CSE 535: Mobile Computing
SnapCard iOS Application

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***Abstract*—This report introduces a social application for iOS that allows users to collect all of their information and social media profiles in a single place, and allows easy sharing or broadcasting of this data. It allows users to add other users and save them as contacts. This application also leverages iBeacon technology, to find nearby events and add people by just a scan of the QR Code. Using the GPS of the smart phone this app also let you know where you have first met your friend and visualizes the same on a map. The report lays out all of these features, and discusses how these features are implemented.**

***Keywords*—Apple, iOS, Social Media, Deep linking, iBeacon, reverse geocoding, QR code, Salesforce API, Carousel View, APNS, Image Compression, Contacts API, GPS Location Management, Business Cards.**

I. Introduction

With the continued popularity of social media websites and more recently, social applications, managing one's information has become somewhat difficult. The number of different applications and websites that have come up is staggering. Every one of them is different and each is suited for a different purpose, ranging from casual snap-chatting to professional hiring portals. Our application, SnapCard, is geared more towards the latter, though not exclusively. The inspiration for the application was to create a "digital business card" that has all the user's information stored in a single place. This card, in addition to having all the essential details, should be easily shareable; as simple as handing out a traditional paper business card.

SnapCard achieves this by asking the user to enter all his/her details when it is launched for the first time. All of this information is used to build a profile, the "digital business card" of the user. Once the profile is set up, it can be shared by simply having someone scan the user's QR code with his/her camera (hence the name, "SnapCard"). Scanning a QR code adds both users as each other's contacts in the application, with further options as described in the next section. SnapCard is also compatible with iBeacon technology, and can work with beacons (hardware transmitters) to show nearby users.

An obvious possible scenario where such an application would be useful, is a conference or any kind of a professional gathering. Attendees can simply set up their SnapCards and then scan them instead of exchanging business cards or contact information. Another scenario is a career fair: recruiters can activate their beacons and view the attendees' details without the hassle of asking each individual candidate for their details.

II. Features and Implementation

SnapCard was developed on Xcode, Apple's integrated development environment, using the Swift programming language [1]. The following sections describe the details of the features provided by our application. All the features can be viewed in the project demonstration video [2] and in the screenshots included with this report.

A. Collecting Information

The application goes through a series of pages, collecting various details about the user, such as his/her name, email address, phone number, etc. These details are stored using NSUserDefaults and an SQLite databse, for easy access to all of the data throughout the application.

When the user is asked to enter their address, they need to mark it on a map. If they are at the desired address, it will already be marked. We have used reverse geocoding to find the user's address using the location marked on the map. Reverse geocoding is basically the process of converting location coordinates into street addresses or place names [3]. Our application uses Google's Google Maps Geocoding API, which provides access to geocoding and reverse geocoding services through an HTTP request [4].

Besides the usual personal details mentioned above, the application also asks for the user ID for a number of popular social media platforms: Facebook, Twitter, LinkedIn, Pinterest, Snapchat, etc. These are deeplinked in the user's SnapCard. Tapping on the icon in a card links to the user's profile on that social media platform.

Following that, users may add a photograph to their cards; we have provided the standard options of either capturing an image from the phone's camera or selecting a photo from the camera roll, in which case we obtain the photo from the photo library.

After all the data has been entered, a digital business card is created for the user, which has their details listed and icons for their social media profiles. This profile screen is where the application starts on subsequent launches. Users have the option to edit their information at any time. For this, we

created a page with tiles representing the different fields of the profile. One can simply tap on any of the tiles to open a text field, where one can then enter new data.

B. Sharing and Adding Contacts

The very purpose of this application is to be able to share your card with a 'snap'. On the "Share" screen, the user has their own QR code displayed, as well as the option to scan another user's QR code. To implement this feature, we programmed the application to perform QR code generation and QR code reading.

Scanning another user's code adds their details to the scanner's application and notifies both users that a new contact has been added. The notifications are provided by the Apple Push Notifications Service (APNS). Additionally, the scanned user also receives all the information of the scanner so that the new contact addition is two-way. The new contact appears in the "All Contacts" section, where one can view all of one's contacts' cards displayed using a Carousel View. At the bottom of each card, there is an option to save that user as a contact. This is implemented by means of the native contacts API access and adds the user's name and phone number to iPhone's phonebook.

In the "All Contacts" section, users can also switch to a map view. Here, a map is displayed with pins representing the contacts. The location of the pins on the map represent the actual geographic locations where the contacts were added using their QR codes.

C. Finding Nearby Users

This feature was developed with certain scenarios in mind, such as the ones described in the previous section. We implemented this feature using iBeacon, which is a protocol for exchanging data using hardware transmitters, called beacons [5]. Each beacon transmits a universally unique identifier using a Bluetooth low energy signal. Nearby compatible devices or applications can use this identifier to alert users.

When a user is near a beacon and his/her device has Bluetooth enabled, going to the "Near Me" section will display a list of all other SnapCard users in proximity of that beacon. One can view these users' profiles and save them as contacts if one so wishes.

III. Task Completion Status

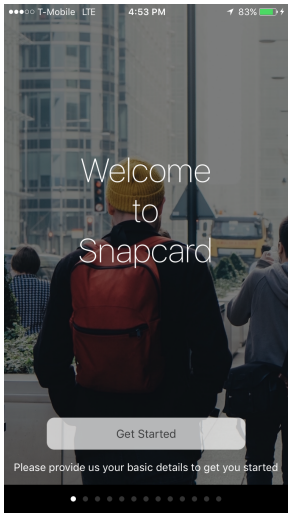
We successfully completed all of the tasks as listed in the project proposal. We further added a few extra features, such as using reverse geocoding to obtain a user's address, QR-Code scanning and Apple push notifications to enhance the user experience.

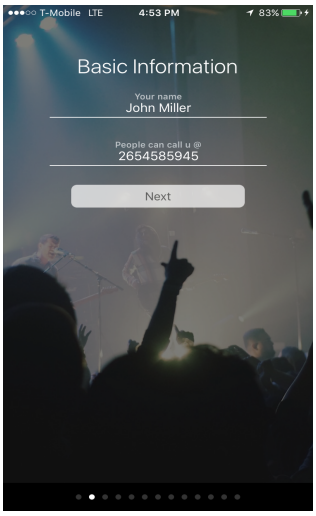
TABLE I. Task Distribution

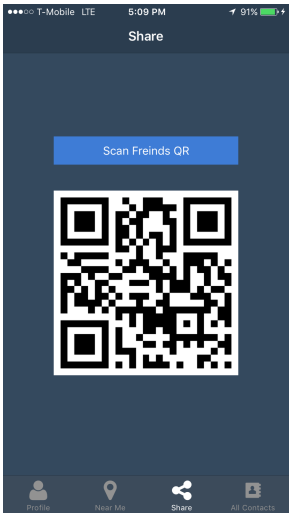
No.	***Task***	***Person Responsible***
1	Developing ViewController to onBoard user by grabbing all their social media links	Gurwinder
2	Creating Pages to take in the basic details of a user (Phone Number, Email, Designation, Attach Resume)	Gurwinder
3	Build a module to store and retrieve the onboarding information of a user in NSUserDefaults or SQlite inside the app	Gurwinder
4	Creating a ViewController to edit the available information (e.g. Edit, Delete or Add new user profile Information)	Gurwinder
5	Building a Home page to show the user profile in Business card like view with all the available social links and information	Gurwinder
6	Developing a shared Singleton Utility class to store all the theming information and reused functions in the application	Vishal
7	Setting up of a fog server	Vishal
8	Create a database in server to store the information of a user according to the location and beacon identification status	Vishal
9	Write 2 APIs which would be consumed from the mobile application to post the location information of the user and to give in all the users in the same location	Vishal
10	Creating a wrapper class in the mobile app to consume the APIs	Vishal
11	Integration with iBeacon and grabbing the current location of the user	Pravin
12	Build a ViewController to show all the cards of the people in the same location. View would be similar to a card holder	Pravin
13	Write a class to access the address book and store the phone Number and Email of other people into the Address Book of the iPhone	Pravin
14	Share the card to a nearby person using QR Code	Pravin
15	Use plots in a map to visualize the location and the first meeting with a person	Pravin

IV. Screenshots

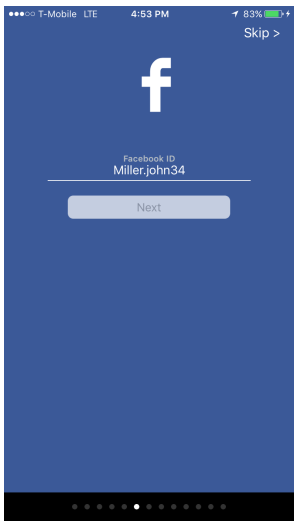
The following screenshots demonstrate the features of the application as described in the previous sections.

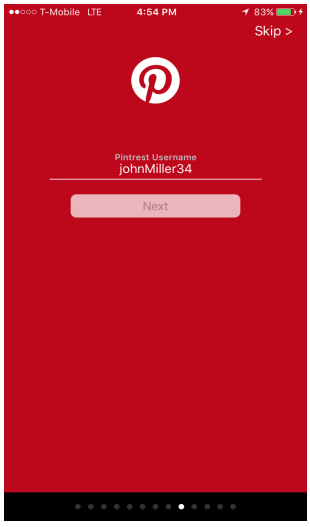

Welcome
to
Snapcard
Get Started
Please provide us your basic details to get you started

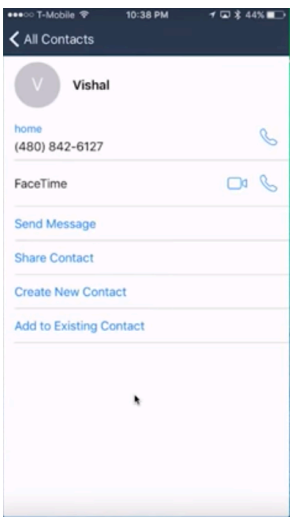

Basic Information
Your name
John Miller
People can call u @
2654585945
Next

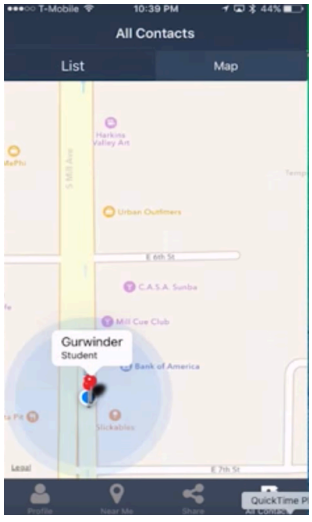

Share
Scan Freinds QR


All Contacts
List
Map
Gurwinder
Mobile Software Engineer, ASU
6023769091
gurwinder@asu.edu
gurwinder.org
1150 W University Dr Tempe...
Save this Contact


Skip >
Facebook ID
Miller.john34
Next

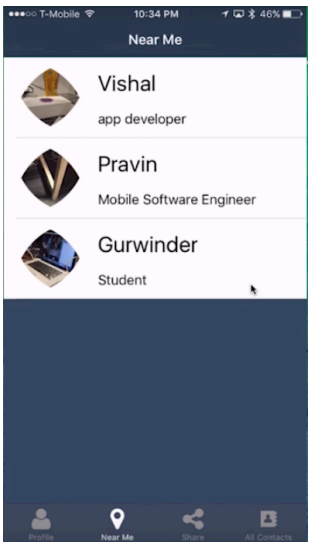

Skip >
Pintrest Username
johnMiller34
Next


All Contacts
Vishal
home
(480) 842-6127
FaceTime
Send Message
Share Contact
Create New Contact
Add to Existing Contact


All Contacts
List
Map
Gurwinder
Student


Profile
John Miller
Mobile Software Engineer, ASU
5643140564
Miller@asu.edu
www.johnMiller.com
4133 E Grove St Phoenix United Sta...
Edit Info


Profile


Near Me
Vishal
app developer
Pravin
Mobile Software Engineer
Gurwinder
Student

V. Conclusion

SnapCard provides a convenient means for organizing one's information and social media profiles, which may be numerous and varied, into a concise digital business card. It also allows users to share their details in a snap, literally. All of the information on one's SnapCard can be edited or updated at any time. Further, a user can view other users in close proximity by means of iBeacon devices.

The application, in its current state, has some limitations. For example, other users' cards displayed under "All Contacts" may become tedious to browse through if one has a large number of contacts. Also, while saving them as contacts, only their name and phone number is saved to the phonebook instead of all the data on the card. The map view may not be of much use if there are a number of contacts who were added in the same geographic area (or within close proximity of each other).

Considering the various limitations and advantages of this applications, there are plenty of ways in which the application can be extended in the future. In addition to bug fixes, usability, user interface and presentation improvements, some new features could be added. For example, a messaging feature to the "Near Me" section which allows nearby users to communicate via instant messaging. Users could also be given the choice to create different versions of their SnapCard, to share in different situations.

References

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