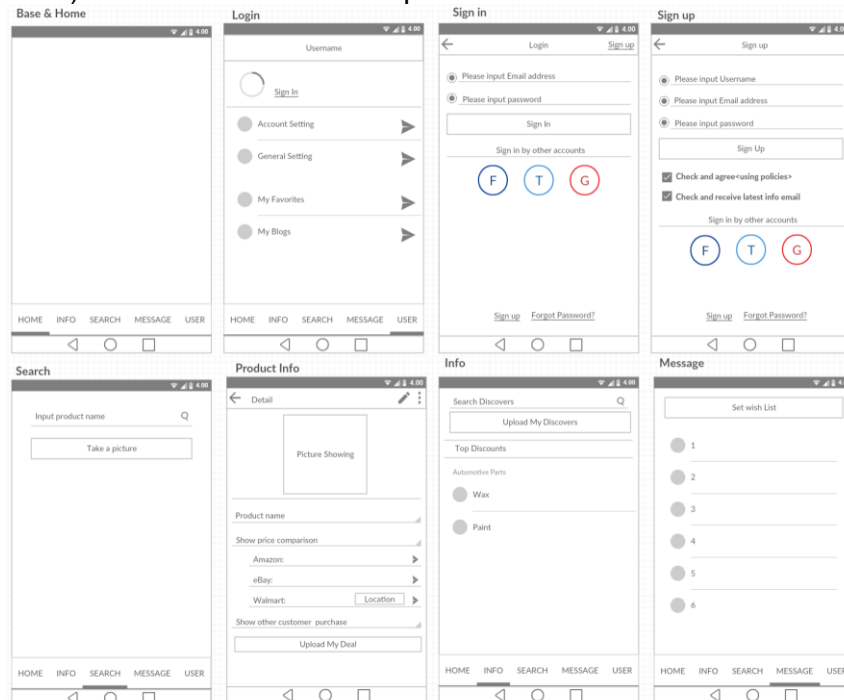
- 1) DB storage of shares and favorites
- 2) Maps integration
- 3) Profile enhancements

### Existing Services/REST API

- 4) Local registry and login + OAuth via Firebase
- 5) Google Cloud Vision API
- 6) Walmart API
- 7) EBay API
- 8) Amazon API integrated and waiting upon Associate API key

### Detail Design of Features (using tools)

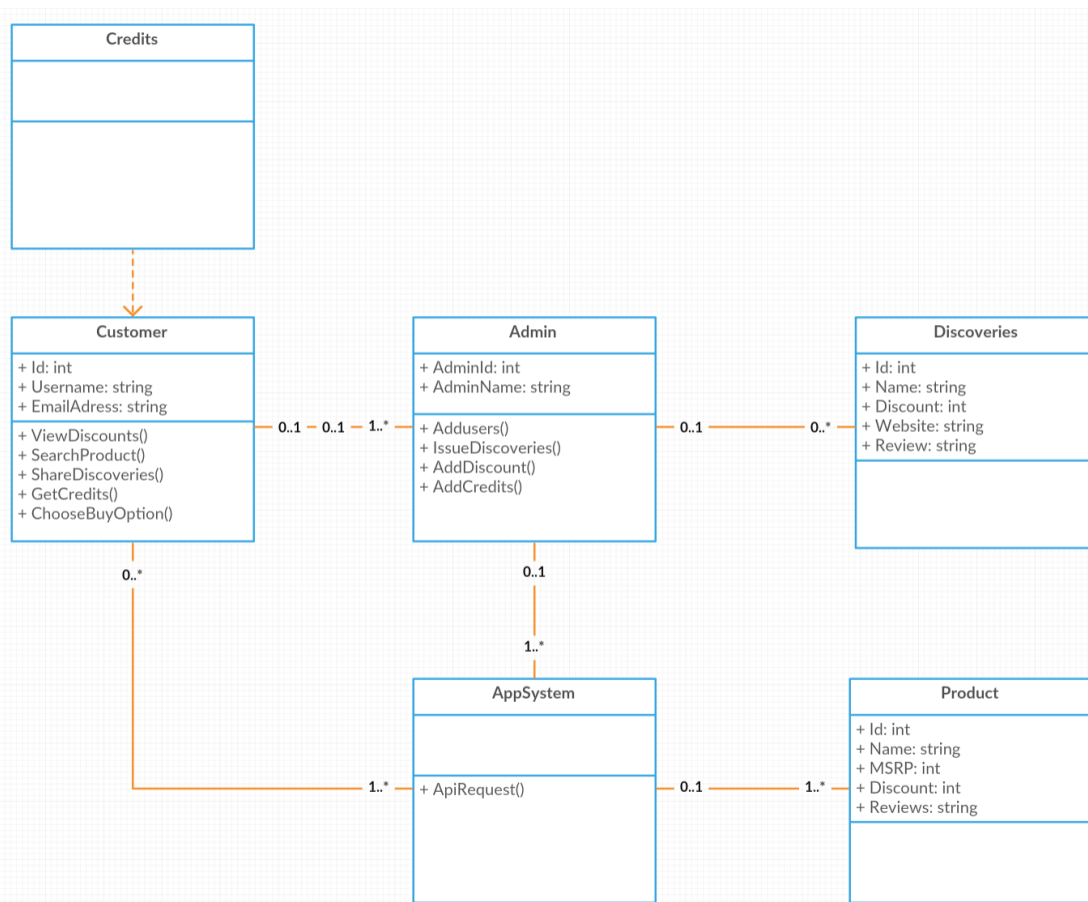
- 1) Wireframes and Mockups



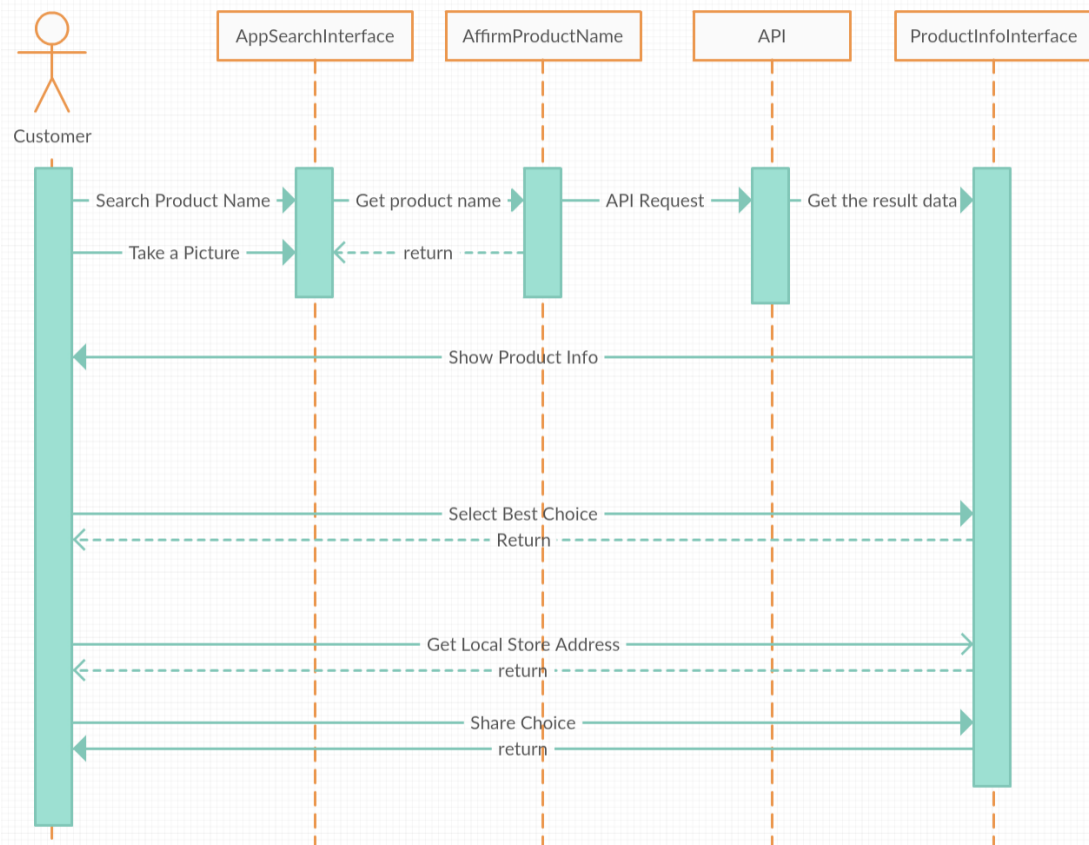
This is our Wireframes and Mockups, in the main page, we have 5 tab pages, Home, Info, Search, Message and User.

- Home: Showing the main app information and top best deal or coupons.
- Info: This page is design for user can upload their discoveries of deal or new product. It is a sharing tab. Also, users can view best discoveries from others.
- Search: User can upload picture of product or take a picture of product in this page, and they will get the information showing.
- Message: Users can set their wish list of products, and the page will show them the product deal or recommendations based on the wish list.
- User: Account settings and general settings, etc.

## 2) Architecture diagram/Sequence diagram/Class diagram



This is the Class Diagram for Search Function (The main part).



This is the Sequence Diagram for Search Function.

### 3) Write User Stories /Use Case/Service description

The most important parts for this app are product recognition, information from third retail companies and source from the app community, and they all be integrated in the search page above.

Then the use case will be like this:

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6. Community is getting bigger, app is getting more useful, people is getting more satisfied,
7. The end.

- **Testing, Implementation and Deployment**

- GitHub Wiki link:  
(code link included in wiki):

[https://github.com/spexican924/CS5551\\_team13\\_Project/wiki/](https://github.com/spexican924/CS5551_team13_Project/wiki/)

## **v.Project Management:**

- **Implementation status report**

- **Work completed:**

- 1) Description

- The app now includes bug fixed and corrected login/registration code
- Pictures can now be submitted to Google Cloud Image API with results for recognized image returning to user
- Search now returns results from Walmart and Ebay APIs and displays results to user
- App is now entirely built in ionic with camera, firebase, and Amazon plugins
- User data is now saved in remote database by user unique identifier
- Users can now upload photos, which are saved in remote storage
- App now includes unit testing frameworks and basic unit tests
- App cross compiles in Android, iOS, and web

- 2) Responsibility (Task, Person)

- Hongkun Jin-
  1. Designed and implemented user share system
  2. Designed and implemented user favorite system
  3. UI/usability improvements
  4. Map page design
- John Goza
  1. Google maps integration
  2. Cordova plugin installation and bugfixing
  3. Bug fixes and repository maintenance

- 3) Time taken (#hours)

- Around 40 hours

- 4) Contributions (members/percentage)

- Hongkun Jin

50%  
➤ John Goza  
50%

- **Related Work**

For item identification we have found strong examples in both the Google Lens application found on many Android phones, as well as the Amazon extension for Google chrome.

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<https://www.digitaltrends.com/mobile/how-to-use-google-lens/>

Documentation for the Google Cloud Vision API:

<https://cloud.google.com/vision/overview/docs/>

Documentation for Amazon Search Products by Keyword API

[https://docs.aws.amazon.com/AWSECommerceService/latest/DG/EX\\_SearchingbyKeyword.html](https://docs.aws.amazon.com/AWSECommerceService/latest/DG/EX_SearchingbyKeyword.html)

eBay API Documentation:

<https://developer.ebay.com/>

Amazon marketplace API Documentation:

<https://developer.amazonservices.com/>

WalMart API Documentation:

<https://developer.walmartlabs.com/>

Slides and code provided in class were consulted repeatedly for this work.

# **Acknowledgement Statement.**

"The work has been completed under the guidance of Dr. Yugi Lee, Rajaram Anantharaman, and TAs (Ruthvic Punyamurtula, Bhargavi Nadendla, Sravanthi Gogadi) in CS5551 Advanced Software Engineering, University of Missouri - Kansas City), Fall 2018.