

HARN

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CIS 4914 Senior Project

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Abstract

In our technology-driven day and age, people expect there to always be “an app for that”. At the University of Florida, that’s largely true. An impressive effort has been made to create a mobile-accessible campus for students and visitors. Yet in this same area, our own Samuel P. Harn museum falls behind the crowd. In order to solve this problem, Casey Feldman and I have set out to give the Harn their own mobile presence via an iOS application that will be made freely available to the public.

Working in partnership with the Harn and our contact Eric Segal, Casey and I created an application that complied with both this project’s expectations and the goals of the institution, which we established a designer/client relationship with. Working in an entirely new development environment, we were tasked with learning about iOS and Xcode, registering as an official company, creating a simple and beautiful interface, obtaining and managing assets, and publishing our application to the Apple app store.

Some of the most common difficulties encountered were communication issues, code and workspace debugging, and learning the procedures for getting Apple approval. Communication issues mainly arose in getting information or assets from the Harn. While this was most critical at the beginning of our project, we kept in close contact with Eric Segal and met bi-weekly to discuss goals and plans. Further into the project we worked on areas that did not require Harn assets until Eric was able to track down the staff members we needed responses from. Code and workspace debugging were to be expected, and mainly were resolved by asking questions and learning more about the development environment. Apple approval was, perhaps, the most unexpected challenge. After much research, Casey and I registered a company (Exception Mark, Inc.) together through the State of Florida, requested an associated D-U-N-S number through Apple’s required provider, and then went through an equally tedious process of learning how to properly package, submit, provide the associated assets, and apply for approval of our application.

Keywords: application, ios, apple, business, registration, communication, museum, art, harn, xcode, storyboards, mobile

Introduction

Background

A lack of mobile presence has not gone unnoticed at the Harn. Not only do employees recognize the need to expand their offerings, the University of Florida's School of Fine Arts' Graphics course has, for the past and current semesters, asked students to mock up an application design for the Harn to use.

Related Work

Last semester, during Fall, graduate student Hannah Soh wrote her thesis on a mobile conceptualization (*Soh*). We read this paper, watched videos Eric provided us for the Graphic Design presentations (*Final Product Presentations*), and referenced other museum apps (such as the Guggenheim (*Solomon*)) when imagining the application we would create for the Harn.

Motivation

Combined with our own desire to learn more about the Objective-C language, Casey and I requested to be on the front lines of the problem solving by creating the Harn's first iOS application for museum visitors. During discussions with Harn representative Eric Segal, we deduced the Harn was searching for a complementary application, which interactively engaged visitors without demanding their attention. Building on the previously mentioned sources and our client's vision, we added our own ideas and flairs to create a comprehensive application for the Harn that accomplishes both their goals and our own goals.

Problem Domain

The problem we tackled in this project was learning the Objective-C language and getting practical experience for developing mobile devices (in this case, iOS devices). No course was available during our time at the University of Florida that taught how to develop apps in area of computer science-let alone get practical client/developer experience in a real product development situation-and this app gave us the ability to take skills developed from Computer Graphics and other courses and apply them to a new and

unfamiliar platform. Furthermore, we are able to help the University's Museum of Art by giving them a viable modern technology platform to connect with students, faculty, and the public on a wider scale. Resulting from this problem, we also ran across communication and Apple development problems through our development process.

Literature Search

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Solution

Development-Based

The solution to our problem was to make an interface that applied physics-based animations, such as sliding, panning, translating, and more to various UIView's as one navigated throughout the app. This allowed for unobtrusive and flexible means of navigation but also, as we discovered, a more fun experience. For the HARN this meant that the resulting application may have more user engagement. We also applied photo filter effects to go beyond just making the app a learning experience but also an engaging and creative one. People can take, edit, and share photos and see how each filter relates to each collection.

In terms of code, one of the largest challenges was making it work across multiple screen heights and resolutions. Image resources had to be accommodated for 3.5" and 4" screen sizes in both "retina" and "non-retina" quality. After a few attempts at first we discovered the easiest resolution to this problem was to duplicate our Storyboard file (a space where a developer lays out the navigation and look of an app) and then modify select areas of code where interface design issues occurred in the transitions, translations, and animations as described above. In these cases we check the size of the current screen and form a rectangle along the border. The height of which is compared to the number 586 which is a 4" screen size and conditions were changed accordingly.

Because each collection and their set of filters are specific and themed to a particular style, we devised a way to make a temptable collection view interface that took in the specified array information and assets and then passed that information from one view into another when relevant. This is called a Model->View->Control design that is heavily touted in iOS programming and was crucial in making our navigation seamless despite different information, yet still fit within our design specifications.

Communication-Based

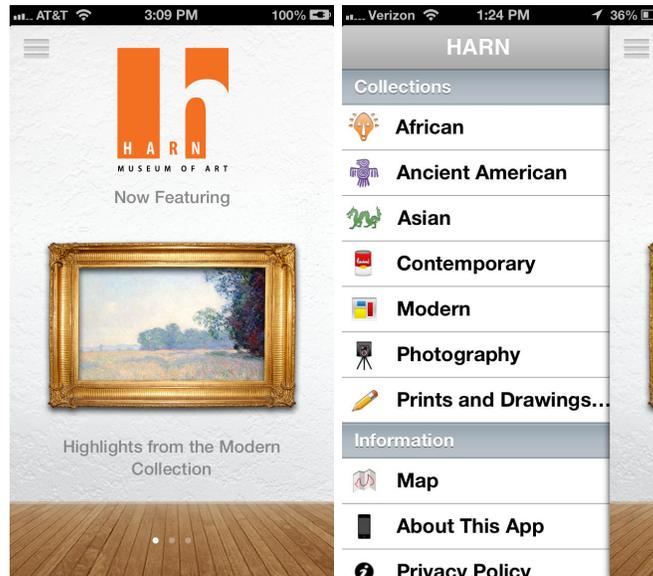
When it came to relying on our partners, Casey and I were quite effective at communicating with each other and splitting up tasks based on skill or preference. If we ran into any problems, we were comfortable asking the other person for help. In addition, we met regularly each week, as well as at additional times with Eric or Entezari.

However, as a student group, we found that our project needs were not always the highest priorities for everyone we were in contact with. In the beginning of the project, we emailed Eric often to ask for updates, and did work on tasks that we were well enough informed on to begin. Towards the end of our project, when our tasks were becoming dependent on getting assets from others, we had to check in with Eric more often. With his help, we were able to continue forward with our application's completion.

Apple-Based

One of our most unexpected challenges, getting registered and approved by Apple has involved a lot of research, reading, paperwork, and phone calls. Casey and I had to create a register a company with the State of Florida, Exception Mark Inc. As per Apple standards, we then had to request an associated D-U-N-S number in order to register both of our accounts as Apple developers. This allows us to test our application on our iPhones, iPads, iPod Touches, etc. As noted in our presentations, this has been a tedious task. Recently, we've gone through an equally tedious, expected set of tasks in our efforts to submit our application to the Apple App Store. An application must be filled out with your app's information, description, company, authors, etc. In addition, screenshots must be uploaded and your app's code package must be submitted securely through your own registered computer and Apple ID – which can prove difficult to authorize. However, this too as been submitted and is currently waiting for review.

Results



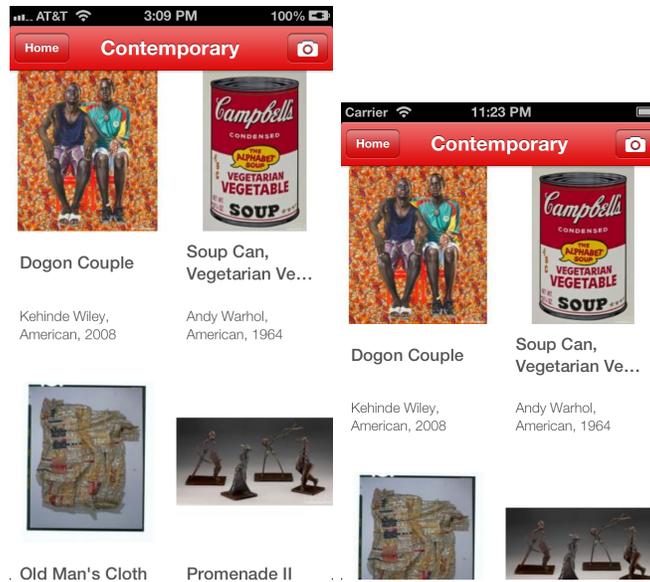
Here you can see our main page, with a slider navigation menu which allows users to choose the collection they are interested in learning more about. Users can access this slider by swiping left to right or clicking anywhere on the screen (except in the bottom scroll area of features), with special emphasis on clicking in the top-left icon.



Our collection view was a task mainly taken on by Casey. Unfortunately, one of his main efforts cannot truly be seen in these photos. This collection will actually resize at photos are longer or shorter – however the assets we received are square thumbnails.



Camera filters proved to be difficult initially, but went much more smoothly after learning more about Core Image Filters and downloading a convenient testing application called “Core Image”. This allowed us to test some of the filters we want to apply and the values we should give it. It was a great reference that sped along the process of creating our filters. We also used Photoshop to create more textural filters.



Storyboarding allowed us to create a device accessible for multiple screen dimensions and resolutions. Code-wise, we tested for screen height to determine which boards should be used. After that initial test-point, the application uses those boards and fits the UI into the appropriate space provided.

Conclusions

For this project we partnered with a client to understand their needs and then build a solution that was not only fun and engaging for users but provided us with a strong development background in iOS programming in the Objective-C language. We combined this knowledge with our prior experiences in interface design and graphics computation to make a set of image filters for photos taken on the device. What we learned in the process beyond just the coding language was a better understanding of product development, how the Core Image Library functions for image processing, how to utilize tools like GitHub to coordinate task management, and memory management on mobile devices to optimize them for best performance.

Future Work

In the future, we hope this app can become a platform for the HARN museum of art so that things such as: adding favorites, an iPad friendly interface, push notifications for events the museum puts on, and more to extend the functionality over time.

Furthermore, database access was the largest problem we had and we hope that one day the HARN's IT department will upgrade their internal systems to have the app access all of their collection's information. The remedy to this was to manually enter in the information for at least 10 works of art as selected by the curators of the museum via NSArrays. This is really the only area of the app that is not sustainable in the long term, we feel.

Acknowledgements

Eric Segal

Acting as the liason between our project and the Harn and providing us with great feedback, direction, and communication throughout the entire project.

Alireza Entezari

Being an excellent advisor and constantly ensuring we are considering all aspects of this project.

Ivy Chen

Working closely with us in a client relationship to communication what an ideal application would look like to the Harn.

Tami M. Wroath

Providing us with high quality assets to use within the application and approving our design as compliant with the Harn branding strategy.

Jessica Park

Referring us to the Harn and Eric as well as providing us with the 10 pieces each collection should feature.

Kristofer Kraul

Moral support.

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Appendices

For those interested in the source code, it can be accessed at the following link. Code should not be used beyond personal use without the expressive consent of Casey Feldman, myself, and the HARN Museum of Art: www.github.com/ligerxx/HARNapp

Biography

I currently work as a Supervisor with Academic Technology's Computer Labs and serve as President of RUB (Reitz Union Board) Entertainment. Next semester I will study abroad in London and obtain an internship to work and learn there. After graduation, I'd like to work in a highly autonomous environment where I am able to experience all aspects of creation and development.

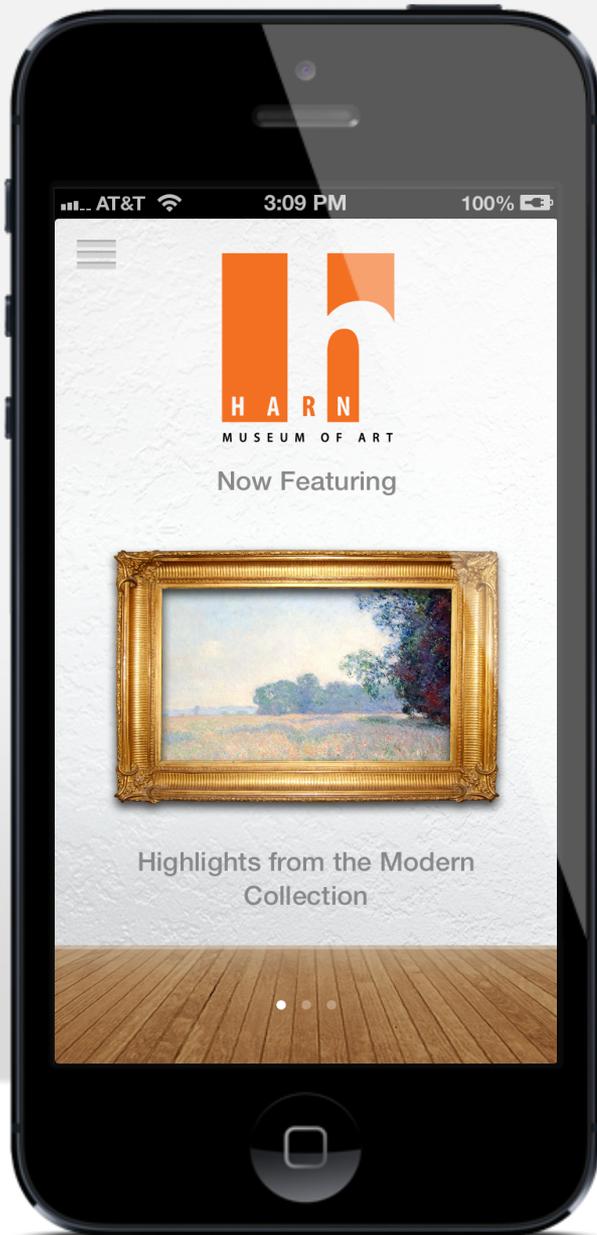
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Summary



Motivation:

Learn iOS/Objective-C and tie it into a tool that could help an area of the University



Problem:

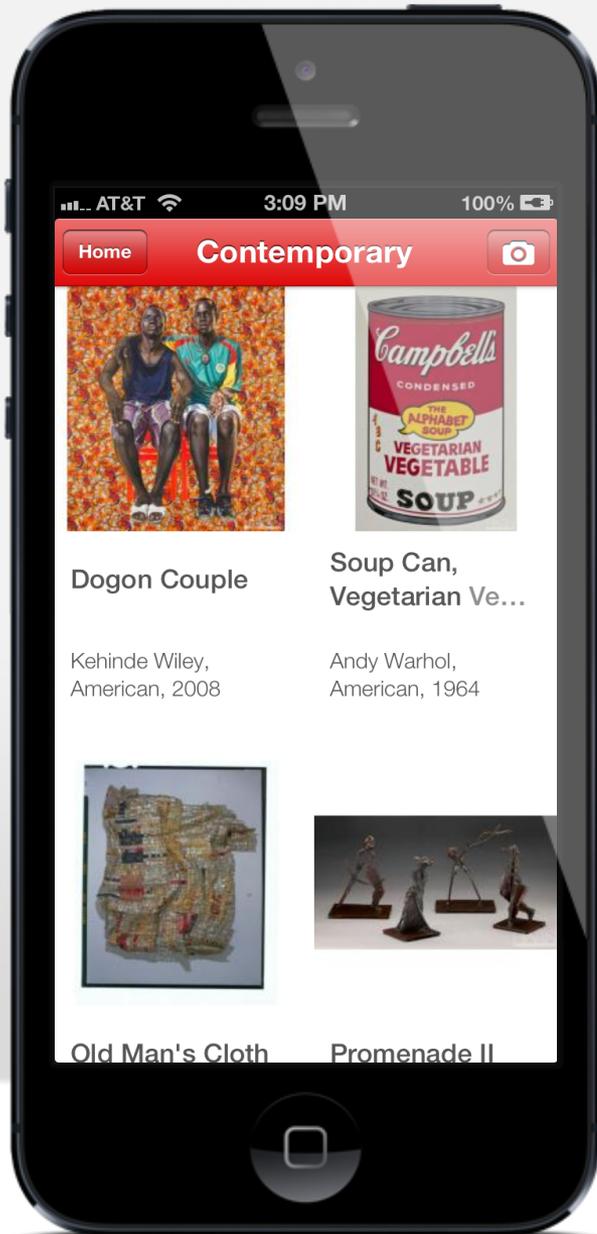
HARN has no mobile technological presence



Solution:

Create an app that will compliment and personalize a viewer's experience at the HARN without taking away from the art.

Literature Search



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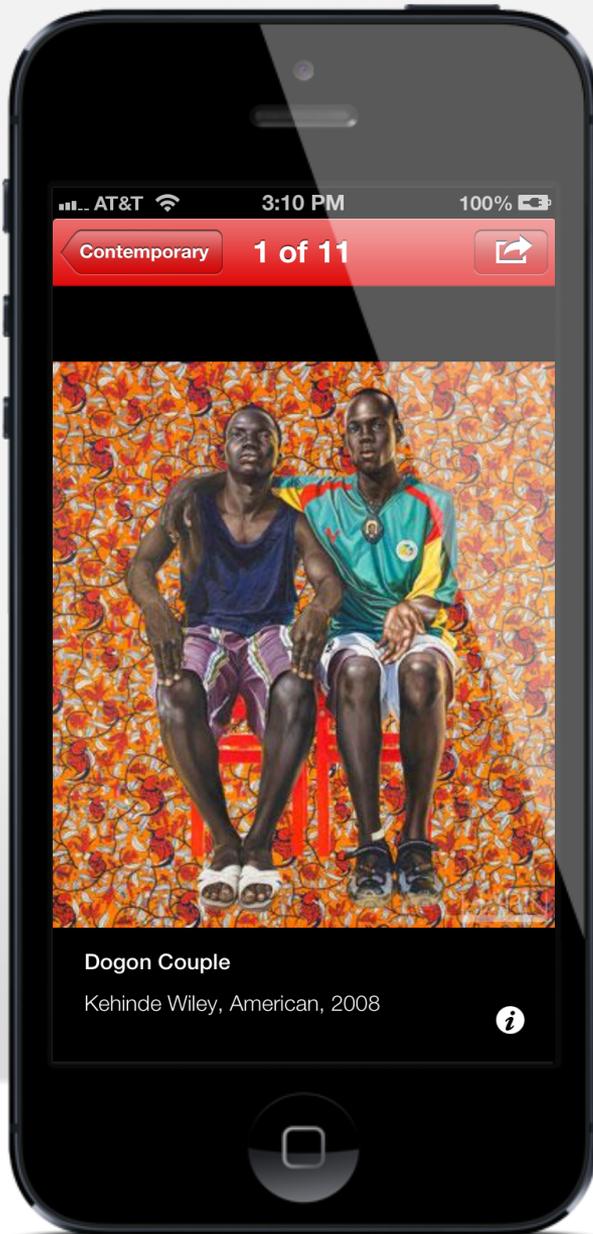
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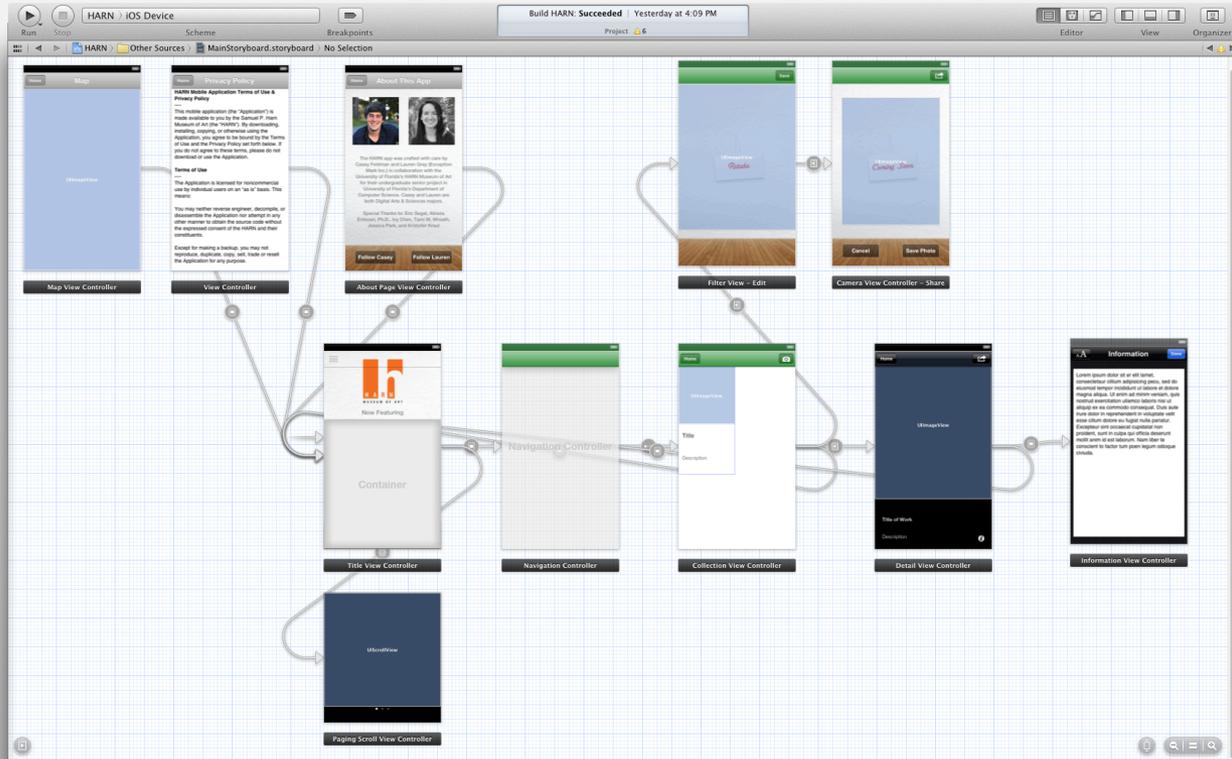
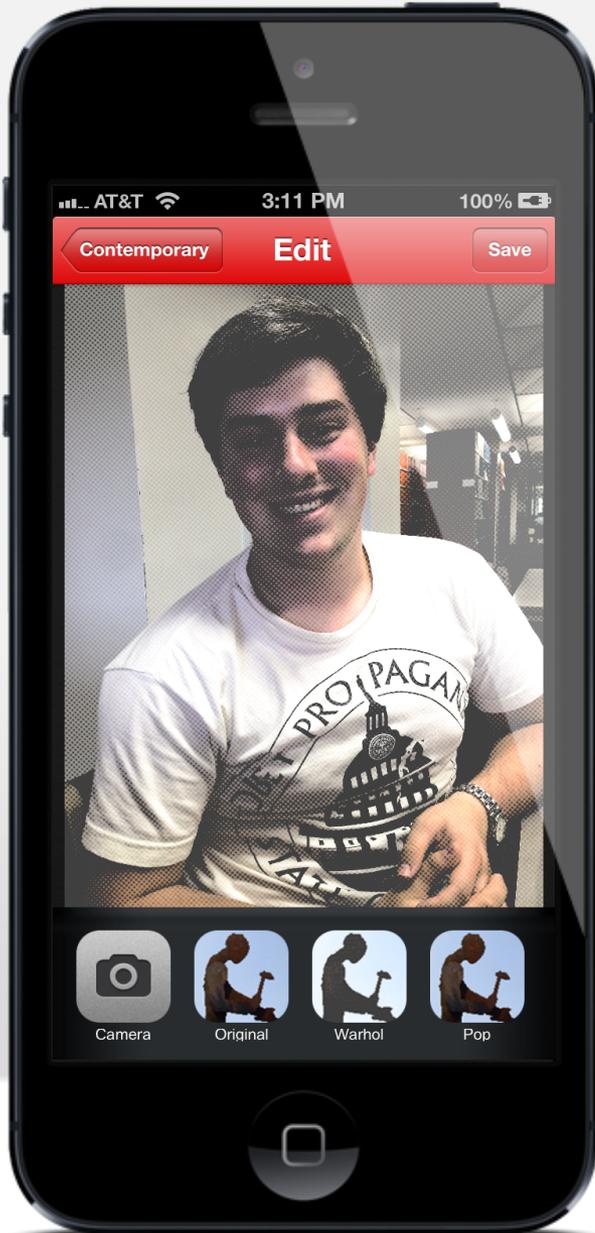
Soh, Hannah. Fostering An Applicable Web of Exchange: Planning an iPhone Application for the Samuel P. Harn Museum of Art. Thesis. University of Florida, 2012. N.p.: n.p., n.d. Print.

Work Performed



- Learning Objective-C
- Creating a Company
 - Registering for D-U-N-S
 - Becoming Apple Developer
- Sliding ListView Navigation Standard
 - Property Lists
- User Settings
 - User Defaults
- Image Filters
 - Core Image
- Publishing Application
 - App Store
 - Certificates
 - Waiting Game

Results

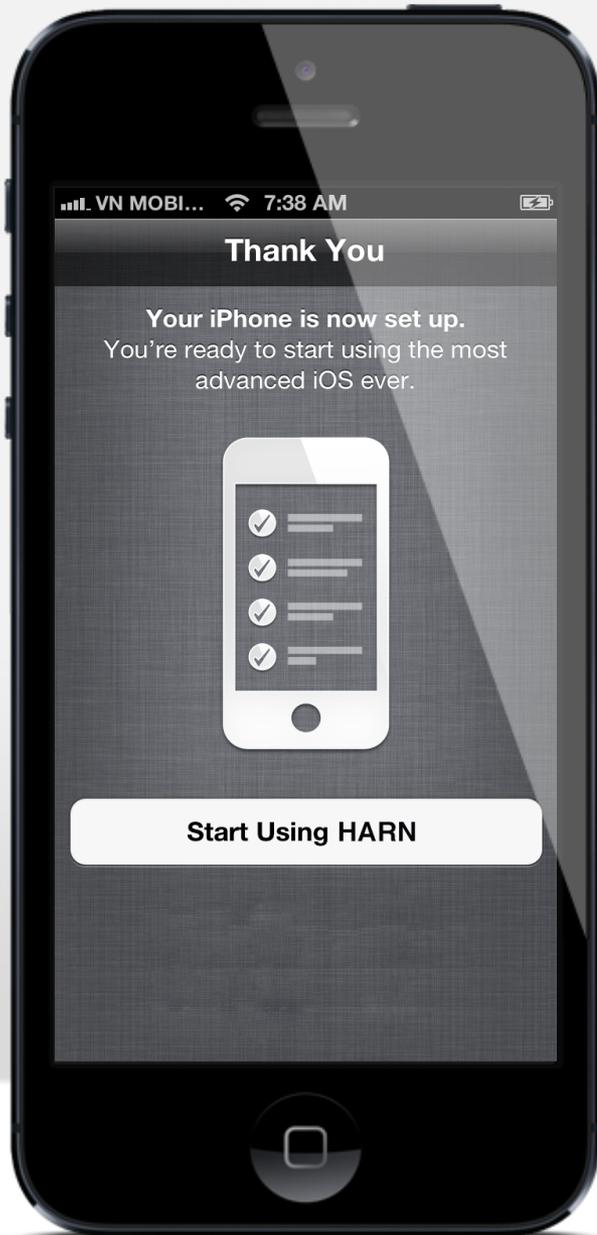




Conclusions + Future Work

- *Conclusions*
 - iOS is fun and powerful
 - Apple is difficult and powerful
 - Art + Learning Through Technology
 - Client-Developer Relations
- *Future Work*
 - Server Connection (when available)
 - Add to Favorites List
 - Github for Future Developers
 - Push Notifications
 - Universal App (iPad Support)
 - Additional Gestures + Polish

Special Thanks



Dr. Entezari

Eric Segal

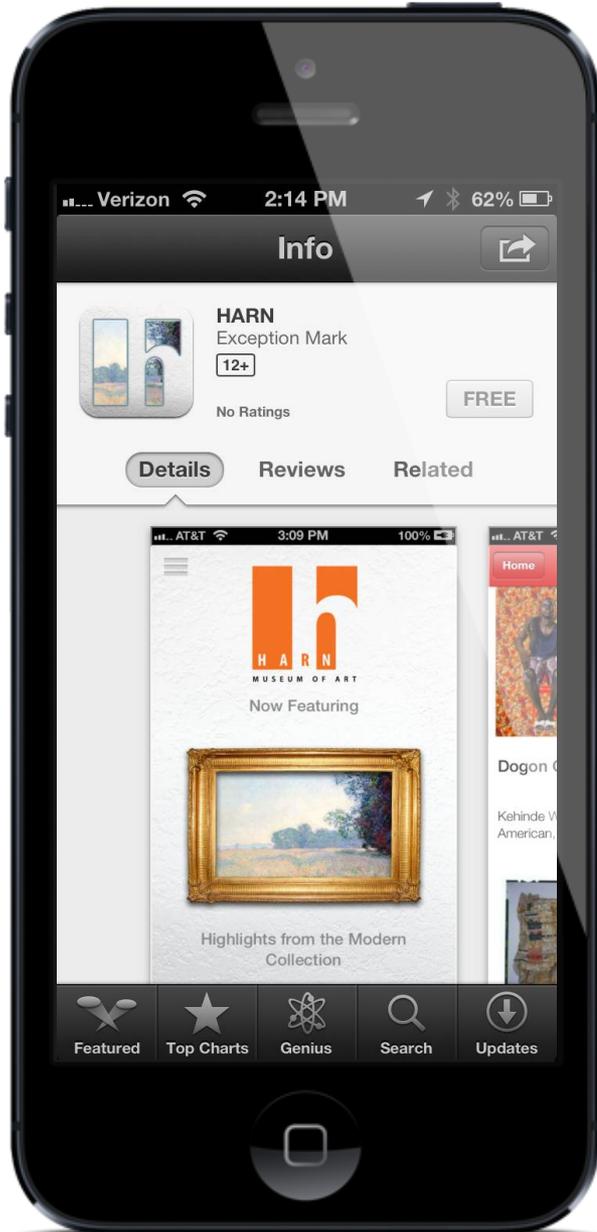
Ivy Chen

Tami M. Wroath

Jessica Park

Kristopher Kraul

Available Now!



“HARN” by Exception Mark

<https://itun.es/us/p3B6L.i>