

The online fashion
operation platform

by

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Declaration

I hereby declare that all the work done in this Final Year Project is of my independent effort. I also certify that I have never submitted the idea and product of this Final Year Project for academic or employment credits.

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We hereby recommend that the Final Year Project submitted by Chan Chi Man entitled “The online fashion operation platform” be accepted in partial fulfillment of the requirements for the degree of Bachelor of Science (Honours) in Computer Science.

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Abstract

As a cosmopolitan city, Hong Kong is also a fashion city. Hong Kong has trained a lot of young and creative professional fashion talents. Some of them can step out of Hong Kong to enter the international arena and promote the integration of Chinese and Western cultures and Hong Kong's unique culture to the world. However, at present, there are not many ways for new designers to promote their designs to other places. The purpose of this project is to develop and provide a cross-platform web platform for young designers to promote their finished designs.

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Chapter 1

Introduction

An online store that provides backend management systems gives emerging designers and smaller brands a platform for them to place their designs. The difference between this platform and other platforms is that designers and brands can cooperate with each other. There can be finished products of different designers in a piece of clothing advice provided to consumers, and it is no longer limited to the same brand or designer's products. At the same time, designers no longer need the platform as an intermediary to communicate with customers. They can directly contact customers to understand their needs and provide corresponding solutions, reducing the time required for intermediary communication and speeding up their problem resolution.

Cross-platform mobile applications not only expand designer and brand promotion channels, but also allow them to monitor and manage their product data at any time and place. As mobile shopping becomes the daily life of the general public, a cross-platform mobile application is necessary and an important way to give consumers know more new brands and promote them to more people through their social platforms.

Chapter 2

Proposed Solution

2.1 Scope of the proposed solution

The solution should include the following components.

An online store with backend system

- Provides data analysis to advise designers on brand marketing
- Connect to different social networks, and buyers and sellers can communicate using social platforms
- Designers can edit and monitor their brand 7 * 24 hours
- Provides the gateway between connecting with web system and mobile system
- Processing image recognition for mobile platform

Cross-platform mobile application

- Designers can edit and monitor their brand 7 * 24 hours
- Allows users to find similar styles of clothing on our platform using a smartphone camera
- Allows users to do the searching with speech recognition
- Offline recommend products view

2.2 Architecture of the proposed system

- Software
 - Magento 2
 - MariaDB
 - React Native
 - Tensorflow
- Hardware
 - Android and iOS system smart phone
- Internet Access
 - Wi-Fi
 - 4G LTE

2.3 Role of Users

- Designers / small brands
 - They can built up and promote their shop easily.
 - Control everything just like they has own a website.
 - They can control and analyse the data to help make the business decisions.
- Customers
 - Buy different products from local designer and get the matching suggestion from designer.
 - They can contact the designer directly if there are any questions.
 - # Research

2.4 Mobile App Platform

Since the opening of Apple App Store in 2008, the number of mobile applications has reached more than 2 million on both Android and iOS platforms

in more than a decade. Today, urbanites use their mobile phones to access the Internet every day to do a variety of things, including online financial management, Instagram and trading. Some people can forget to take their wallets out of the street, but they can't go out without their smart phones.

The development of mobile applications is also all the rage. To this day, mobile application development has gradually evolved into different types, and companies can choose the type of development suitable for the enterprise's mobile application according to their needs, resources, development time, and so on.

2.4.1 NATIVE APP

Native app means develop an application using the native programming language of the mobile system. From the earliest ObjectiveC to Swift for iOS, or Java to Kotlin for Android, are the most direct development methods. In theory, native applications should be able to make the most of all the capabilities of the phone and achieve the best user experience.

Native applications can change immediately following the upgrade of the mobile phone system, so it can make fuller use of the functions of the phone than other development types of applications. For example, machine learning, or Augmented Reality, epoch has been quite popular in recent years, is a native application that can be used for the first time.

In contrast, the disadvantage of native applications is that the development cost is relatively high. In the iOS or Android market, sometimes even PC users need to be taken into account. Unless under special requirements, it is basically necessary to support users on more than two platforms at the same time. With multiple platforms being developed separately, it is not uncommon to double the cost and time of development.

2.4.2 HYBRID APP / CROSS-PLATFORM APP

When the problems of time and development cost of native applications become more and more obvious, the market naturally has relative solutions at the historic moment, and this is the hybrid application.

The basic concept of a hybrid application is to place a web browser in the smart phone. Through this browser, you can open a website that simulates a mobile phone application. Because browsers are common to mobile phones, all programs that can be shared are presented in the form of web pages. For the functions that the web page fails to implement, it will implement by native programming language. Taking the application of Android and iOS platforms as an example, a hybrid application can achieve twice the development cost and time of a native application by about 1.5 times the development cost and time.

In 2015, Ionic, which used AngularJS and Cordova as its foundation, was a madman, and a large number of applications written in Ionic emerged. However, the core problem of the hybrid application at that time was the performance of the user interface performance. At the time, the browser performance of Android and iOS was very limited. In terms of user experience, hybrid applications were much worse than native applications.

In order to reduce development costs without giving up the user experience, various mobile application companies continue to explore, of which Cross-platform App is the successor of hybrid applications. The biggest difference from hybrid applications is that they improve the user interface experience. Instead of using web pages and browsers, they provide a common user interface development framework for developers to develop native user interfaces. This greatly improves the user experience of hybrid applications. Facebook's React Native, Microsoft's Xamarin, Google's Flutter or Vue Native, these are cross-platform application development frameworks.

However, although these development frameworks all claim to be development tools for native applications, they are quite similar to native applications in terms of user experience and performance. But cross-platform applications often take at least a few months to support the latest smart

phone features, which is always not as fast as native applications. Even so, cross-platform applications can still meet the needs of more than 90% of users. Mobile applications that you often come across, including Instagram, Evernote, UBER, Twitter, Netflix, etc., are all cross-platform applications, which shows that cross-platform applications have become the mainstream of today's development model.

2.4.2.1 Xamarin

Xamarin was born in 2011. The first set of products was Xamarin.Mac in 2012. iOS apps can be developed using C# language and successfully listed on Apple's App Store. Xamarin was bought and integrated by Microsoft shortly thereafter. In Visual Studio, the use of Xamarin to develop App in the past required additional payment, but now as long as you download Visual Studio Community, you can directly develop Xamarin related applications.

The main feature of Xamarin is that developers can directly use C# to call APIs of Android and iOS to generate a native interface. The architecture is basically very similar to the native language architecture (Android, iOS). The development is almost the same. The advantage of using Xamarin to develop cross-platform apps is that the general logic program can be used directly between the two projects of Xamarin.Android or Xamarin.iOS. But we still have to call the respective underlying API if it need to render the UI part. In other words, Xamarin only unified the development language, in fact, you must still understand some Android and iOS development frameworks to develop.

From the perspective of Github's community thermal network, although Xamarin has launched products as early as 2011, the thermal network between developers seems to be not high, because Xamarin uses the underlying API to present the UI, so the screen presentation between different devices can sometimes be very different, for example, TabbedPage is very different on Android and iOS.

In addition, Xamarin's Hot Reload can only be used to render XAML UI. Although it supports fast deployment, it still seems to require a long compiling time.

Based on the above conclusions, developers who are more suitable to use Xamarin as a development tool should be:

1. Have C# development experience
2. Developers accustomed to the Visual Studio development language as the main development tool
3. Developers who have a certain understanding of the Android or iOS UI layer framework
4. Newcomers who want to quickly develop a simple business process App

2.4.2.2 React Native

React Native is a cross-platform development framework that Facebook opened its source code in May 2014. The development language is Javascript. The syntax and architecture are very similar to the front-end web development React.JS JSX and CSS. It allows front-end web developers to quickly enter the development area of React Native App.

The framework of the React Native operation is built with Javascript. Javascript can directly call Native to build the UI. In addition, React Native also supports real-time hot reload. In other words, React Native does not need to be re-run during the Run-time stage. Compiling programs can directly control the control operations of the UI or program logic, and the execution performance is also very close to the Native development performance.

Observed by the popularity of the community, React Native can be regarded as a very fast and popular development framework in recent years. The main reason should be attributed to the success of the React.JS development model. Many React.JS front-end web developers can quickly enter the ranks of mobile device application development. In addition, Facebook and Instagram apps are also developed using React Native. I believe that

many players who are curious about the function of Facebook to update components locally should want to understand how Native React it works, but React Native uses Bridge to call the underlying Native UI through Javascript after all, so the consistency of the UI appearance of different operating systems depends on the third-party components.

However, taking Tabbed Page as an example, compared to Xamarin.Form, React Native's Tabbed Page has made it possible for the display of operating system screens of different platforms to be quite similar.

Relatively speaking, the React Native framework is very suitable for developers using these conditions:

1. Those who only understand Web front-end development technology, because they only need to understand Javascript and CSS to understand React Native code.
2. Developers who like React.JS development architecture
3. Developers who need to develop cross-platform apps quickly

2.4.2.3 Flutter

Flutter was announced by Google at the 2015 Flutter conference. The official stable version was announced on December 4, 2018. The bottom layer mainly uses C++ for development to connect iOS and Android, and uses Google's Skia graphics library to provide the bottom graphic support. All of Flutter's UI is composed by combining various Widgets. The basic library is written by Dart, which provides the categories and libraries required by Flutter.

Flutter's hot reload can inject the modifications from original file into the running application. Flutter expands this function by supporting stateful hot reload. In most cases, changes to the source code can be immediately reflected in the executed application without restarting or losing any state.

Different from the way that Xamarin and React Native call the native interface, the biggest difference of Flutter is that the interface of Flutter is derived through the 2D engine Skia Render, so the performance is even bet-

ter than the native application. Because all the UI is rendered, the screen output by Flutter are almost the same on iOS and Android.

Judging from the popularity of the community, Flutter has grown faster than React Native. According to the number of followers on Github, it has already surpassed React Native. It should be expected to become the most popular cross-platform development tool.

However, compared with Xamarin and React Native, the stable version of Flutter has only been released to the present in the past year or so. The stability of the framework has yet to be tested by time. The method of direct rendering is likely to replace the original development framework that use Native UI, and become a new generation of popular cross-platform device development trend.

Flutter has a high consistency on the screens presented on different devices, and developers can reduce many maintenance costs arising from the inconsistency of output functions.

What types of developers is Flutter suitable for:

1. Requires consistency in screen display across platforms
2. The product needs to be online in the fastest time
3. Those with higher UI performance requirements

2.4.3 WEB APP / PROGRESSIVE WEB APPLICATION

To put it plainly, the Web App is just a web page, but this kind of web page is mostly built using the framework of Single page Applications. With the development of browsers on mobile phones in recent years, web apps have been able to give users the feeling of being very close to native applications.

In terms of performance, the performance of web apps in current browsers has improved a lot compared to a few years ago, but of course it is inferior to the two mentioned above. In terms of functions, the web app also has many functions that cannot be achieved, such as reading QR Code, Bluetooth device information, etc., and cannot use paid functions such as Apple Store

or Play Store. However, if the enterprise's application is mainly based on simple data such as text and pictures like a shopping network, the web app is definitely a good choice.

Base on the advantages of web apps, iOS and Android also made corresponding performance enhancements, so Progressive Web App appeared. When you use Safari on iOS or Chrome on Android to browse the web, users can choose to add the web page to the desktop of the phone, so that the web page will appear as a mobile application, for the average user, PWA looks no different from other mobile applications. And these applications can also use the functions that many native applications have, such as pushing information, reading coordinates, taking pictures with the camera, using the mobile phone compass, and so on.

Web app and Progressive Web Application also have a very prominent advantage, that is, it can be used directly without downloading through the App Store. There are many reasons why users refuse to download native apps, such as limited Internet data, insufficient phone capacity, and too many apps installed on their phones. The web app and PWA are to dispel the concerns of these users. Users can simply scan the QR Code or search on Google to start using it. This fast experience is quite effective for promoting new products.

The most important thing is that the development cost and time of the web application is the shortest among various development models. With the lowest cost, it can support almost all mobile phone platforms, even computer desktops can be used simultaneously. It is very suitable for some such as online shopping, it is a service that does not require many functions of the mobile phone to reserve a room, etc..

2.5 Ecommerce Platform

2.5.1 MAGENTO

Magento is an open source e-commerce platform written in PHP programming language; it is mainly for enterprise-level applications and can handle various needs.

The technical requirements of Magento's website construction are relatively high, and the cost of operation and maintenance is relatively large, so Magento is suitable for enterprises with many types of SKUs, large traffic, and high investment. The large traffic is because some e-commerce systems like Opencart, the system performance will be reduced when the traffic is large, and Magento will be more stable.

Magento is designed to be very flexible, with a modular architecture system and rich functions, which is easy to integrate seamlessly with third-party applications. Since magento is open source, the code is completely in your own hands, so you can personalize all the content of the website according to your needs, including Shopping flow, page content, custom buyer show, reviews, etc. can think of everything. Thousands of special function plugins for Magento have been developed by global enthusiasts and enterprises, which can be turned on and off at any time after installation. In addition, Magento does not have any platform commissions. The server, source code, and database are owned by the business owner. # Design of the solution

As mentioned above, the core problem that I want to solve would be the very good works from our fresh designer are buried and do not have chance to let others know. This problem is mainly caused by designers need to have a many connections before they can built up their own brands. However, the fresh designers may not have the chances or platforms to know more people and get resources to promote their well products to other places. If there is a platform that provide a chances to let them promote their products and learn more built up skills for their further usage.

By finding the suitable solution of this project, I have studied a similar cases

done by Hong Kong Polytechnic University.

For the platform which is ITC Store and is done by Hong Kong Polytechnic University, it is found the their platform has some benefits and disadvantages that fulfil the need of this project.

The benefits:

- Connect with the offline store, the customer can take a look of the product before they buy from web store
- Provide an online store for other counties have a way to know more our local designer products
- There is a middleman to monitor the uploaded information

The disadvantages:

- Designers don't have any control of their products on the website
- There do not provide any data analyse service to the designers
- Customers need to contact to the designer through the middleman, it takes time for the communication

It is found out the studied case neither solve the problems in Hong Kong, thus we need to come up with the following solutions to solve the problems.

As the problem of designers don't have any control of their products on the website, I would build up a web store with a backend system and mobile application for designers to upload the products and have different settings.

As the problem of lacking contact to the designer, customers can contact the designer through chat room from the web store. The web store and mobile app can show the newest product from the local designers. All the sales data will upload to the server and database for further analysis which provide to the designers.

After doing the research, the React Native cross-platform application is the most suitable for this project to complete in a short period.

2.6 Development Difficulties

Since the project time period limitation and the requirement of the CST student, the mainly development in this project will more force on how to use a cross-platform language can be used to built a native like mobile application that can function on both iOS and Android system. Therefore, the web store with Mangeto is only have the basic function that provided by the framework and the development of the mobile application for designers is cut off.

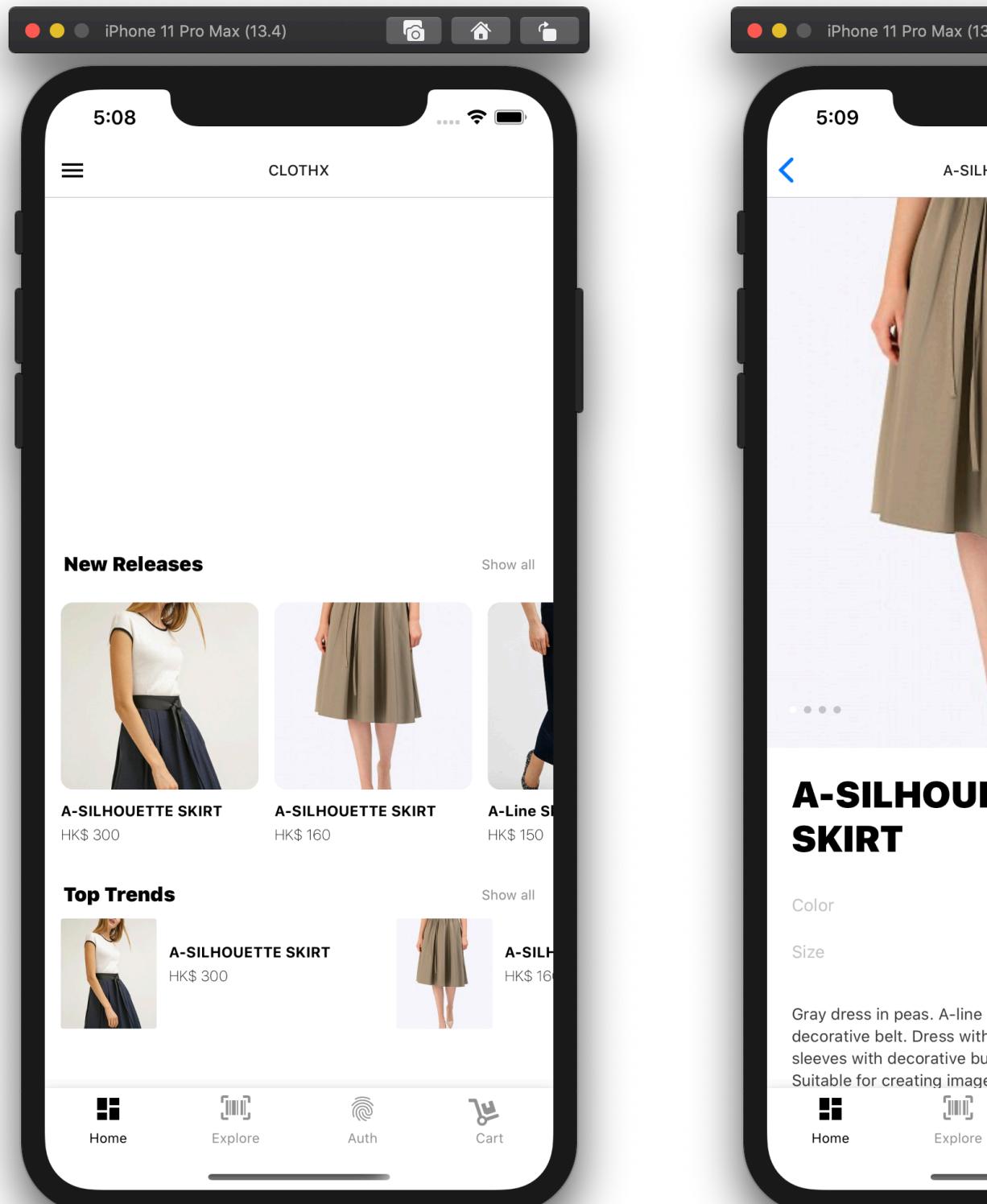
In addition, the version of the React Native I used is the latest version. However, some of the plugins are not yet support the latest one, like use Apple Pay / Google Pay for in-store purchase, therefore it cannot be provided in this demo.

Lastly, the image recognition function need a huge library which have trained. During to the time limited, MobileNet pre-trained model is used for the image recognition. The data which the model provided is not what this project need, therefore it is only for demo usage only.

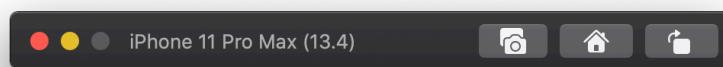
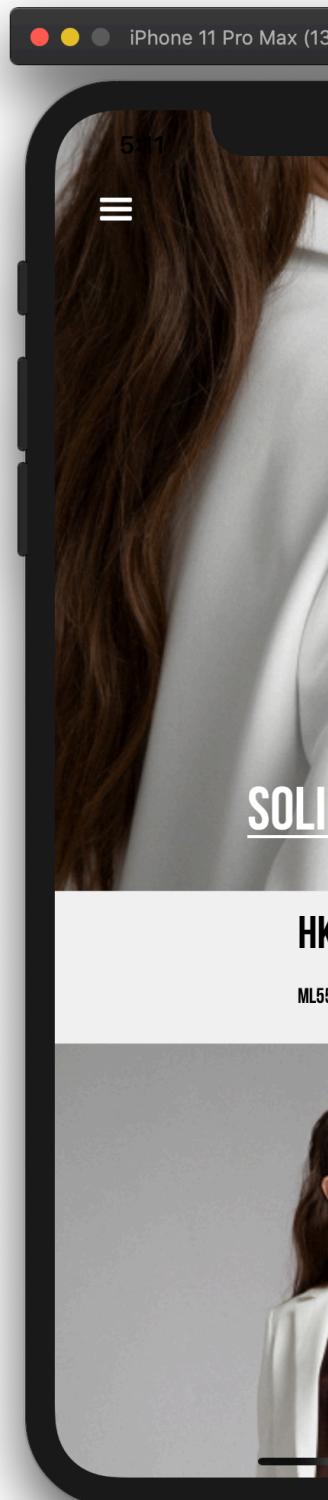
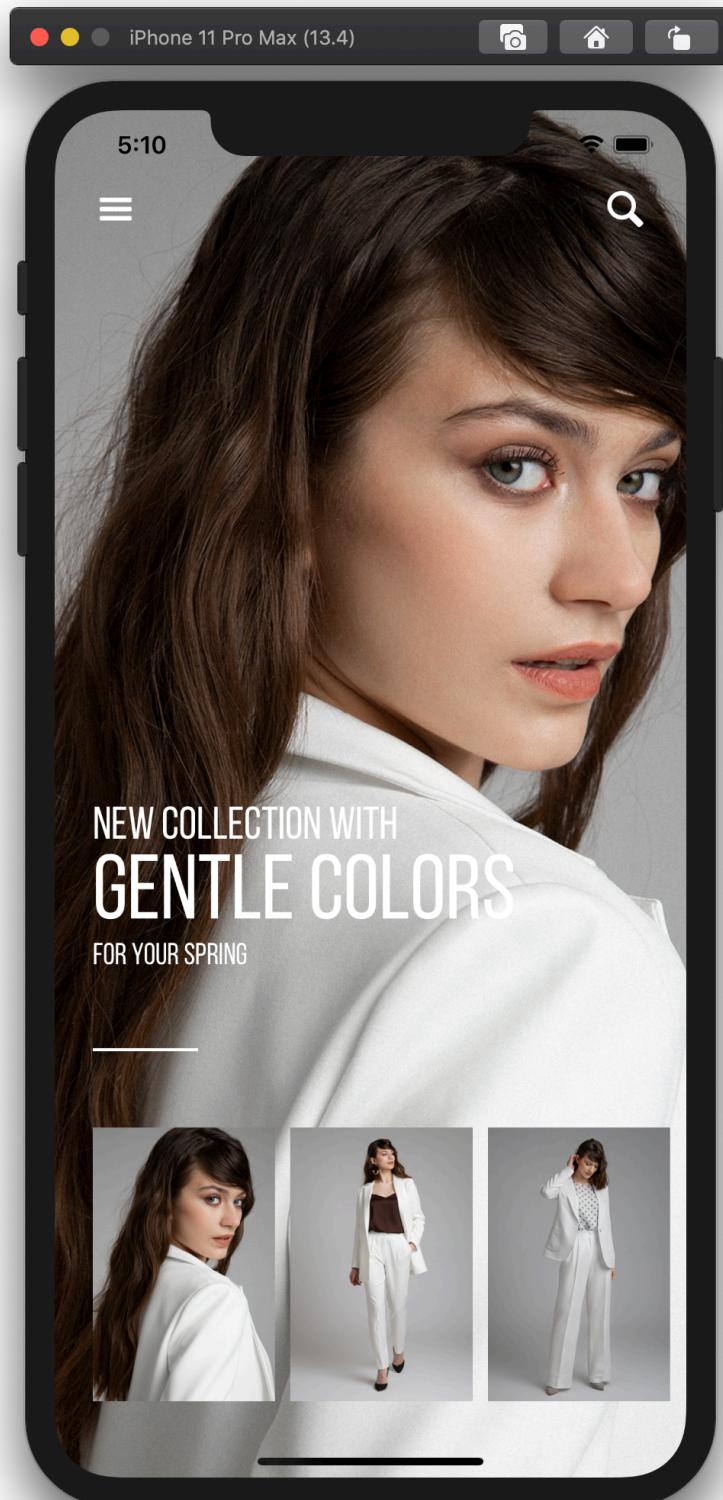
2.7 UI Design

2.7.1 MOBILE PLATFORM

2.7.1.1 Connected with Magento API



2.7.1.2 Without connect Magento API



2.7.2 WEB PLATFORM

The image is a collage of screenshots from the CLOTHX website, illustrating its web platform. It includes:

- Home Page:** Shows a large banner with a woman in a striped skirt, a seasonal discount offer, and a 'MARCH 2019' promotional section featuring a woman in an orange dress.
- Product Detail Page:** Shows a woman in a purple blazer and striped skirt. The right side features a detailed view of the striped skirt with options to change color, size, and view more details.
- Category Page:** Displays a grid of various skirts, each with a 'VIEW DETAILS' button.
- Upsell Products:** A section showing recommended products like 'A SILHOUETTE SKIRT' and 'PLAID SKIRT'.
- Contact and Footer:** Includes a dark footer with contact information (INFO@CLOTHX.CO), social media links, payment method icons (VISA, MasterCard), and a copyright notice.
- Cart Page:** Shows a cart item for a 'STRIPED SKIRT' (SKU: 8822/MIDDLETON/F-BLK) in size F, color BLACK, quantity 1, and amount HK\$300.00. It also includes a promotion code input field and an 'ACTIVATE' button.

Critical Evaluation

Unlike what the project have anticipated from the very beginning, it faced many challenges during the development of the system which led the project to change the strategy in turn of development focus. The project had to leave the web store at its basic function state in order to catch up on the schedule. And over the course of the development, the project have come across some aspect that it have overthought before, like the development of the mobile application of the platform. It is prove that although there are some variation between the initial planning and actually development, it was able to retain most of its intended values and functionalities through flexible implementation.

2.8 Changes to design and justifications

As time moved on while developing the platform, it encountered many different challenges and difficulties. It was able to tackle some of them, like some changes to mobile application design in order to have the mobile application work better with the platform. But some of the challenges were so difficult that we have to straight the project postpone the development of the function, like the in-store purchase, it was unable to use in the latest version of React Native, and due to the upcoming deadline of the project, it had to regrettably put aside its development and focus on the rest of the platform.

2.9 Quality of implementation

As the project did some changes to the design to the overall of the platform, the implementation of the actual platform does a huge different from the previously designed one. For example, the project has to shift the focus entirely away from the building of the web store and cut off the mobile application for designers to ensure the development of the rest of the platform is close to the requirement of the CST student. But overall, most of the users retain their intended functions, the designers are still available to con-

trol their settings, and have data analyse service. Customers can browser and search the product from the web store and mobile application. As for the programming techniques, Magento is the main framework for the web application and React Native is used in iOS and Android application. # Result and conclusion

As a summary to the entire development of the system, it was surely full of challenges and changes. One of the major problems that the project faced was cease of development of the web store and mobile application for designers, it is because as CST student, we were supposed to focus on the development of the software technology portion of the system. The shift of the focus from the system development to technology ensures the build quality of the software technology and makes sure it would be delivered in the schedule that the project planned. There are some limitations to the platform, for example, the platform do not have filter for filter the unrelated information or products which uploaded by designers.

2.10 Future development

1. The control measures function

Since we have to protect the rights of the designer and customers, some function like add the watermark and filter the non related information need to provide in the platform.

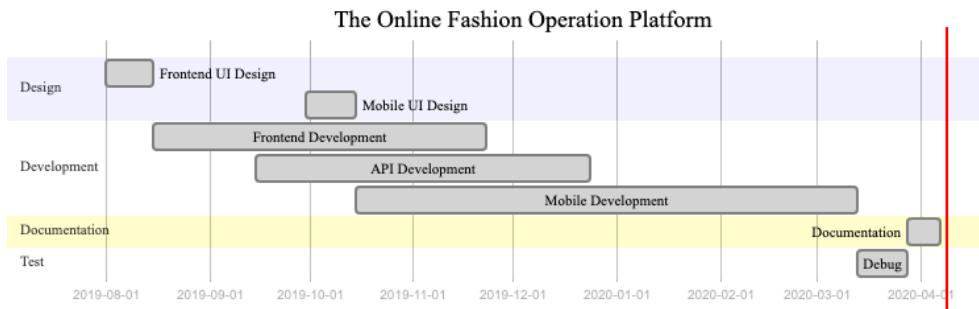
2. Offline support

We can connect with the offline store to let the designers has more way to promote their design and have more data collection.

3. Customised service

Some of the customers are looking for the customised service but not the finished project. It is a chance to let different designers to provide their ideas and even get some resource. # Appendix A

2.11 Project Schedule



Chapter 3

References