Platform to Connect Businesses

to Their Customers

A Master's Project Submitted to the
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Table of Contents

Abstract

Most businesses today rely on social networking websites and apps, mailing lists, text messages, or their company website to promote their products and services. Some of the methods require heavy maintenance to achieve good results, such as Facebook. Some require an insignificant amount of time, such as mailing lists, but these often get disregarded by their customers. Some social networking sites may even damage a business' image because of fake reviews and ratings that tend to appear on those sites. Therefore, there is an opportunity for businesses to promote their products and services more easily and efficiently. This project entails building a website for businesses to put up their store information and promotions and a mobile app that will allow customers to view that information. This project will focus on building a tool to allow businesses to connect with their customers, featuring a user-interface where it is easy for mobile users to view store information and promotions; a feature called "electronic word of mouth" that allows users to exchange their profiles with other users; a list of business categories from which the businesses can choose when they sign up; and a user-interface that makes it easy for businesses to edit store information and promotions. Last but not least, this project discusses what I did to promote this platform and the future work of this project.

Keywords: platform, business, customer, website, mobile app, promotion

Platform to Connect Businesses to Their Customers

As technology advances, more businesses move their business-related information from print to digital. In today's world, it is very rare to find a business without a web presence. Some businesses even take the initiative to create and maintain social networking websites such as Yelp and Facebook. Another trend that is worth noting is that big companies seem to develop their own mobile apps to promote their products and services due to increasing numbers of people with smartphones and the amount of time spent on smartphones. One of the differences between a website and a mobile app is that a mobile app can run in the background so that the users can be easily notified when the app sends out push notifications, and it allows easier customer access to the applications. The sensors on a smartphone are also tightly integrated, which enables a mobile app to have functions that a website cannot perform as efficiently such as finding users' location using both GPS and Wi-Fi.

However, as more companies develop their own mobile apps, customers are more unlikely to download every app that is produced from each company because it is inconvenient and requires time to use and learn to navigate. Most importantly, there are only so many apps an average user accesses each month. For instance, U.S. smartphone users, on average, accessed 26.7 apps per month from September 2014 to December 2014 [1]. In other words, if a user frequently visits 50 different stores, this user would hypothetically have to download an app from each store to keep up with their latest information. If all of these stores offer a mobile app, it is very unlikely that a customer will install and regularly use all of them.

This project comprises two parts. The first part is a website for businesses to put up and edit their store information and promotions. Instead of building a mobile app for businesses, I

decided to build a website because it can be accessible from various devices, and there are no platform-compatibility issues. The second part is an iOS app for customers. I chose to build an iOS app because, according to Smith (2016), the iPhone's share of U.S. and Canada smartphone usage was 52.3% in 2014 [2]. In other words, there are many people in the U.S. that use an iPhone. Combined with a back-end, this project allows information that is provided by businesses to appear on the mobile app. Specifically, basic store information, such as address, hours, amenities, pictures, menus (if it is a food-related business), hours of operations, promotion types, store ID, website, student discounts, and promotional posts would all appear on the mobile app. Detailed implementations and structures of the website and the app will be discussed in the following sections.

Motivations

One of the motivations behind this project is to allow every business to have a "personalized" mobile app. Instead of spending large amounts of money on developing a mobile app, this project allows them to display their store-related information on an app. In addition, this project makes finding each business' store page much easier for customers because it is designed to be an online directory that is managed by businesses. Moreover, this platform does not allow commenting or rating, so businesses do not have to worry about fake reviews or fake ratings that could damage their image.

Another motivation behind this project is to minimize the number of apps a consumer needs to download to keep up with his/her favorite stores' information. In addition, all the store-related information comes from the businesses directly, so it minimizes the probability of a customer having incorrect information. Last but not least, the current social-networking solutions

for displaying business' promotions are lacking; therefore, there is an opportunity to improve how promotions are displayed for each business.

Back-end

In order to rapidly develop this product, I chose Backend as a Service (BaaS) provider to handle the back-end requirement of this project. BaaS simplifies the back-end by providing a simple user-interface to manage cloud storage and provides useful features that are commonly present in today's mobile apps, such as push notifications, social networking integration, user accounts, system e-mails, and more [3]. Specifically, Parse is the BaaS provider that I used for this project. It provides an iOS Software Development Kit (SDK), which I used to develop the mobile app of this project. For the development of the business website, I used their JavaScript SDK. Compared to other providers that were available during the time that I was developing this project, Parse offered the most comprehensive guide and support, hence my decision to use this provider. The details of the tables that I created on the database for this project will be discussed as each feature is introduced.

Business Website

The first step to creating a business' store account is for owners to sign up and create an account. Since there are many different business categories, it is imperative that the structure of these categories is straightforward while maintaining the completeness of the list of categories. There were three websites that I used as guides to come up with the structure of these categories, which were Facebook, Groupon, and Yelp.

Sign-up Form

Yelp's list of categories is too extensive to be used in this project; doing so would cause businesses to spend a lot of time determining the category in which they belong to. However, this

list helped me to complete the final list of categories that would be included in this project [4]. Groupon's list of categories is very simple and easy-to-understand, but it is missing some categories. For instance, if a business is a professional service company, there is no category on Groupon that fits this category [5]. Facebook, on the other hand, has a complete and straightforward list of categories, but the six big categories on their page are not very clear to mobile users [6].

I used each company's list of categories as a guide to come up with this project's list of categories. Specifically, there are six big categories that businesses can choose from, which are "things to do", "food & drink", "mobile", "shopping", "beauty & spa", and "service". Within each category, there are subcategories. Because of the wide range of business categories in the "mobile", "shopping", and "beauty & spa" categories, there is an "others" category that allows owners to briefly describe their businesses.

In addition to selecting a category, the sign-up form requires businesses to provide a business name, an address, a store ID, a phone number, an e-mail address, and a password. To make the sign-up process as easy as possible, I only included information that is necessary to create a basic store-information page (see Figure 1 and Figure 2). For instance, store ID is required because mobile users can use a store's ID to find the corresponding store page. The e-mail address is required but not displayed on the mobile app because its only purpose is so that a business owner can receive an e-mail to reset their password if they forget it.

If the owner's provided e-mail address or store ID has been taken, a real-time generated warning message will appear below the input box. After the owner submits the form, the program sends all the provided information to the cloud code on Parse that I wrote to process and

sign up users. If the sign-up process is completed without an error, the program redirects the owner to the sign-in page.

Sign In

On the sign-in page, owners can use either a store ID or an e-mail address to login. Before allowing access to the owner's store page, the program checks to determine whether or not the owner has verified his/her e-mail address. Verification is completed by sending an e-mail containing a verification URL to the owner when he/she signs up. This prevents people from using fake e-mail addresses or other people's e-mail addresses to sign up (see Figure 3). In addition to sign-in, there is a link to the *forgotPassword* page. It contains an e-mail input box that allows the program to send an e-mail to an owner that contains a URL to reset the owner's password.

Personalized Store Page

This web page retrieves and displays each owner's store information. It contains a link to add or edit a promotion post; a link to add or edit photos; a link to add or edit menus; a link to edit a store's contact information; a link to edit a store's hours; a link to edit a store's amenities; a dropdown to edit a store's dollar sign; and an input box to edit a store's student promotion information. This page allows owners to easily navigate to a section and to edit or add information (see Figure 4, Figure 5, and Figure 6).

Promotional Post. This page contains a form of promotional post. It allows owners to specify whether a post is an in-store promotion or an online promotion. It also specifies a period of time that this promotion would last; three short descriptions regarding this promotion; a profile image of this post; and a section for its related photos (see Figure 7). Since there are six big categories in this project, to improve the speed of querying a store's promotional posts, I

created a table for each category that holds the promotional posts. Instead of searching a big list of a stores' promotional posts, the program can search a store's promotional posts in a single category. This is much more effective and efficient.

Detailed Promotional Post. This page contains the detailed information of a promotional post. When a business owner clicks on any promotional post in the personalized store page, the program takes the owner to this page. Owners can easily glance at all the information of a promotional post without having to worry about changing the information. Moreover, this page has a 'delete' button for a promotional post in addition to the 'delete' button that appears when an owner hovers over a promotional post on the personalized store page. If the owner would like to edit a promotional post, this page also has an 'edit' button that takes the owner to the promotional post editing page (see Figure 8).

Menus. If a store is in the "food & drink" category or another food-related subcategory, the personalized store page has a section for owners to add or edit their menus (see Figure 9). Menus are separated from photos, so customers do not have to spend time digging out menus from the photos section. To prevent owners from using too much space on the database, the program restricts each owner to having only 10 photos uploaded to the database. Each photo has to be less than 2 MB in size because if it is bigger, the loading time on the mobile app would take too long and would consume too much data for the mobile users. To improve the speed of querying a store's menus, I also created a table for each category. Saving a photo to the database requires calling a save function from Parse. The callback of the function returns a URL that is saved in the photos array.

Photos. This page is very similar to the menus page in terms of functions and code (see Figure 10). However, it allows owners to upload a maximum of 25 photos instead of 10 photos

in the menus section, because owners may want to take various photos of their store and products. Moreover, deleting any photos on the menus and photos pages does not interfere with the original order of the uploaded photos. In addition, if photos are already saved in the database, the photos do not get uploaded twice. Because uploading photos takes a long time, I incorporated third-party loading animation into this project, so owners can tell that the program is uploading and processing the photos.

Contact. This page allows owners to edit their basic contact information, including business name, street address, city, state, zip code, phone number, direction, and website URL (see Figure 11). When owners edit their addresses, the program uses Google Maps API to figure out the latitude and longitude of that location. This is used for calculating the distance between a mobile app user and the store's location. If owners input incorrect addresses, every time the owners visit their personalized store page, the program outputs a warning message to the owners to let them know that they have an incorrect address. This is important because an incorrectly listed address would cause an owner's store to be hidden in the mobile app.

Hours. Owners can add or edit their hours of operation from Monday to Sunday. If a store is closed on a particular day, there is a button for each day of the week that the owner can select to indicate that the business is closed (see Figure 12). The structure of the submitted data is a two-dimensional array. The first dimension has seven one-dimensional arrays, which start with Monday and end with Sunday. The second dimension consists of six elements or one element, depending on whether or not a store is closed. If it is not closed, the six elements consist of hours, minutes, and a string of AM or PM for both open and close times.

Amenities. The amenities page consists of seven default amenities, which are accompanied by icons when displayed in the mobile app. Owners can also add or delete custom amenities (see Figure 13). This is done by using JavaScript to dynamically insert HTML code to this page.

Dollar Sign. The dollar sign is used to tell how expensive or inexpensive a store's products are (see Figure 14). The dollar sign ranges from 1 to 4, with 1 being the least expensive and 4 being the most expensive [7]. This is used in the mobile app to allow customers to easily filter out stores that are expensive or inexpensive.

Student Promotion. This input box allows owners to specify their student discounts (see Figure 15). The mobile app has a dedicated student discounts filter button that filters out stores that do not offer a student discount, which makes finding stores with student discounts a breeze.

Locate My Current Location. This feature is only available to businesses in the mobile category. When accessing this page, the program retrieves a business's current location and determines their address via Google Maps API. It then asks businesses to input an expiration time for this address (see Figure 16). This feature allows mobile vendors to easily share their current location and the duration of time they would be staying at that location.

iOS app

The first step that I took in developing this iOS app was to use a prototyping software to design the layout and the look of the app (see Figure 17). Since changing layouts in an iOS app is a time consuming process, using Fluid UI--a prototyping software--saved a lot of time that might be wasted if I were to change any of the layouts manually. After I finished designing the prototype, I started working on the welcome screen of the app.

Welcome Screen

This welcome page is the first page that mobile users see when they open this app (see Figure 18). Instead of creating a separate page to display the features of this app, I used a *PageViewController* to display the top four features. Users can swipe right or swipe left to view them. If a user decides to use this app, there are three options to choose from.

One is to sign up or login using Facebook. The other is to sign up or login through this app. Lastly, the user can use the app without an account. Using Facebook login, or sign up or login through this app enables users to perform account-related activities, such as favorite a store, see each of their favorite store's promotional posts, save a promotion, receive push notifications from favorited stores, see recommended stores based on the user's preference, use the app offline, and use the "electronic word of mouth" feature to exchange the user's profile with that of others. If a user decides to sign up or login through the app, after entering a username, password, and e-mail address, the program sends an e-mail to the user to confirm this e-mail address. Before confirming the e-mail address, the user is not allowed to use this account to login; this prevents the user from using a fake e-mail account or somebody else's account.

This page also has a store logo and a spinning animation on top of this page when users open the app. The reason is that the program needs to determine whether or not a user is logged into this app. If the user is logged in, the program redirects the user to the home page. If the user is not logged in, the program removes the store logo and the spinning animation to show the options and the tutorial on this welcome page.

Home Page

There are three sections on this page: the top section, the categories section, and the featured section. The top section consists of a search bar, an icon to search a store by store ID,

and an icon to the “electronic word of mouth” feature (see Figure 19). The categories section consists of six categories icons to each category page. The featured section consists of stores that are recommended to users based on their preferences.

In terms of the search function, the program queries two attributes--“name” and “category” --from the *BusinessInfo* table on the database. Since the results have to be either from the name attribute or the category attribute, the program performs an OR query of “name” and “category”. In other words, when a user performs a search, the program retrieves and combines the results of names and categories that contain the words provided by the user. From those results, the user can access each store’s personalized store page by tapping on each search result.

As for searching a store by store ID, after a user finishes entering a store ID, the program queries the database for a matching store ID from the *BusinessInfo* table, which contains all of the details from a business store except for their promotions and photos. If a search result is found, the program immediately performs a segue to that store’s personalized store page. If a search is not found, the program outputs a message to the user.

The “categories” section consists of links to each category’s search page. To avoid having duplications of code, I designed a template that would work for the entire categories search page. When a user taps on the “food & drink” category, for example, the program performs a query to find all the stores that are from this category and sorts them based on their relative distances from the user.

For the “featured’ section of this page, the program first retrieves a user’s profile. This profile is updated when a user favorites or un-favorites a store. When a user favorites a store, that store’s ID, location, and its category are stored in the user’s profile. However, if the user un-

favorites a store, that store's information is removed from the profile. All of this information is saved in the database, so the program keeps track of what types of stores the user likes.

When the user's profile is retrieved, the program determines which types of stores in each category the user likes and sorts them from the most to the least favorable. According to the type of store the user likes the most, the program recommends four similar stores from that category. According to the type of store the user likes the second most, the program recommends three similar stores. For the remaining categories, the program recommends two stores from each category. Moreover, all of the recommended stores are located near the user's location. If the user does not have a profile, the program recommends two stores from each category that are close to the user. When a user taps on a result from the featured section, the program performs a segue to that store's personalized store page. The "electronic word of mouth" feature will be covered in detail in a later section of this paper.

Category Page

On the "category" search page, stores are retrieved based on a user's current location (see Figure 20). For each search result, there is a store logo image, a name, a category, icons in terms of the types of promotions that are currently available, a favorite icon, a dollar sign, and a distance value. If the user taps on the graduation hat icon, the program automatically filters out stores that do not offer a student discount. In addition, stores that offer a student discount have their description of the student discount displayed in their result. Therefore, it is really easy for students to find nearby stores with student discounts. Moreover, as the number of stores grows in each category, it is extremely inefficient and slow to retrieve all of the nearby stores; to solve this issue, I implemented pagination on this page.

Specifically, the top 20 stores are retrieved and displayed on this page. As the user scrolls down to the page, there is a “browse more” button at the bottom of the page. By pressing the button, the program skips the first 20 stores and retrieves the next 20 stores from the database. This button disappears when there are no more matched stores to be retrieved. As a result, the user experience of this page is fluid and fast.

Filters Page

There are four sections on the “filters” page (see Figure 21), which are “sort by”, “price range”, “promotion”, and “category”. For the “sort by” section, a user can choose from “most relevant”, “distance”, “price (high to low)”, and “price (low to high)”. As for now, “most relevant” is very similar in terms of the algorithm to “distance” with one difference in that selecting “distance” does not retrieve stores that are outside of a 200 KM range. The reason is that when users select “distance” they would most likely want to find the closest stores rather than seeking stores that are really far away. However, “most relevant” is the default option, which does not convey any information regarding search preference.

As for the “price range” section, users can select multiple dollar signs that match their interest. For instance, if a user is looking for a restaurant in a price range of 5 to 25 dollars, he or she would select the one-dollar sign or two-dollar sign options to find those restaurants. This is achieved using a “containIn” API call from Parse. This API call would look for stores with the dollar sign attribute matching one or two dollar signs.

In the “promotion” section, the default selections are “in-store”, “online”, and “student”. In other words, when a user selects this option, stores with any types of promotion would be retrieved from the database. Users can also select multiple or single promotion types. For

example, if a user would like to search for stores that offer in-store promotion featuring a student discount, then the user would select “in-store” and “student” in the “promotion” section.

The last section in the filters page is “category”. This subcategory list is different in each category, and the list is dynamically generated for each category. Therefore, adding new subcategories is very easy to do. It only involves adding the name of those subcategories to the existing array that holds the list of subcategories. Lastly, when a user finishes selecting the options on the filters page and taps on the close icon, the program applies all the changes and retrieve stores that match those constraints and display them on the category search page.

Store Page

On the store page, the target business store object along with its photos object and promotions object are retrieved from the database. The data is processed and displayed on the store page (see Figure 22). If some of the information is missing, they will be replaced with “Not available”, or in some cases are completely hidden from view. Moreover, there are many quick and useful links on this page. For instance, tapping on a store’s listed phone number dials the number for the user; tapping on a URL takes the user to the default safari browser; tapping on the address field takes the user to the Maps app and computes the direction from the user’s current location to that store’s location; continued pressing on the address field copies the address text for the user; and tapping on any of the photos on this page takes the user to a page where the user can zoom in and out of the photo. In addition, the current day’s hours are retrieved and computed to determine whether or not the store is currently open or closed.

If one or more promotion post is available, the user can swipe to the left or tap on the post’s title to view it. This post contains all of the information that is uploaded from the business website’s promotion post page. The user can save this promotion post or view photos. In short,

the design of the store page allows users to easily navigate to a store and see what promotions are currently available from a store.

Favorites Tab

The favorites tab allows users to see their favorite stores, their favorite stores' promotional posts, and their saved promotional posts (see Figure 23). For each section, stores are organized alphabetically, which allows users to easily locate a store. On their favorite stores' promotional post section and the saved promotion post section, the first letter of the user's favorite stores is displayed on the right side of the screen, which is a link that takes the user to the section of the page that contains that letter. Furthermore, tapping on any of the stores in this tab takes the user to that store's personalized store page.

Another important feature that can be found in this section is offline support. When a user favorites a store or saves a promotion post, the store's object, which contains all the information about a store, and the store's promotion post object are saved locally on the user's phone. Therefore, if a user loses their connection to cellular service, the user can still access each favorite store's basic store information and promotions.

Notifications Tab

In the notifications tab, users receive push notifications when their favorite store has added or updated a promotional post or when their favorite mobile vendor has opened at a particular location (see Figure 24). Tapping on a notification regarding a promotion post takes the user to that promotional post, and tapping on a notification regarding a mobile vendor takes the user to that store's personalized store page. Users can delete individual notification messages or delete all of their messages at once.

The push notifications of this app are made to connect businesses with their customers. When businesses have promotions or discounts, their customers are able to receive an instant message regarding this information so they are always connected. Because the store page is managed by a business' owner, customers are able to receive the most up-to-date and correct information from the store.

Settings Page

There are three sections on the "settings" page, which are "profile", "notifications", and "contact us" (see Figure 25). In the "profile" section, users can choose to upload a profile image for their account, change their username, or remove their profile picture. As for the "notifications" section, users can choose to toggle their favorite stores' notification message on or off. In order to manage stores' notifications, there is an attribute for each store object that keeps track of the users that favorite each store. Furthermore, when a user favorites a store, un-favorites a store, or changes his/her username, this information is updated accordingly.

Lastly, the "contact us" section allows users to send an e-mail to me regarding any comments or issues. This is done by incorporating "Mailgun", a third-party service that takes care of e-mail delivery to this app. To send an e-mail, the program calls one of the functions from the cloud code that I wrote and stored on Parse's server.

Electronic Word of Mouth

The last feature of this app is called "electronic word of mouth". This idea was first conceived by my advisor for this project, Professor Majid Sarrafzadeh. The idea is to allow a user to exchange stores that they like with another user, which is similar to chatting in-person with a person about stores but in a much more efficient way.

One of the difficulties we faced when implementing this idea was how to transmit data between phones, including Android phones and iPhones. Currently, there is no efficient way to do this. For example, Bluetooth and NFC do not work between Android phones and iPhones. My approach to this problem was to use push notifications. When a user accesses the "electronic word of mouth" page, the program sends this user's information to a table on the database, and the program continually checks that table for other users. When other user is found, the other user's object is retrieved and processed to be displayed on this page (see Figure 26).

When the first user taps on the other user's icon, the first user's phone sends a push notification directly to the second user. When the push notification arrives on the second user's phone, the program prompts the user to accept or ignore the "exchange profile" request from the first user. If the second user accepts the request, the second user's program sends a push notification to the first user, retrieves the first user's profile, and determines which stores to recommend to the second user. Upon receiving the confirmation message from the second user, the first user retrieves the second user's profile and determines which stores to recommend to the first user.

Even though push notifications are reliable and fast, I implemented a "time-out" mechanism to prevent the program from continuously looking for a push notification if the notification is dropped along the way. When recommended stores are determined, the program would take the user to a "Recommended Stores" page, where the user can view each store's personalized store page and favorite a store.

Promoting This Platform and Future Work

The first step that I took to promote this platform was to find businesses to sign up and create store pages. The process was much more difficult and time consuming than I had

anticipated. To create a store page, most businesses required the owners of their store to approve this decision; however, most owners were not present in their stores when I visited, so I had to schedule an appointment with them or send an e-mail to them. Sending an e-mail was the most ineffective way to reach owners because of the 20 emails that I sent out, none of them replied.

Scheduling an appointment and meeting the owners was the most effective way to have them sign up and create their store pages. If I was able to meet an owner of a store, there was an 85% chance of success. However, leaving a note or a business proposal almost never worked. After two weeks of promoting this platform to the businesses, I had 87 stores that signed up and created their store page on this platform. I also obtained a partnership with ComNet; they supplied free calling cards and discount cards to me to help promote this platform. Additionally, in the three days that I spent promoting this app on UCLA campus, 50 people downloaded and used it.

Nevertheless, there are some improvements and adjustments that need to be made to make this platform scalable and more useful. First, instead of visiting each store to have them sign up and create their store page, it is much more efficient and cost-effective to add stores ourselves at the expense of losing photos or menus of stores, including the store logo. Having to visit every store ourselves the best day that I had with 0 rejections from stores when I visited was 11 stores in one day. This took roughly six hours of visiting stores continuously without rest. Therefore, to achieve my goal of having most of the stores in a city using this platform, I would have to spend weeks or even months visiting them, and some of them would refuse to be on this platform. From the experiences that I had, I found that it was going to be necessary to change how each store is handled and added to the platform.

In addition, even though my original intention of leaving out comments and ratings was to prevent fake reviews and fake ratings, I determined that having reviews and ratings help users decide whether or not they want to see a store's personalized store page. Without comments and ratings, users would have to access each store's page individually to have an idea of the quality of their services and products. In conclusion, this project certainly opened my eyes to how a product in the technology industry, in terms of scale, work, and structure, would be developed. Moreover, it taught me how to promote a product to both businesses and consumers.

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Figures from the Project

Figure 1: Sign-up Form – Part 1

This form consists of one or more drop-down lists of categories, a business name input box, a street address input box, a city and a state input box, and a zip code input box.

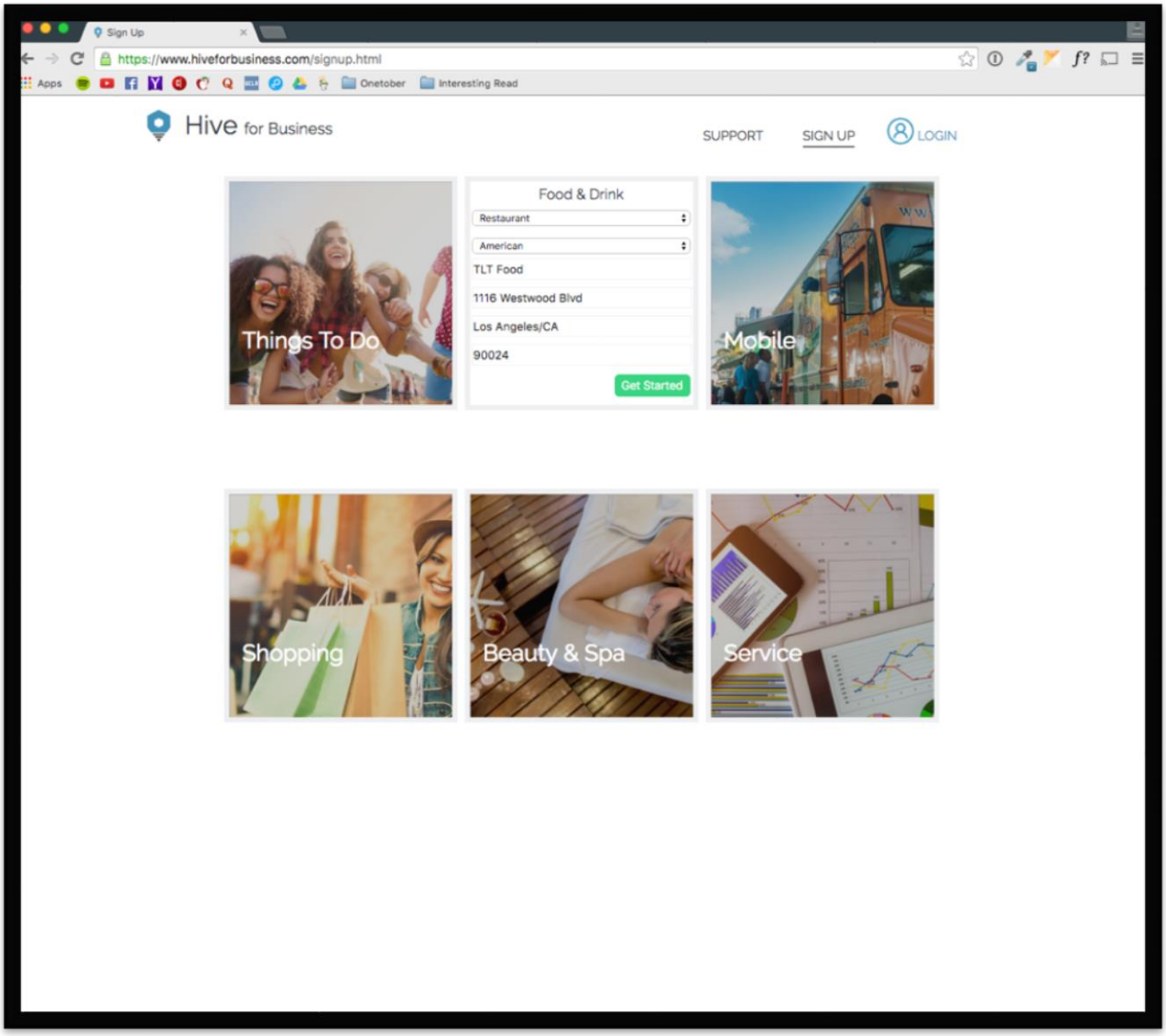

Figure 2: Sign-up Form – Part 2

When a user clicks on the "Get Started" button, a pop-up box will appear. This box consists of a store ID input box, a phone number input box, an email address input box, a password input box, and a confirm password input box.

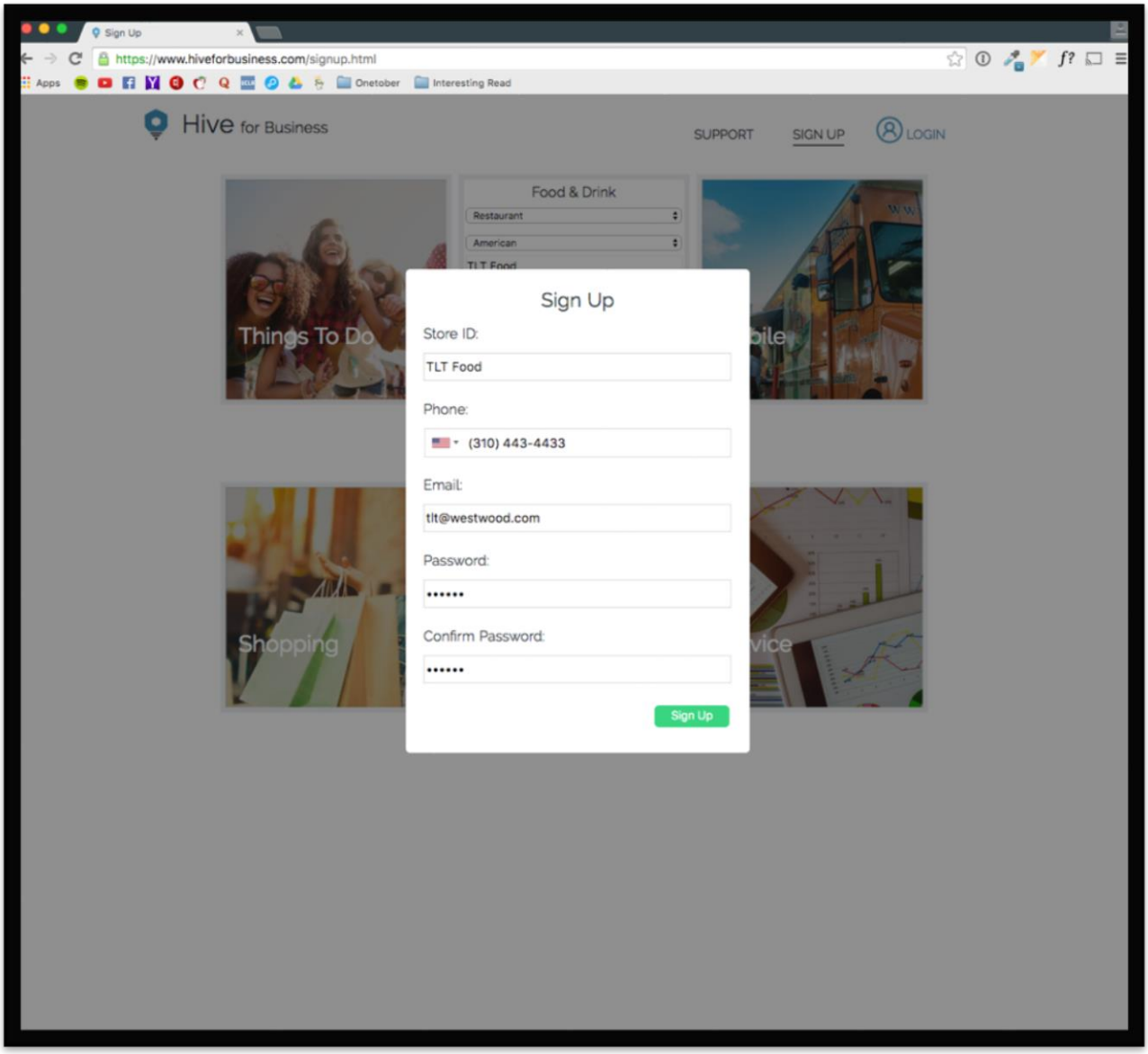

Figure 3 – Sign In

The sign-in page consists of an input box for store ID and e-mail, and an input box for password. There is also a link to the *forgotPassword* page.

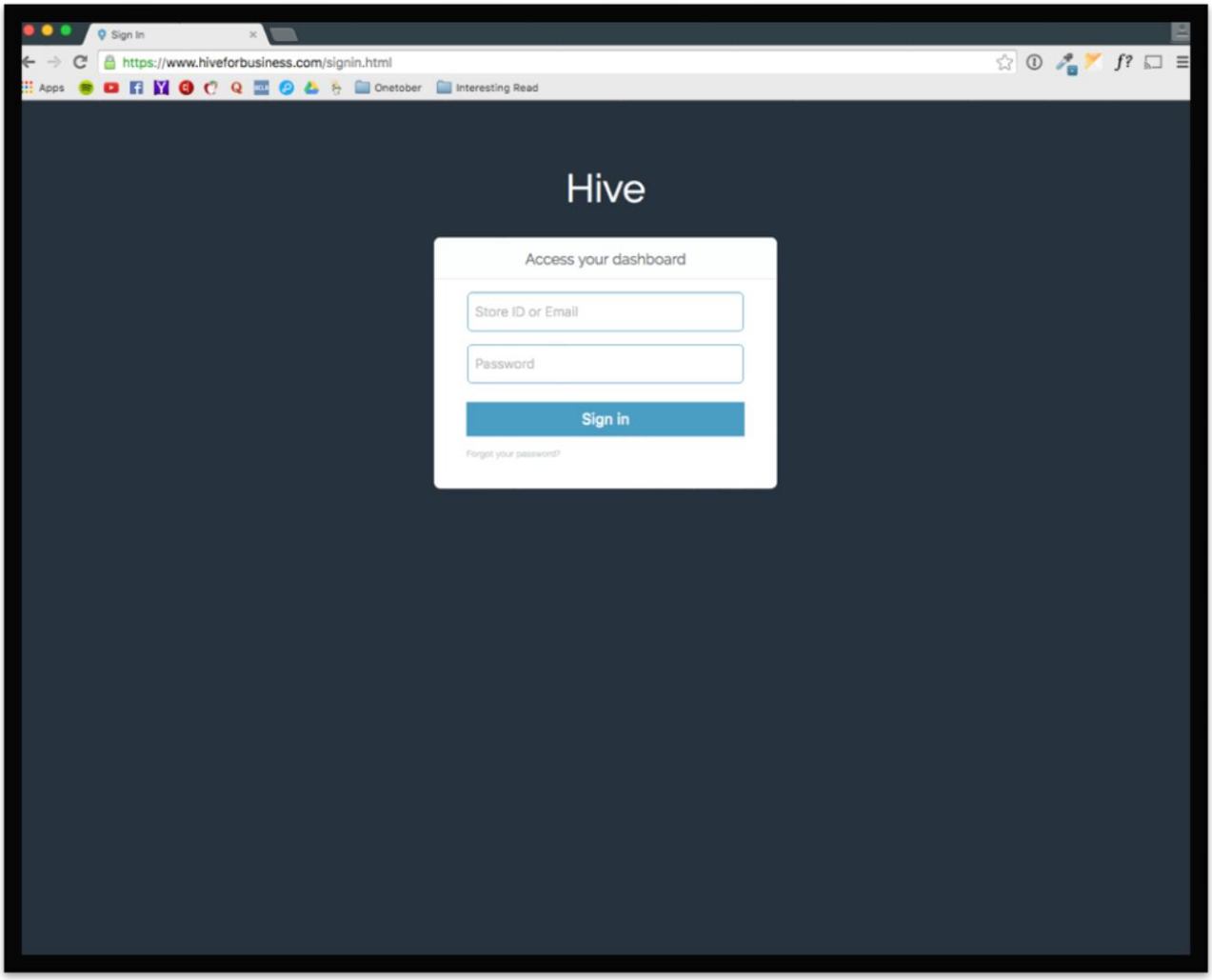

Figure 4: Personalized Store Page – Part 1

This image contains a portion of the personalized store page. It has an upload button for a store's banner image and the store's store logo image. In addition, it contains a link to the *addPromotion* page and links to every promotion post that is created by the owner.

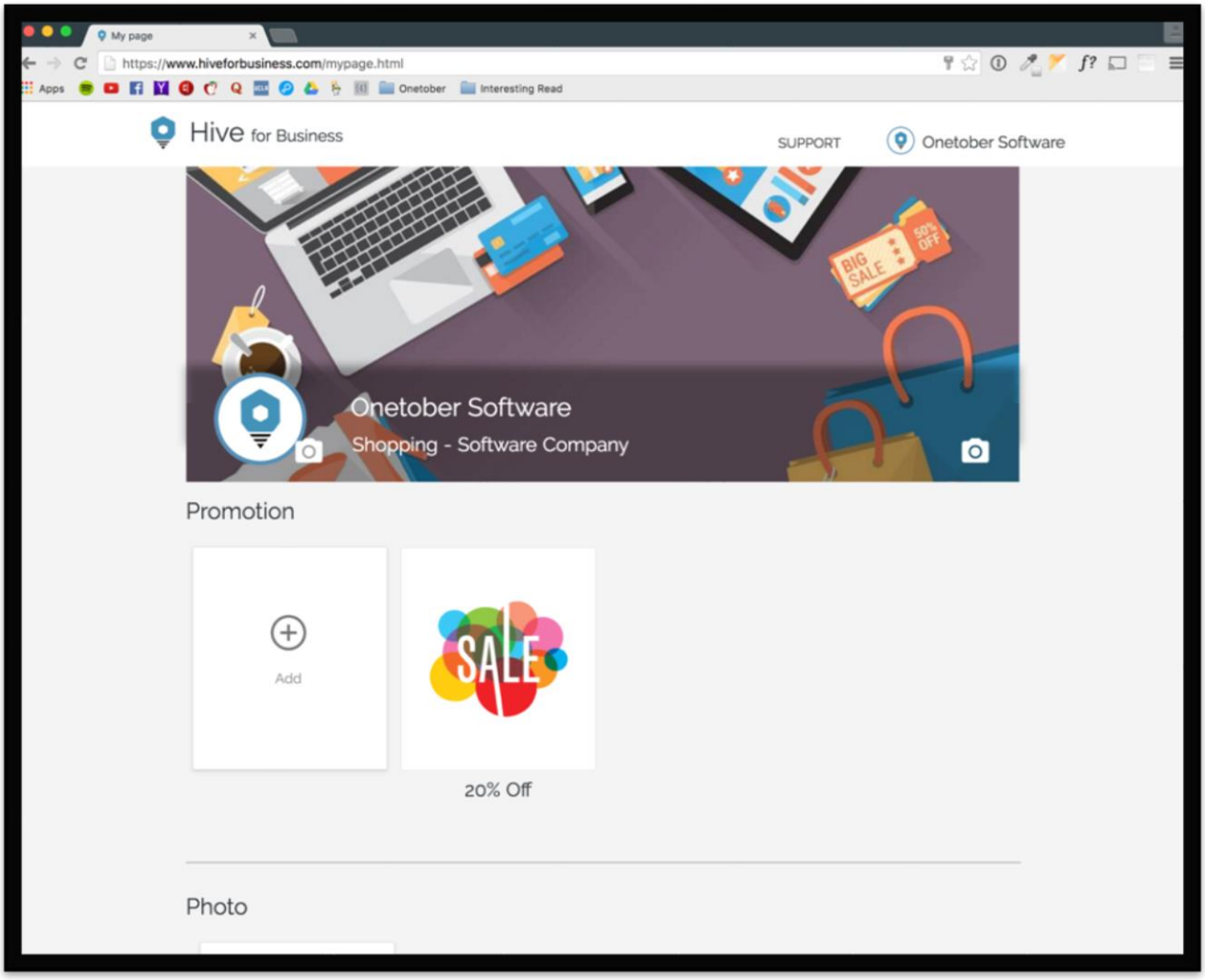

Figure 5: Personalized Store Page – Part 2

This image contains a portion of the personalized store page. It contains a link to the *addPhotos* page and a link to *editContact* page. Every image that is uploaded by the owner would appear under the "photos" section. The store's basic information, which includes website URL, direction of how to find this store, address, and phone number, are retrieved from the database and display under the contact section.

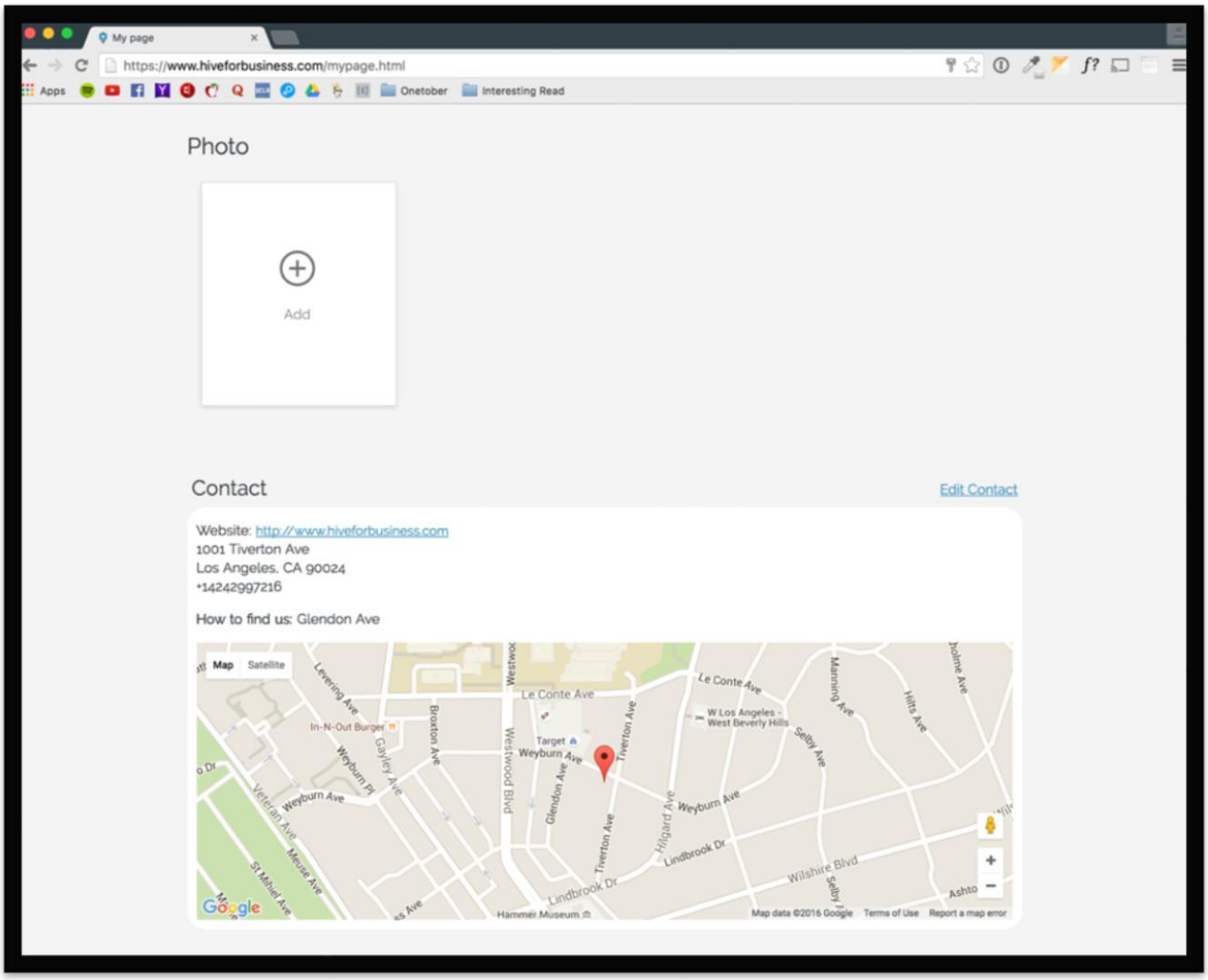

Figure 6: Personalized Store Page – Part 3

This image contains the last portion of the personalized store page. It contains a link to *editHours* page, a link to *editAmenities* page, a dropdown list for editing the dollar sign, and an input box for editing a store's student promotion.

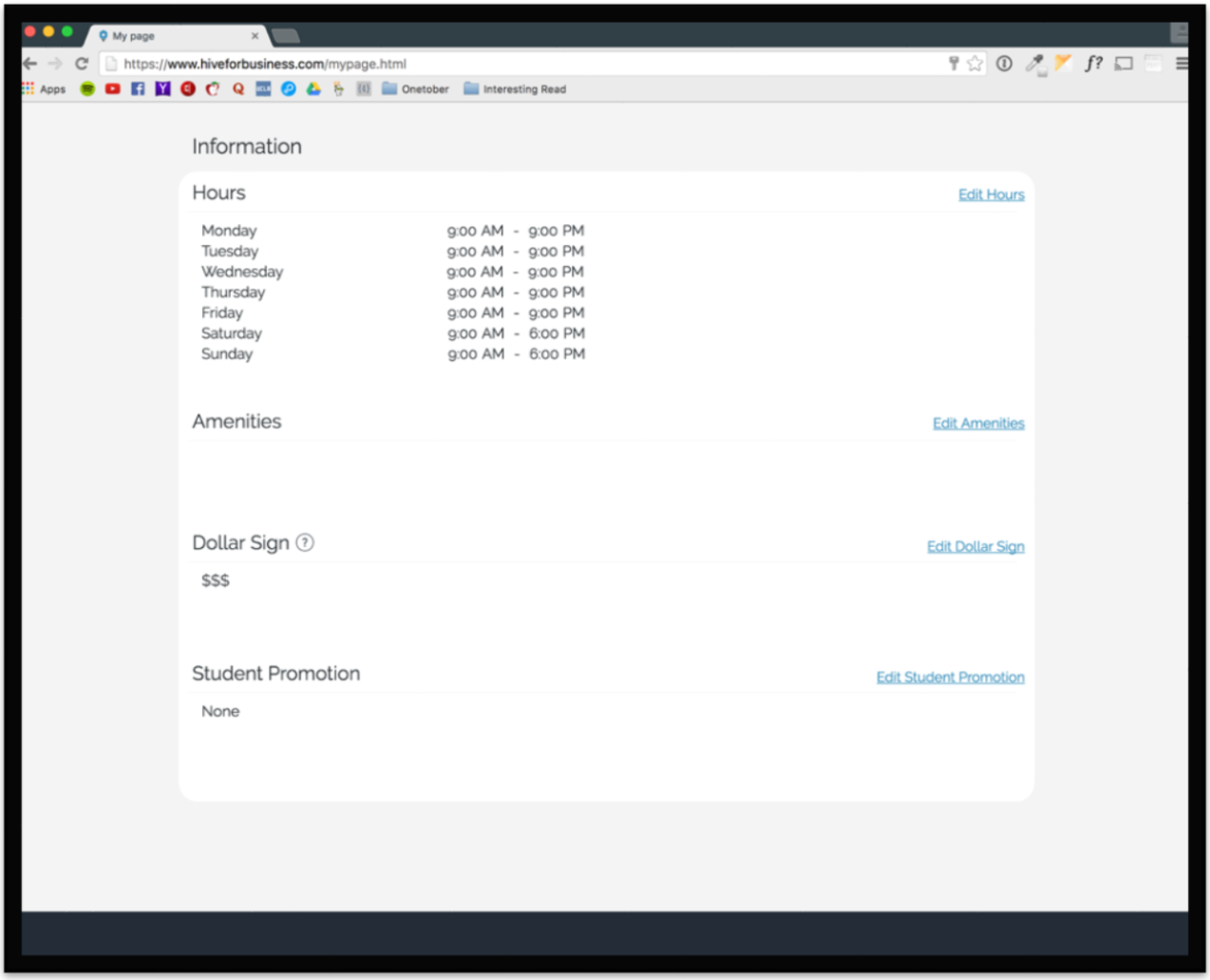

Figure 7: Promotional Post

This page contains all the necessary information of a promotion post.

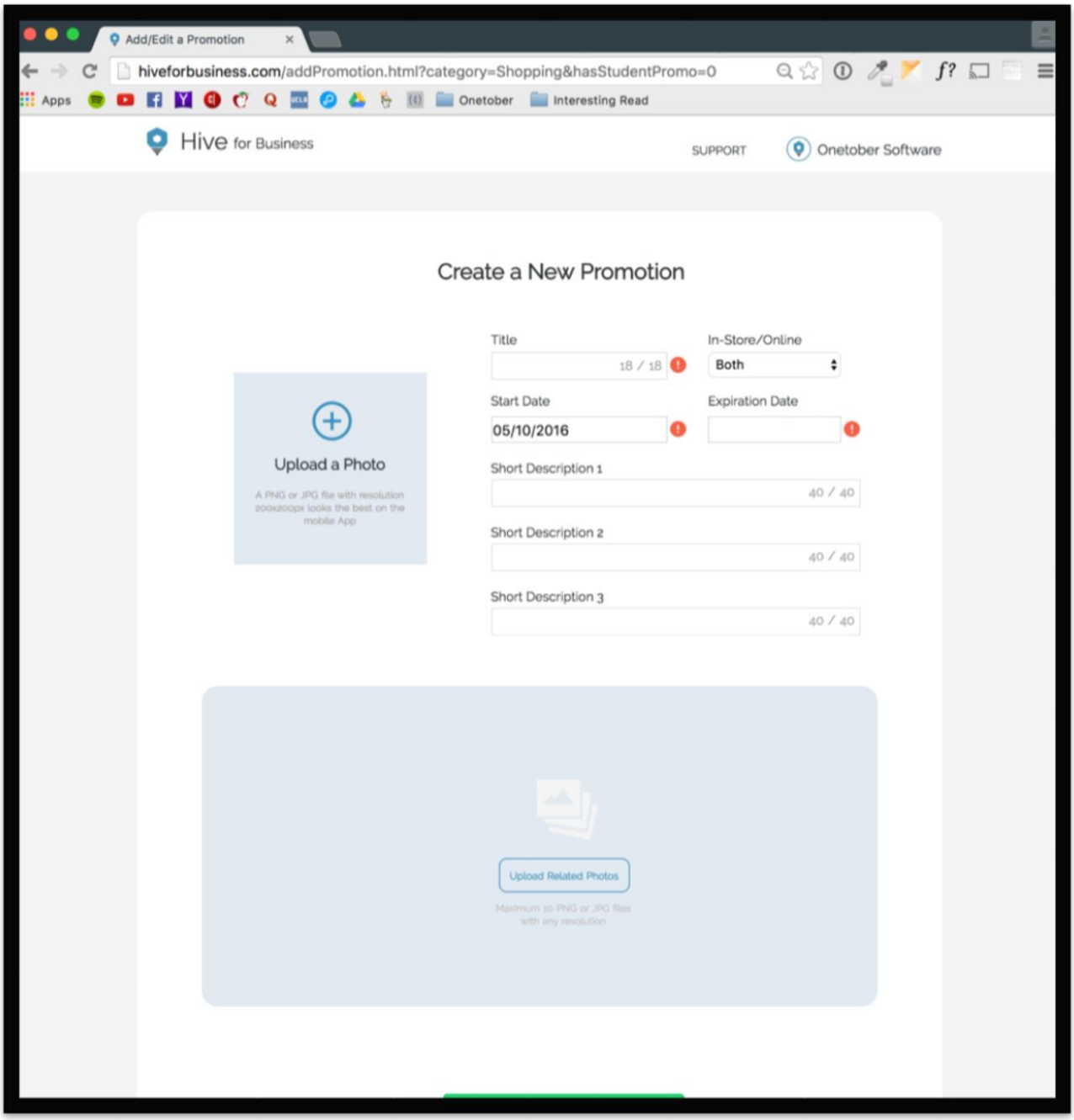

Figure 8: Detailed Promotional Post

This page retrieves a promotion post's information from the database and displays them.

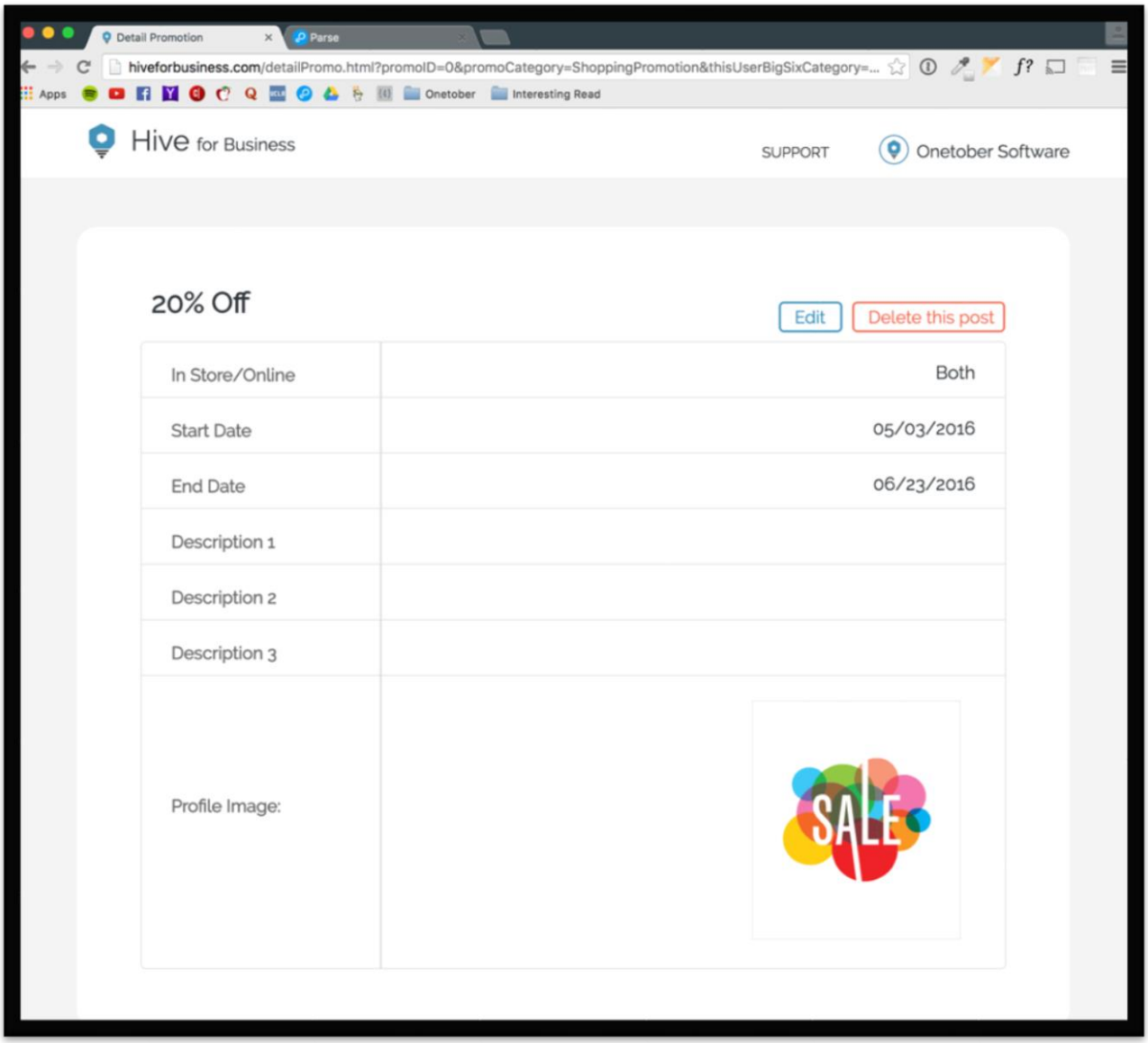

Figure 9: Menus

This page allows owners to add or edit menus.

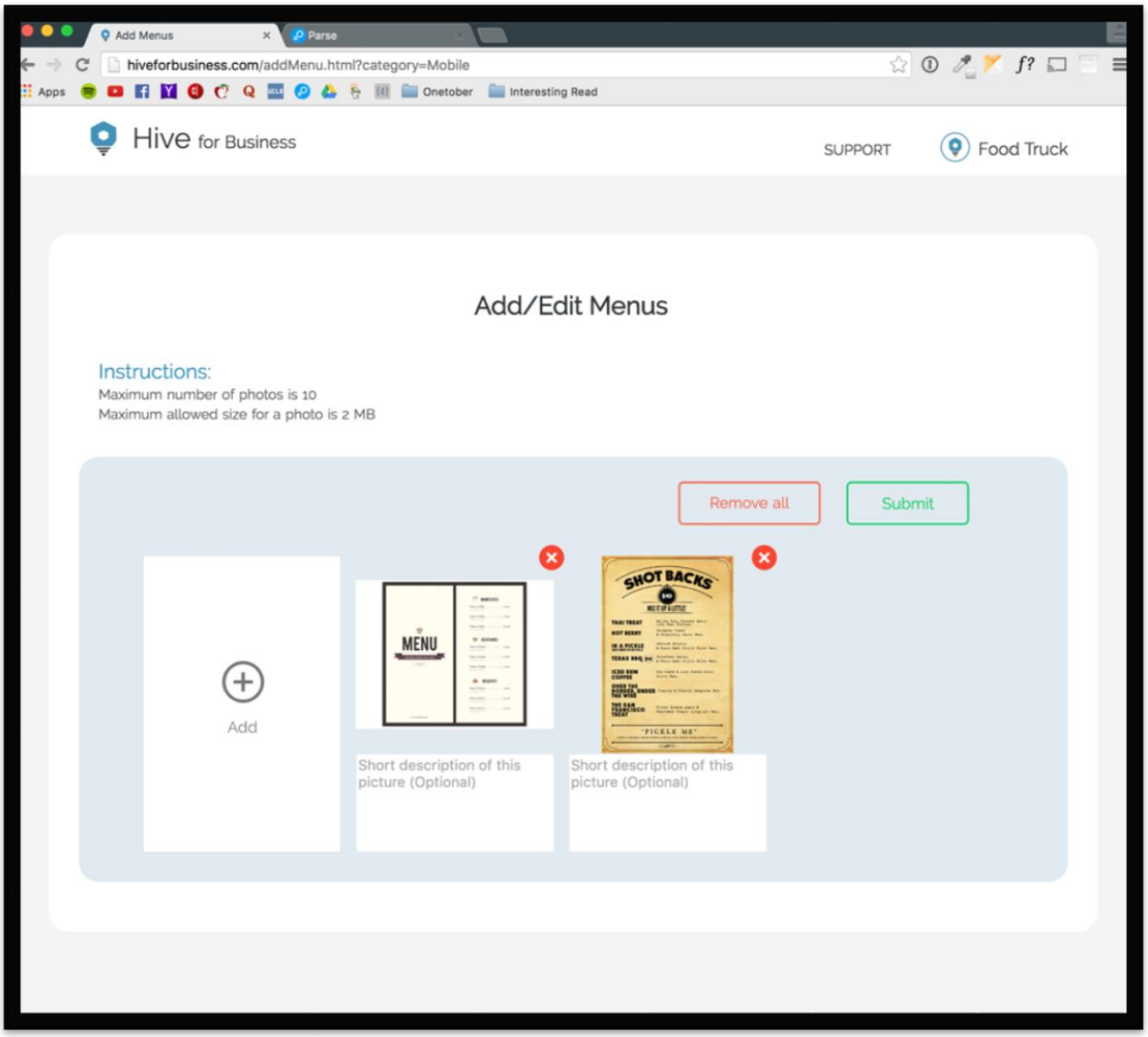

Figure 10: Photos

This page allows owners to add or edit photos.

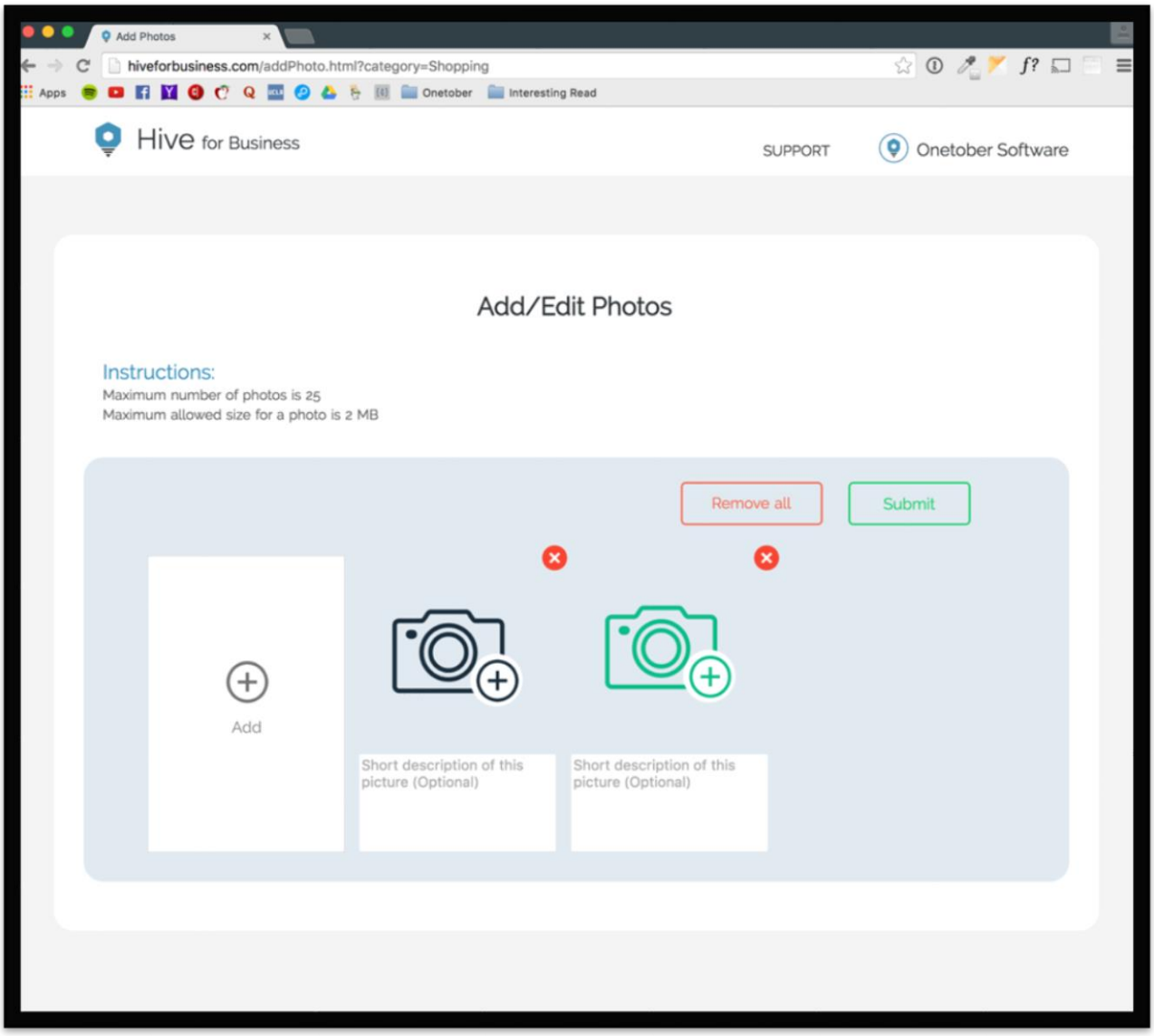

Figure 11: Contact

This page retrieves and sets an owner basic store information, including business name, street address, city, state, zip code, phone number, how to find us, and website URL.

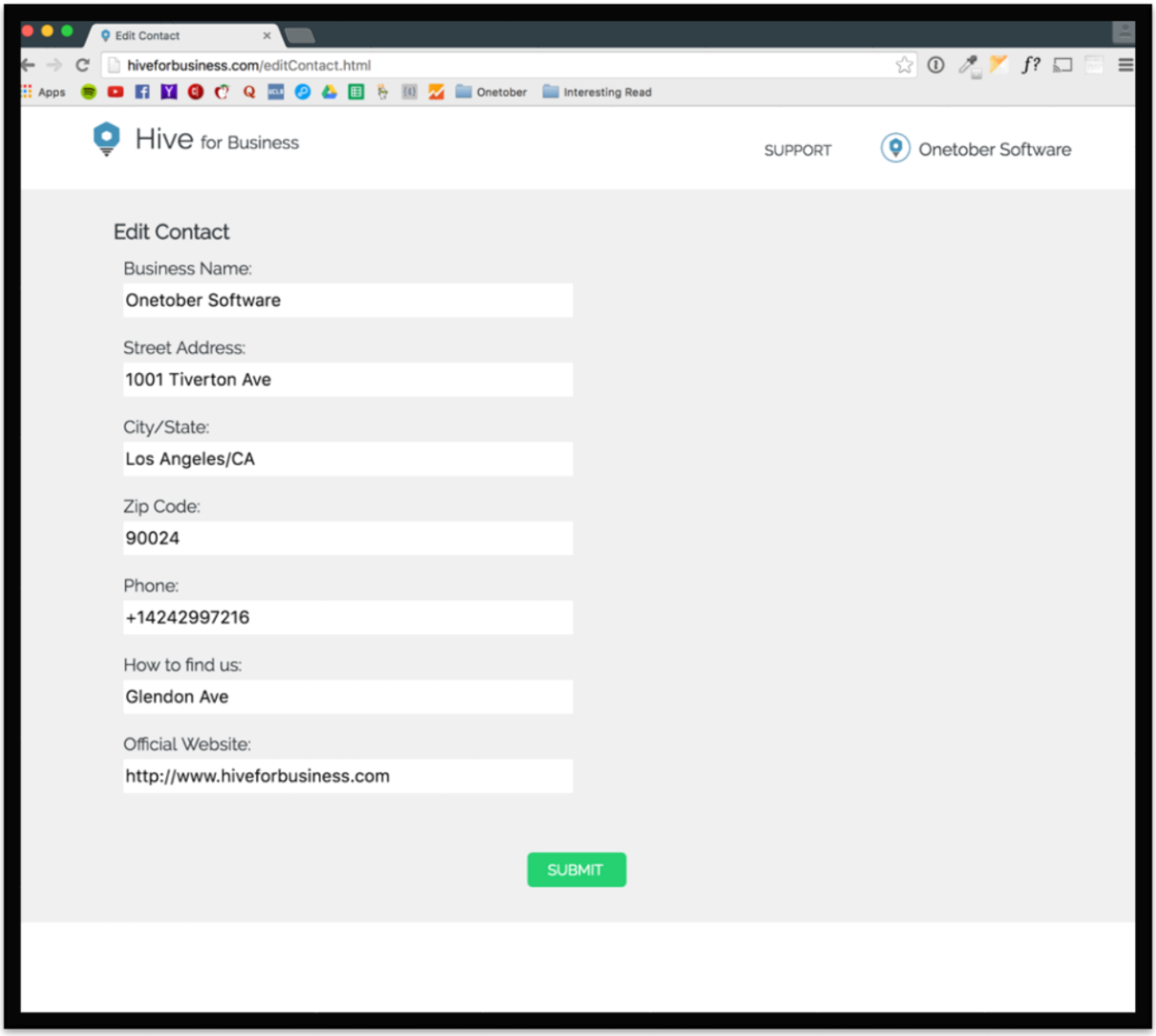

Figure 12: Hours

This page retrieves and sets a store's hours of operation from Monday to Sunday.

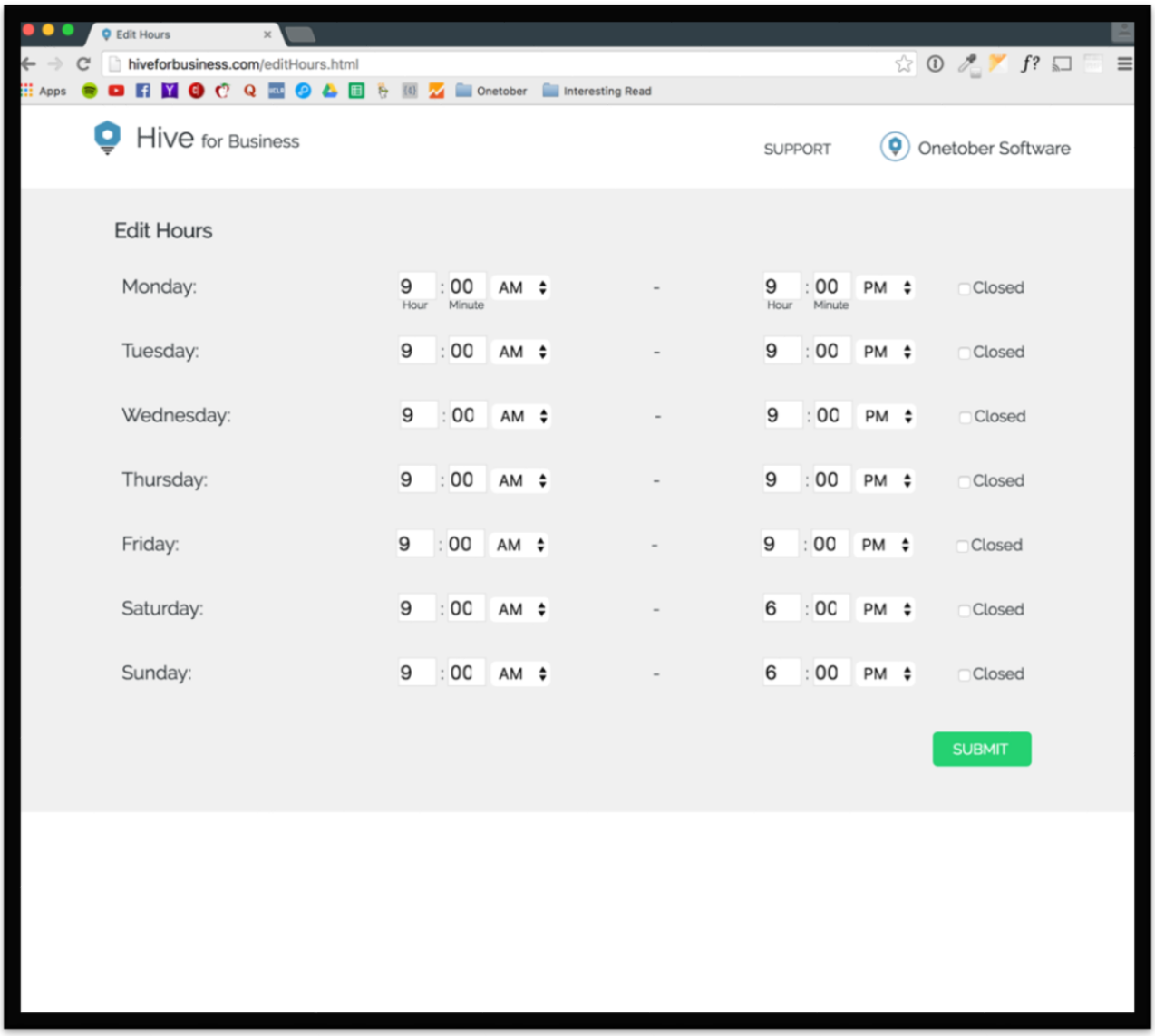

Figure 13: Amenities

This page retrieves and sets a store's amenities.

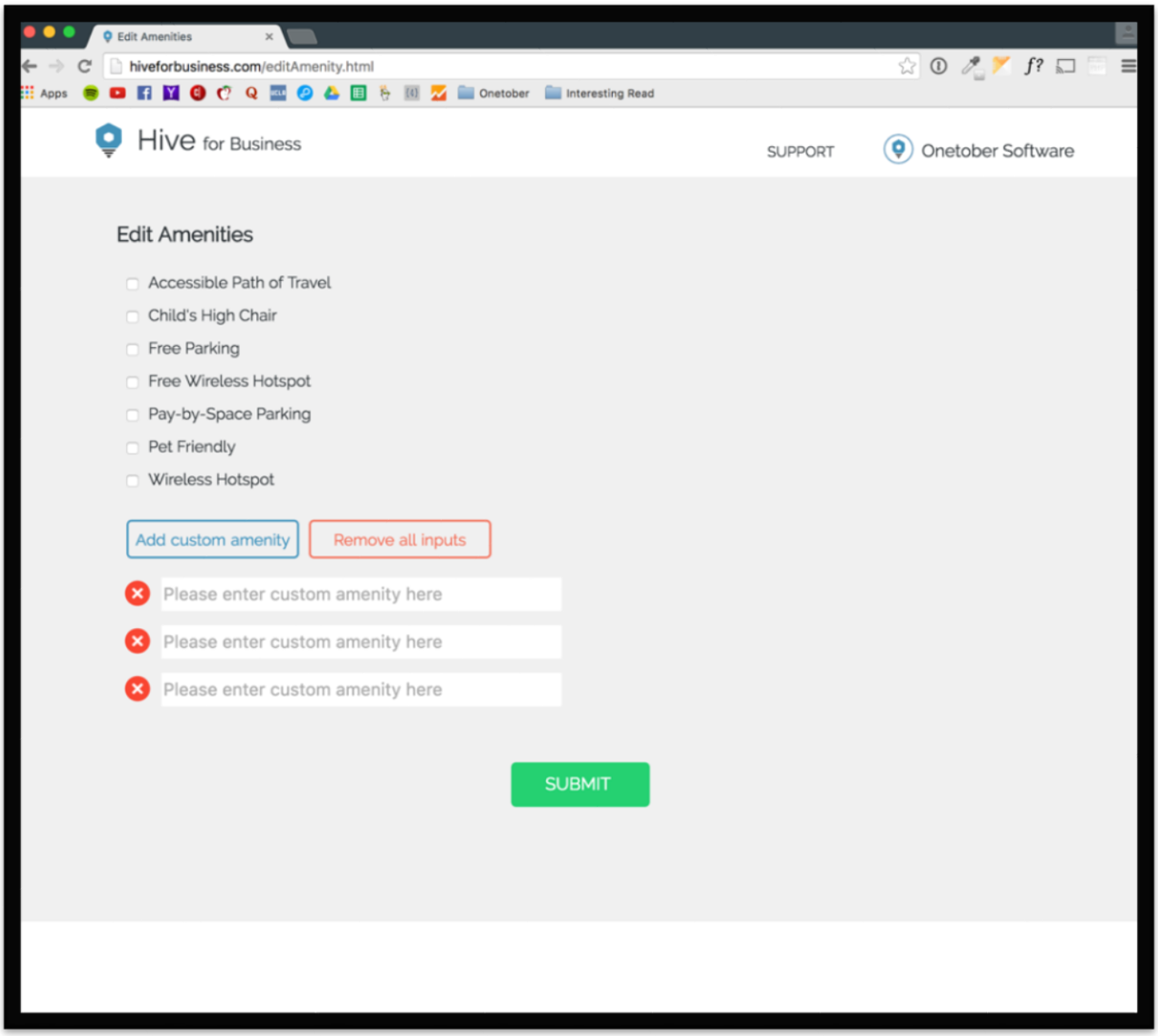

Figure 14: Dollar Sign

This dropdown allows users to specify how expensive or inexpensive of their store's products in terms of dollar signs.

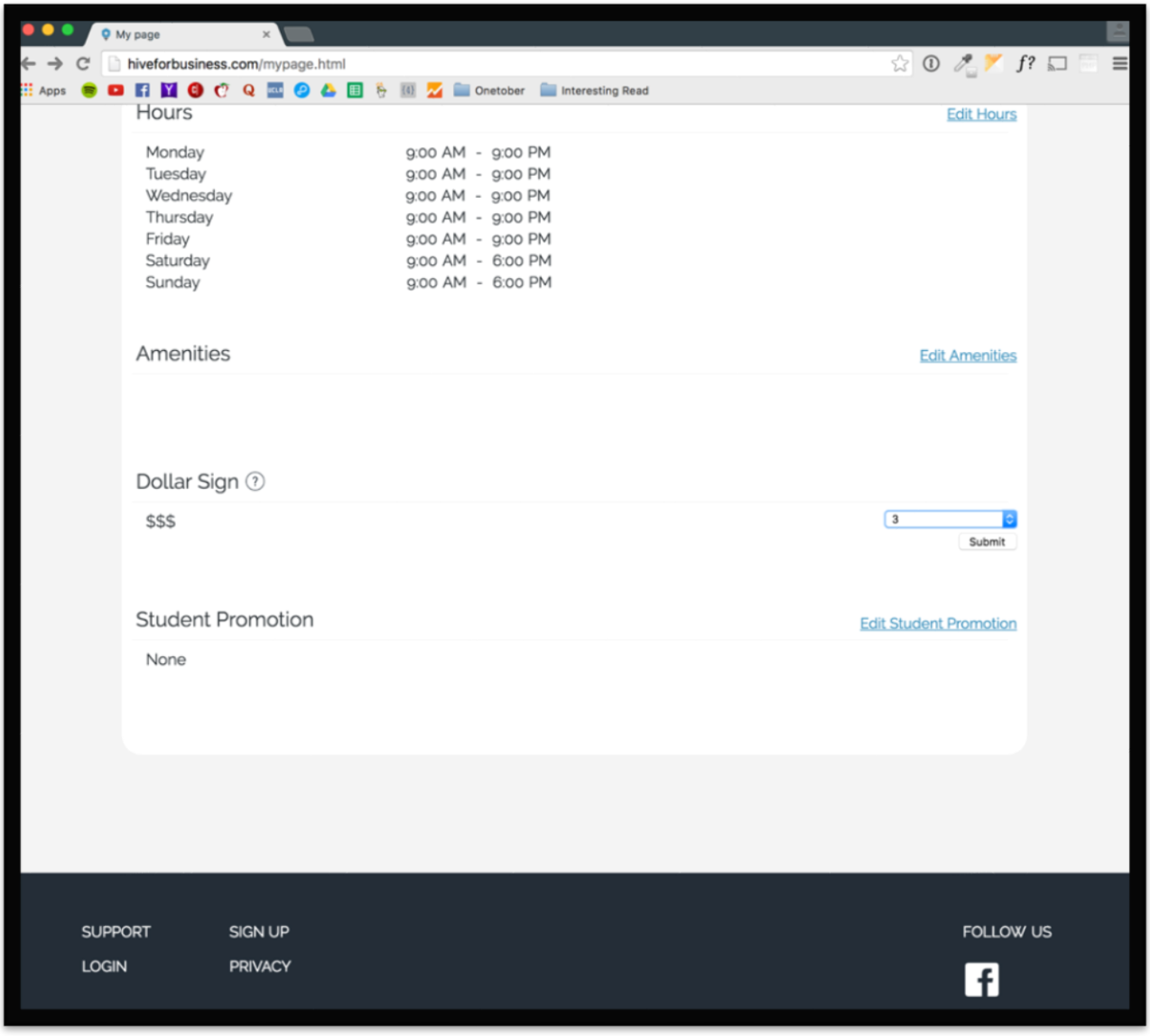

Figure 15: Student Promotion

This input box retrieves and sets a store's student discounts.

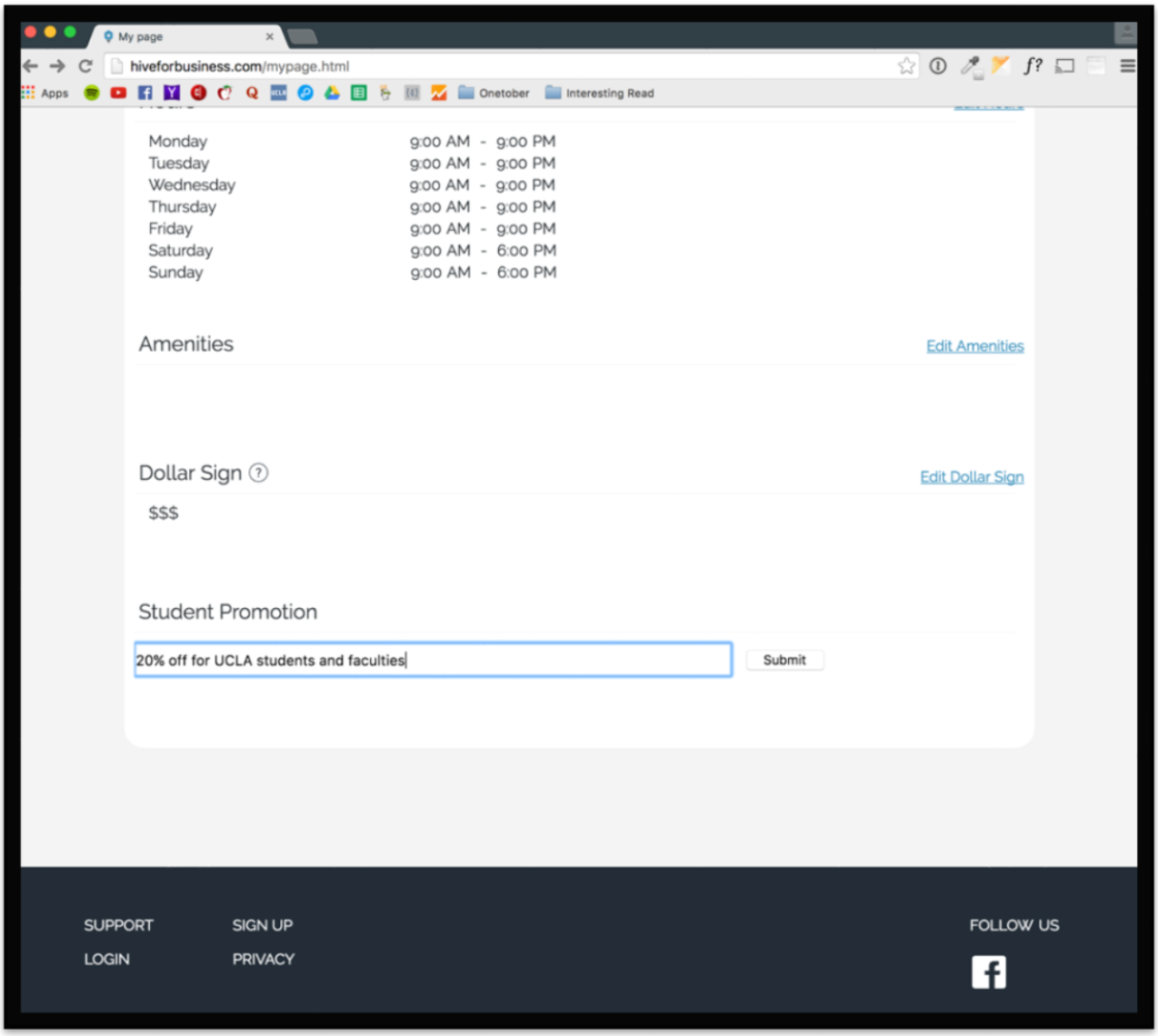

Figure 16: Locate My Current Location

This page allows mobile owners to easily share their current location and their expiration time of that location.

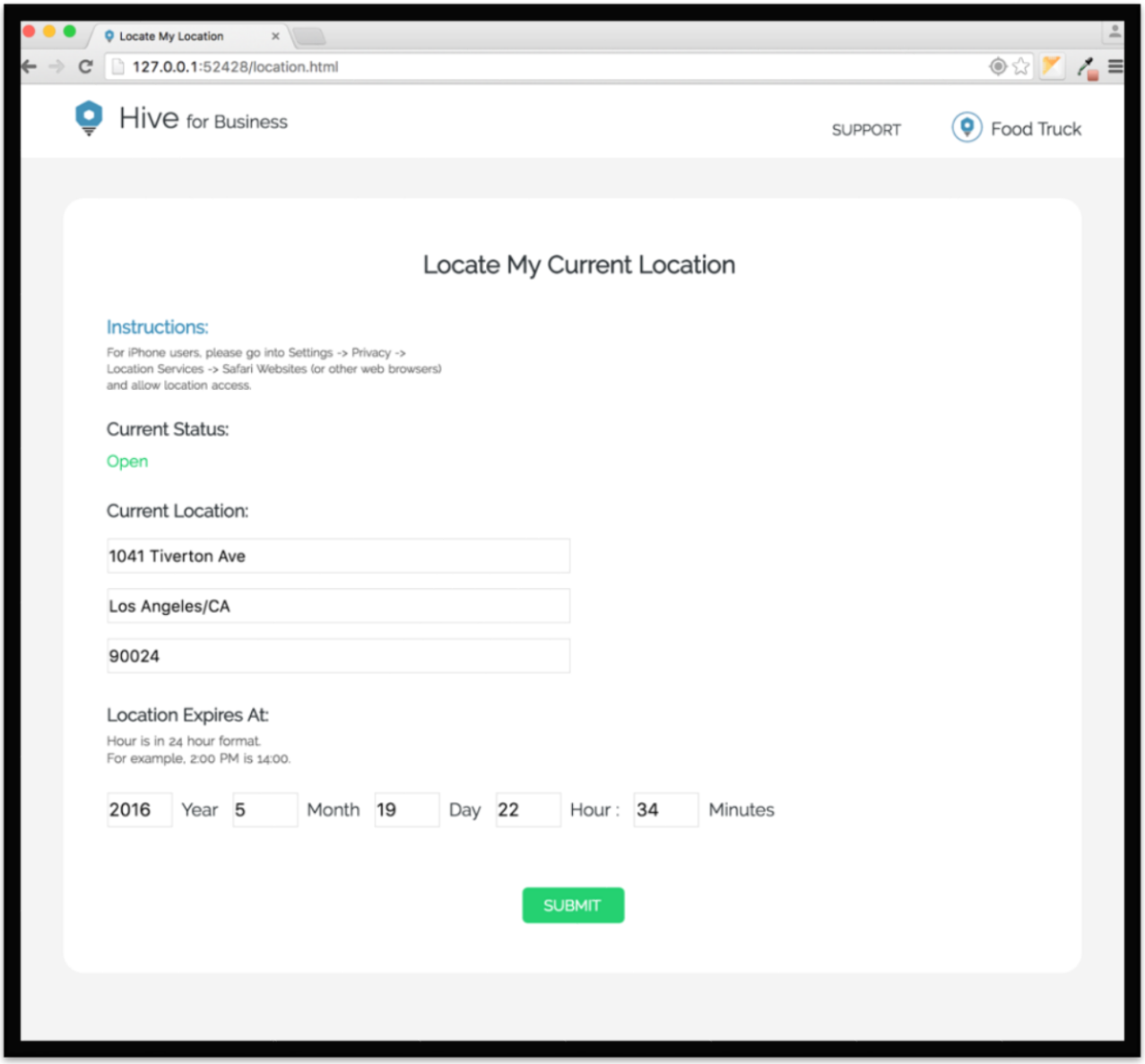

Figure 17: Prototype

The following figure is the prototype and design of this app.

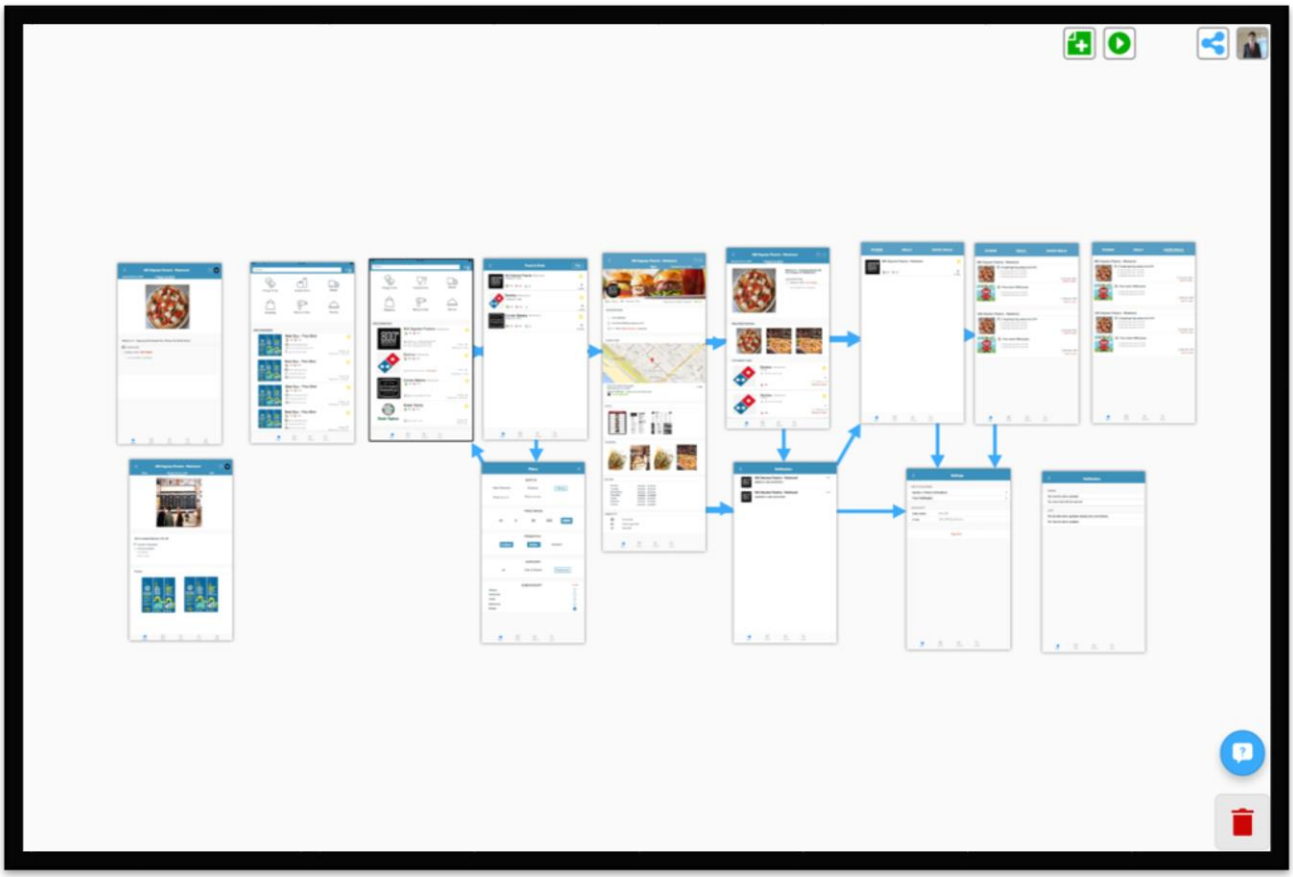

Figure 18: Welcome Screen

The picture on the top left is the welcome screen. The picture on the top right is the sign-up page. The picture on the bottom left is the sign-in page. The bottom right is Facebook sign-in.

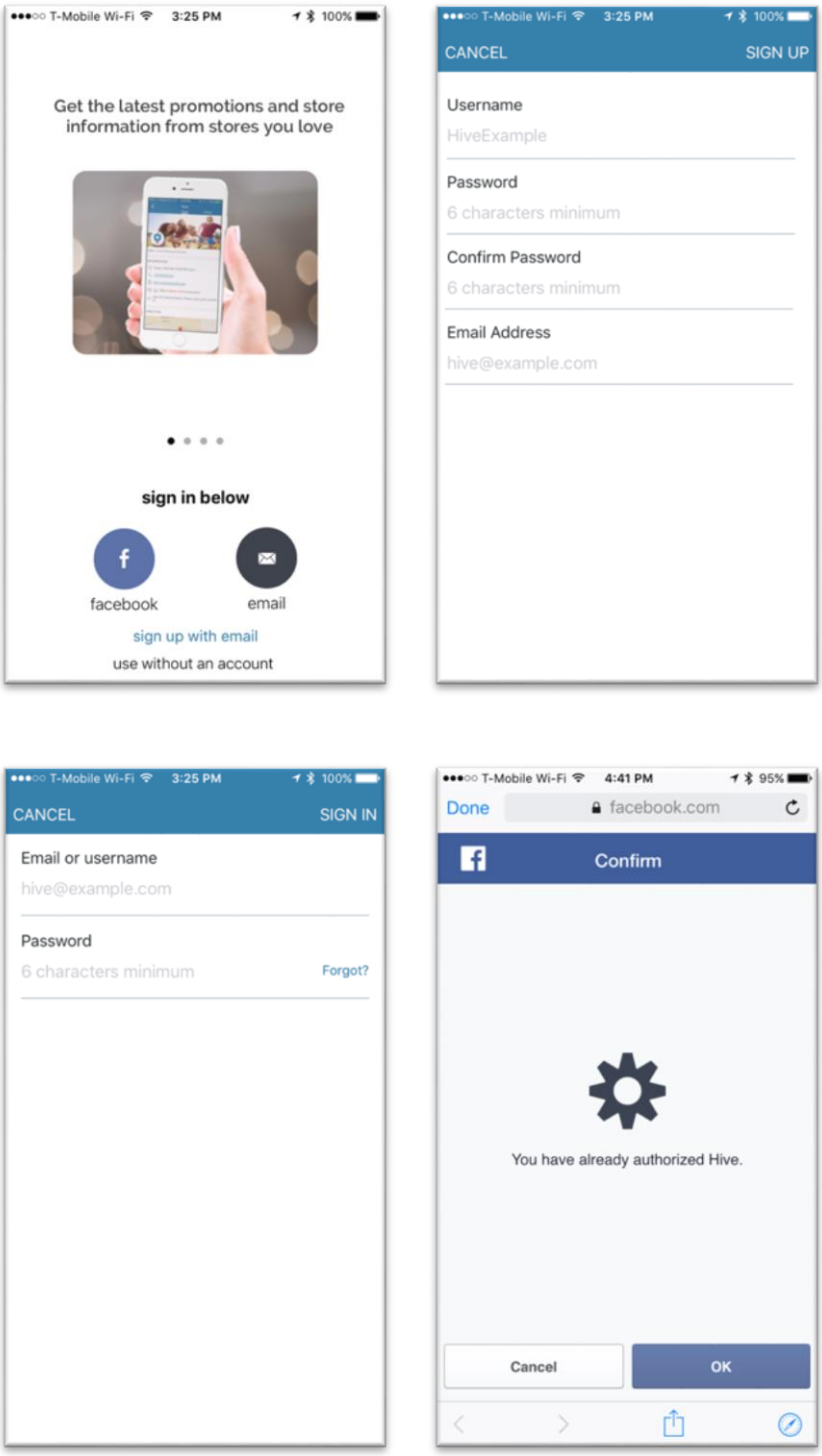

Figure 19: Home Page

This following figure is the home page of this app.

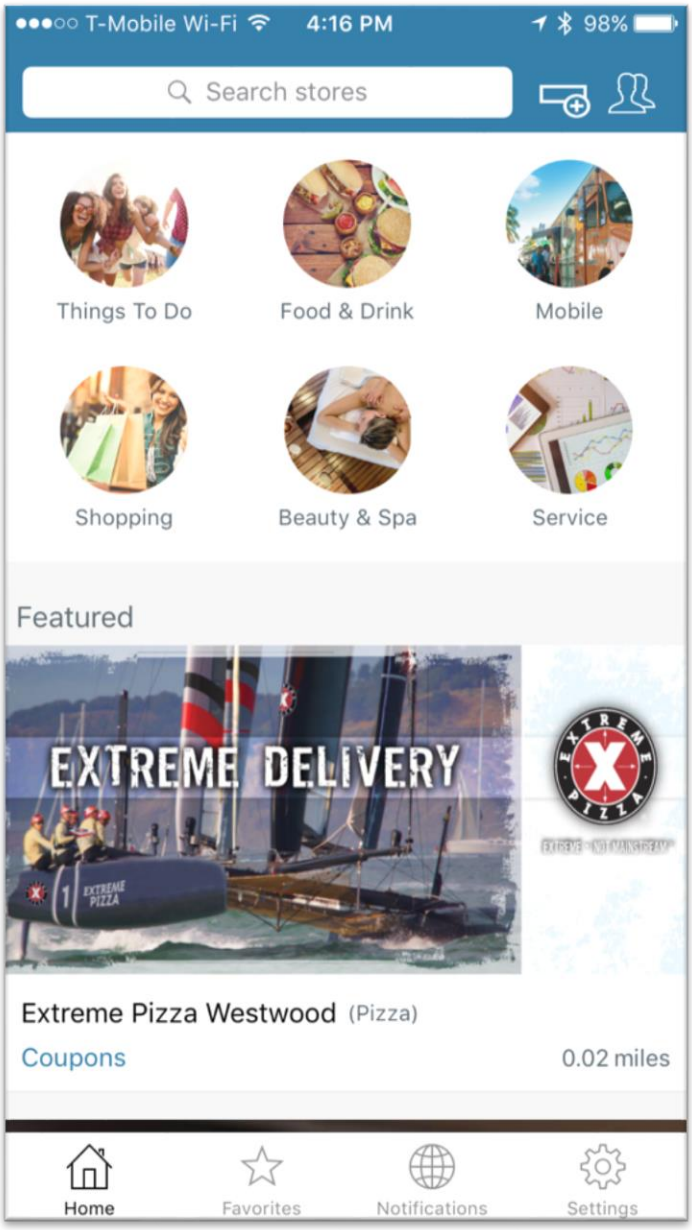

Figure 20: Category Page

The left figure is part of the search results for “food & drink”. The right figure contains some of the nearby stores with student discounts after a user taps on the dedicated student discounts filter button.

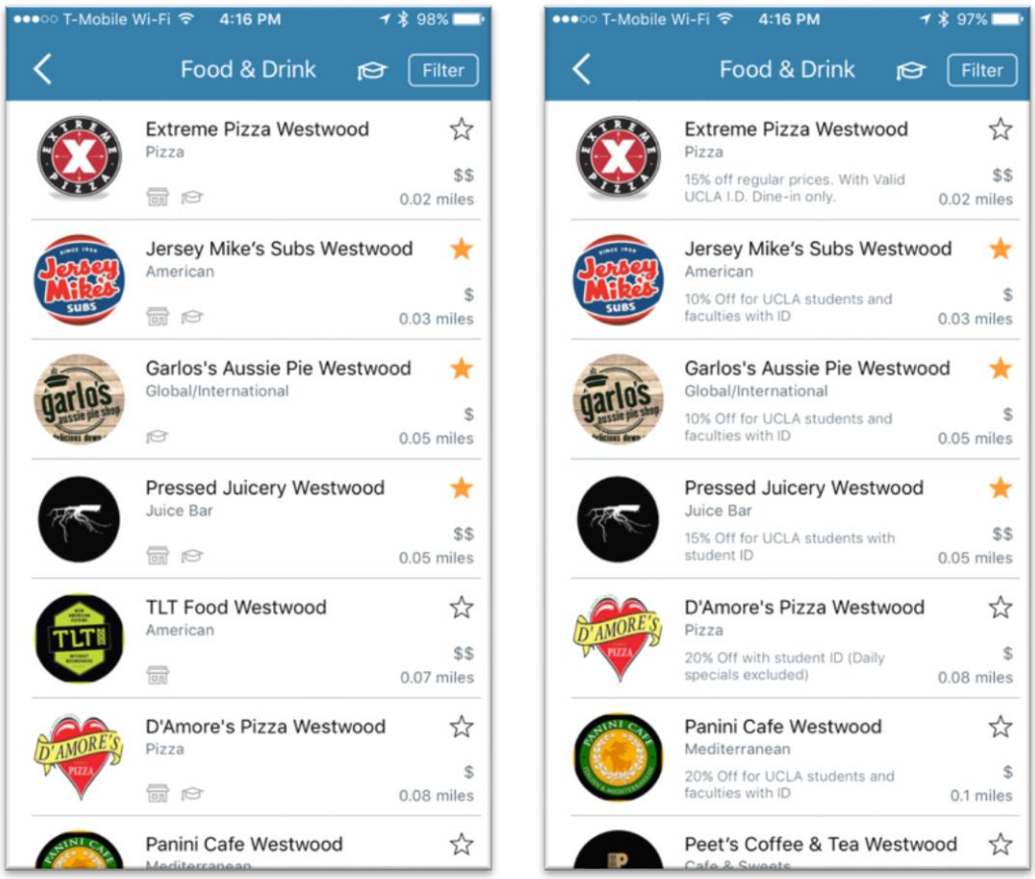

Figure 21: Filters Page

The left figure is the filters page of “food & drink” category. The right figure is the bottom of this filters page.

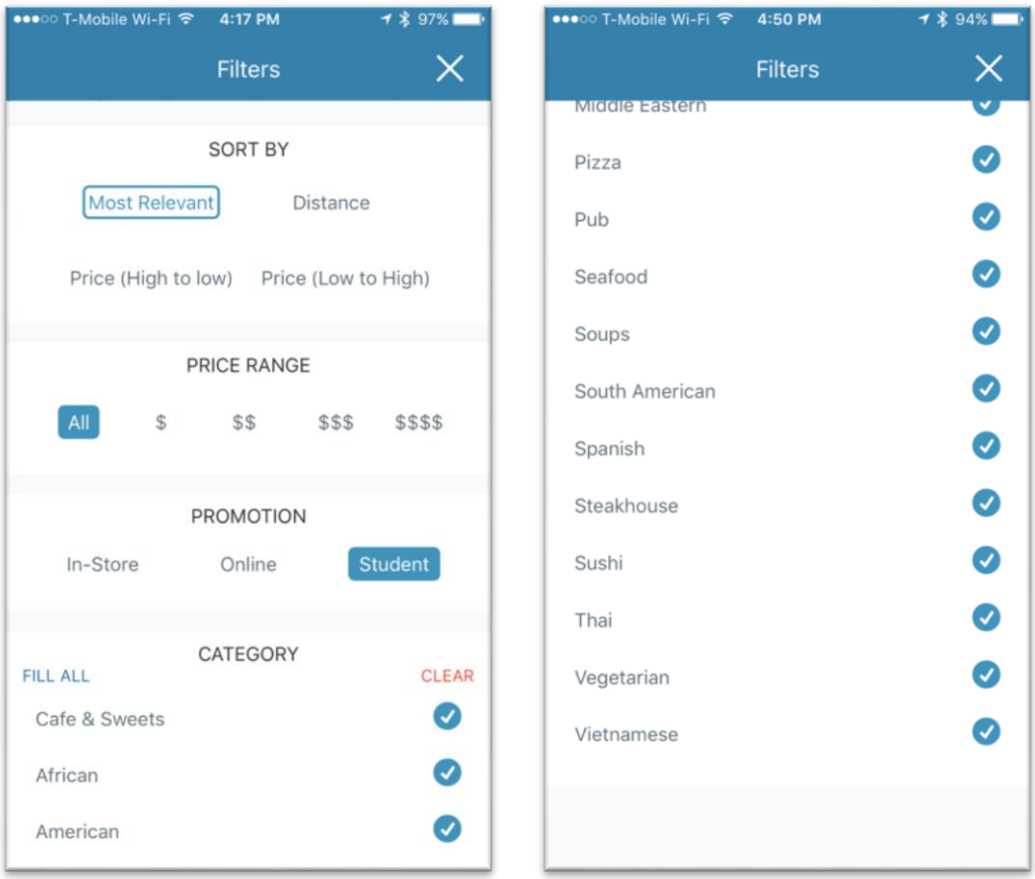

Figure 22: Store Page

The top-left figure is Pressed Juicery Westwood's store page. The top-right figure is part of that store's page. The bottom-left figure is the remaining sections of that store's page. The bottom-right figure is one of the promotion posts from that store.

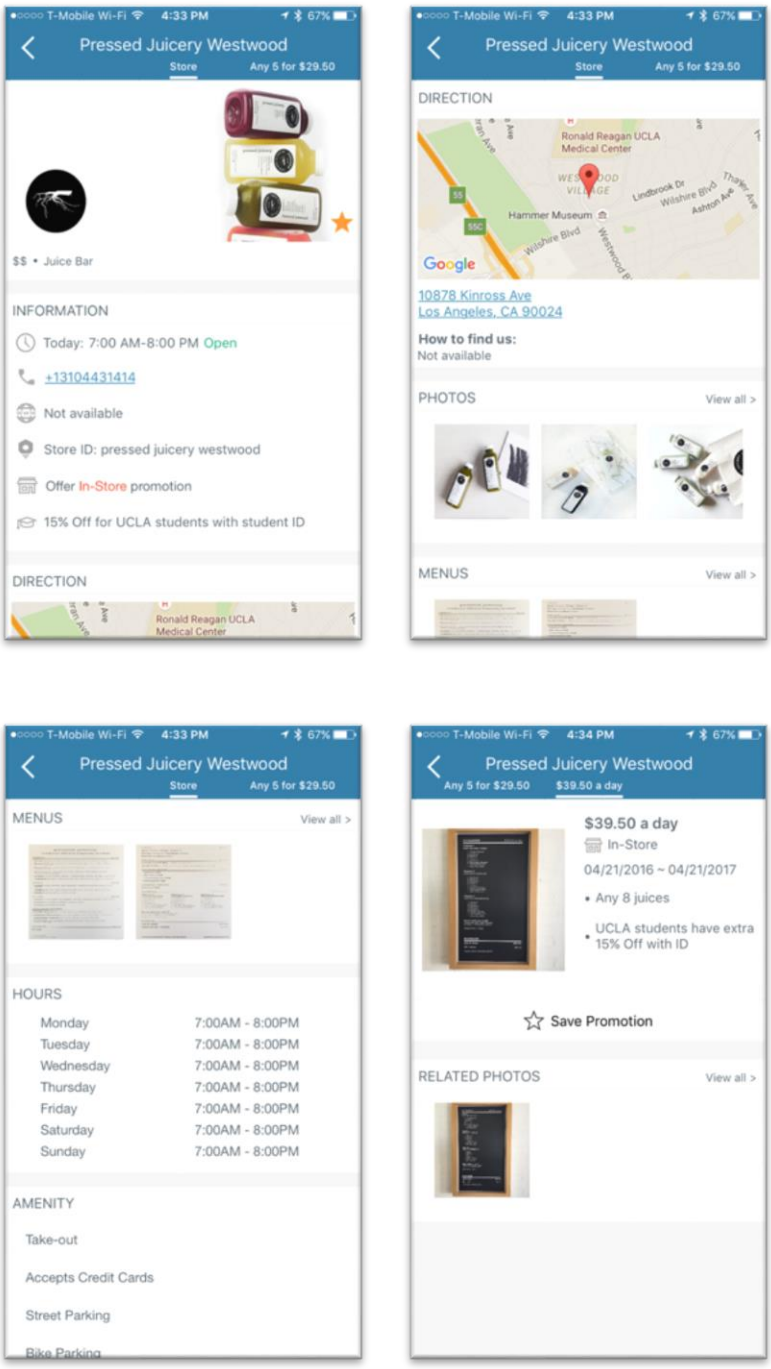

Figure 23: Favorites Tab

The top-left figure is a user's favorite stores. The top-right figure is the user's favorite stores' promotion posts. The bottom figure is the user's saved promotion posts.

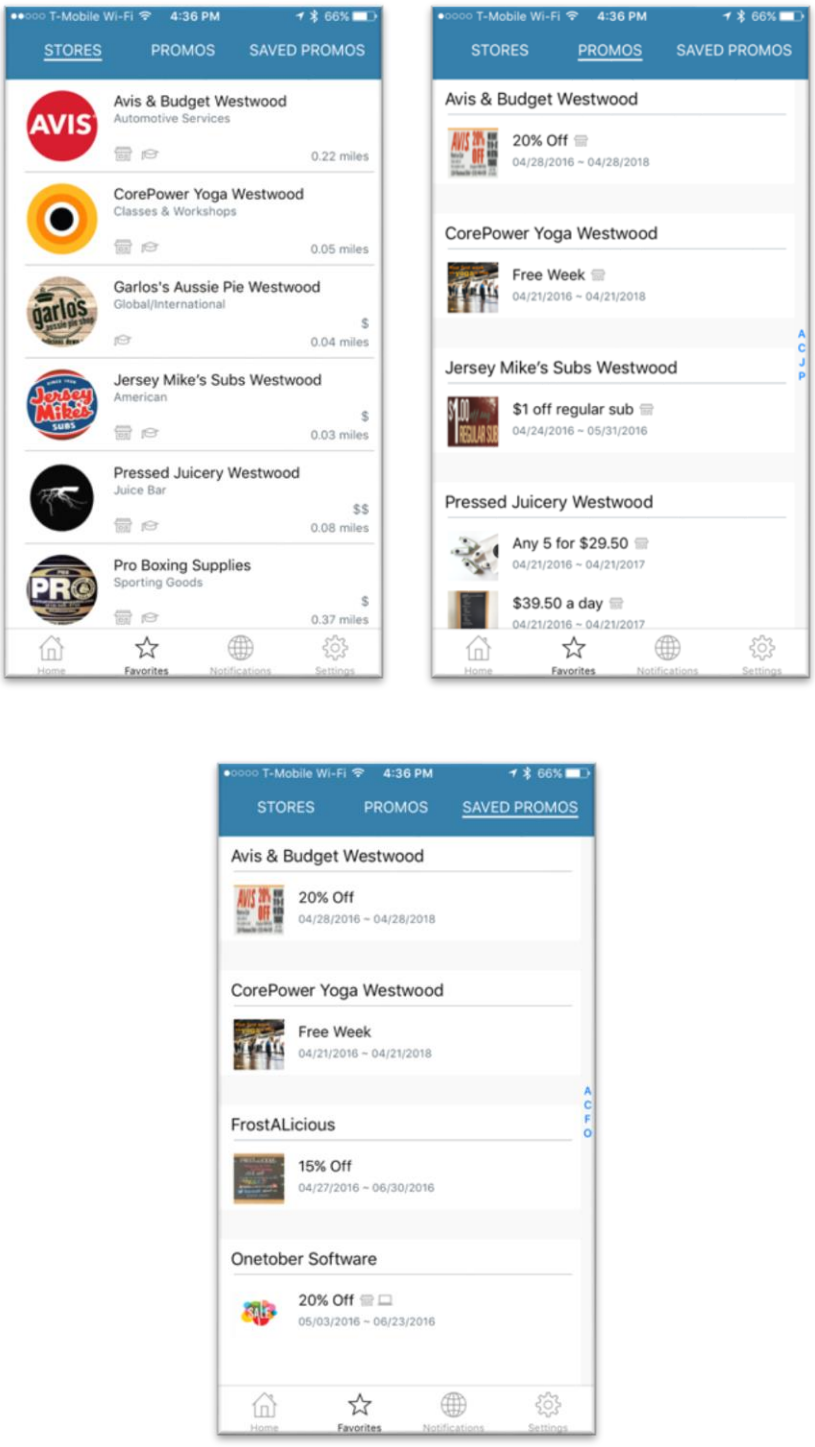

Figure 24: Notifications Tab

The left figure is the notifications page. The right figure shows the delete option for the first notification.

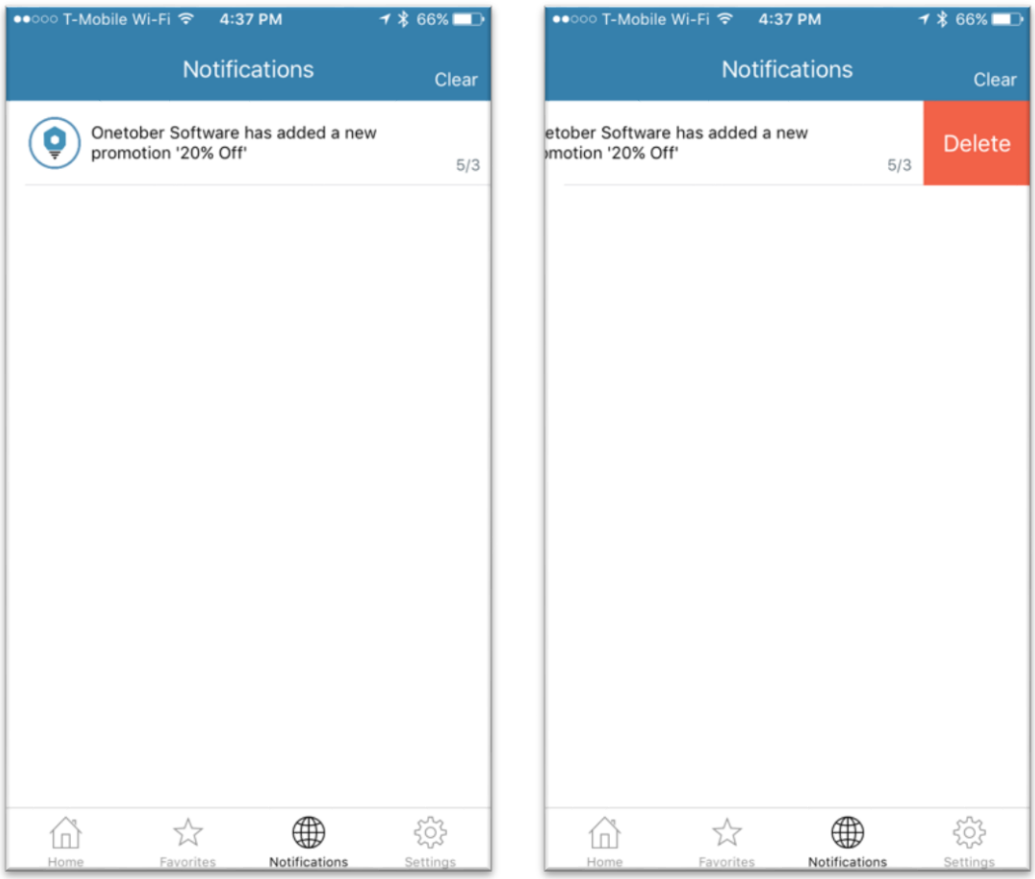

Figure 25: Settings Page

The top-left figure is the settings page. The top-right figure consists of options that pop up when the user taps on the profile section. The bottom-left figure is the notifications page. The bottom-right figure is the *Email Us* page.

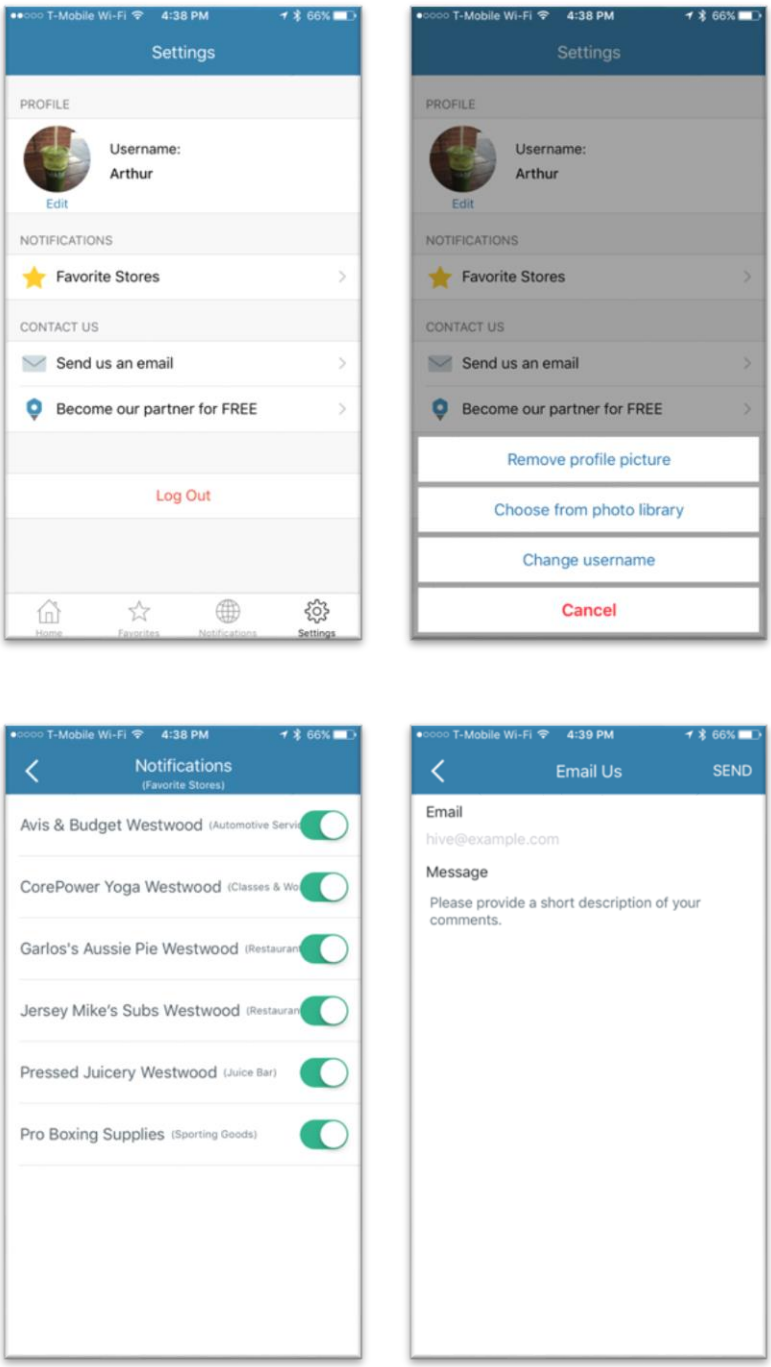

Figure 26: Electronic Word of Mouth

The left figure shows where a nearby user is found. The right figure shows the recommended stores that are recommend to me by the other user.