KJ Fashion Shoes E-Commerce Mobile-Based Application with Implementation of Image Recognition System

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ABSTRAK

Pada masa kini, aplikasi mudah alih e-dagang terkenal, dan semua orang pernah mendengar dan menggunakannya sebelum ini. Walau bagaimanapun, dalam projek ini, bidang tumpuan adalah kasut fesyen. Tetapi sesetengah e-dagang kasut fesyen tidak menggunakan pelaksanaan sistem pengecaman imej yang mampu pengguna mencari visual seperti mencari dengan imej tanpa menaip sebarang kata kunci. Oleh itu, tujuan projek ini adalah untuk melaksanakan sistem pengecaman imej dalam e-dagang kasut fesyen untuk membolehkan pengguna mencari produk pilihan mereka dengan lebih cepat dan mudah. Selepas kajian dilakukan terhadap tiga aplikasi sedia ada, kita dapati terdapat ciri unik yang memudahkan pengguna. Malah, aplikasi yang dicadangkan juga akan mempunyai ciri unik yang mengurangkan penggunaan masa pengguna untuk mencari produk. Metodologi Agile digunakan untuk aplikasi yang dicadangkan ini secara langkah demi langkah yang menjalani fasa Define (Define), Fasa Reka Bentuk (Design), fasa Ujian (Test), dan fasa Deploy (Deploy) untuk melakukan pelaksanaan. Seterusnya, Ujian Penerimaan Pengguna (UAT) juga akan dijalankan bagi memastikan aplikasi dapat berjalan tanpa sebarang ralat.

ABSTRACT

Nowadays, the e-commerce mobile application is famous, and everyone had heard of and used it before. However, in this project, the focus field is fashion shoes. But some of the fashion shoes e-commerce does not apply the implementation of an image recognition system that able the user to visual search such as searching with the image without typing any keyword. Hence the purpose of this project is to implement the image recognition system in fashion shoes e-commerce to let the user find their preferred product more quickly and easily. After the research is done on three existing applications, we can find that there has a unique feature that makes it easy for the user. Indeed, the proposed application will also have a unique feature that reduces the time-consuming of the user for searching a product. The Agile methodology is applied for this proposed application by step by step which undergo of Define phase, Design phase, Test phase, and Deploy phase to do the implementation. Furthermore, the User Acceptance Test will also be conducted to ensure the application can run without any errors.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

In this internet era, e-commerce applications such as Lazada and Shopee has rose become famous and everybody had heard before from any resource such as newspapers and social media like Facebook, Instagram, Twitter, and YouTube which are the most daily social media usage in the world. E-commerce is known as electronic commerce and its purpose of it is to conduct daily business transactions through the internet by buyers and sellers. This system encourages anyone to buy or sell almost anything through the internet in online. There are six main types of e-commerce such as Business to Consumer (B2C), Business to Business (B2B), Consumer to Consumer (C2C), Consumer to Business (C2B), Business to Administration (B2A), Consumer to Administration (C2A).[1] Firstly, B2C includes the transactions made between the business and the consumer, and it is the famous sales model in this e-commerce type. For example, when you buy a jean from an online fashion retailer, it defines as business to consumer transaction. Secondly, B2B includes the sales made between the business. For example, the B2B transaction made between the manufacturer of the product and a retailer or wholesaler. Thirdly, C2C is the earliest type of e-commerce and understand as the sales of services or products between customers. For example, C2C most likely is selling the relationships between consumers such as Amazon or eBay. Fourth, C2B is which is the traditional model for e-commerce which understand as the individual consumers who make their services or products on the market for business buyers. For example, a blogger or photographer stocks photos available for business. Fifth, B2A is understood as the transaction made between administrations and online businesses. For example, the services or products built by the software company provide to the government such as the MySejahtera app. Sixth, C2A is similar to B2A but is a transaction made by the consumer and administration like selling an online service or product to the administration. For example, C2A includes online consulting for online tax preparation and education.

In this project, the field of e-commerce discussed is fashion which is shoes, and the type of e-commerce used is B2C[2]. With the popularity of e-commerce, there are many different product fields such as fashion, movies, food, and others. This is because it lets customers or users find the specific field for a specific product they wanted to buy or sell. This way also can save time for them to explore the product. Previously, fashion e-commerce becomes rose because of the pandemic Covid-19 forced many businesses field in Malaysia to learn and adapt to the new norms. For example, to avoid the exploration of the seller or customers to the pandemic when the transaction is made in the store, they prefer the transaction made online and the selecting of the product. Nowadays, evenly the SOP become slack, they prefer e-commerce compares to walk-in to the store because of the convenience and some promotions done by the seller through e-commerce. For example, as Malaysia's most popular and visitor fashion e-commerce mobile application, Zalora had reported that most of the younger age Malaysians group still prefer shopping online for clothes, while periods such as the year-end sales, Lunar New Year, and Ramadan. Shopee also reported that fashion apparel still has been among the top purchased products during the 2.2 Chinese New Year Sale and 11.11 big sale.

The image recognition system in this e-commerce could help the user find the products more accurately and quickly. The function of the system is to scan the real-time products of the user's choice using the android application and get the immediate result of the similar product that capture or upload from phone gallery. This is because it will let the user find their preferred products more easily and quickly without typing the keyword of the product. In this case, we also used TensorFlow Lite and Teachable Machine to implement the image recognition system for this application. The machine learning used for image recognition is a Convolutional Neural Network (CNN) whose purpose of the algorithm is to process the data through multiple layers of the arrays. Generally, face recognition or image recognition is using this type of neural network. Meanwhile, the difference between another ordinary neural network with CNN which CNN takes the input of the image and makes it into a two-dimensional array, and then directly operates on that image without focusing on any feature extraction which another neural network will keep focusing on. [3]

Teachable Machine is a web-based GUI application that allows users without advanced technical knowledge to build unique machine learning (ML) categorization models. They developed it to assist educators, designers, and others in learning about ML through the development and use of their classification methods. Its widespread adoption indicates that it has given individuals the opportunity to teach, learn, and investigate ML concepts: Teachable Machine has been used to develop courses, tutorials, and other materials on subjects like AI ethics at organizations like the Stanford d.school, NYU ITP, the MIT Media Lab, as well as innovative initiatives. Over 125,000 categorization models have been produced by over 182,000 people across 201 nations.[4], [5]

1.2 Problem Statement

Fashion e-commerce nowadays has provided an easy way to sell products to a huge customer base. When users visit the e-commerce site, they expect to find the products they are looking for easily and quickly. Generally, many e-commerce websites need a web browser to visit their page such as Levi's which is the world's largest maker of pants. The mobile-based application e-commerce is born to let the user more easily and quickly visit the site of e-commerce without using the web browser and just clicking on the application only. For example, it is convenient and can save time for the user to open and load the site of e-commerce in a web browser. The notification also can pop up in the notification bar of the smartphone when there are promotions made by the retailer, it will let the customer receive the promotion notice within a second. In this way, the profit business of e-commerce will rise quickly as the visitor increase. [6]

In e-commerce, the main key component is product search. When the customer is buying a particular product on an online platform, generally he will find the products by entering related information on the search icon. Based on the input he entered, a list of similar products will recommend to the customer. In another word, if the customer is not sure about the product information or it is the product just seen and he wants to buy, searching for the products using this traditional way can be tedious. This is because this traditional way just allows the customer to search based on criteria like categories, keywords, the name of the product, etc. However, some e-commerce application does not provide any search functionality such as image recognition. For example, if I see someone wearing a pair of Addidas shoes which I like a lot. Now going to search or find this pair of shoes in e-commerce could be time-consuming as I do not know the keyword of these shoes or their category. It is hard to describe this product's features such as its textures and shapes. Another example could be happening such like T-shirt with a particular logo or pattern. Hence, the implementation of an image recognition system is built into this fashion e-commerce which allows users to take a picture or upload a gallery photo of the products to search for it more significantly and accurately. [7]

1.3 Objective

1. To study the limitation of existing e-commerce mobile-based applications in the fashion field.
2. To develop the image recognition system for fashion e-commerce in the mobile-based application.
3. To evaluate the functionality of the fashion e-commerce mobile-based application.

1.4 Scope

1. User Scope:
   - Customer (male or female)
   - Admin (company staff)

2. System Scope:
   - Mobile based application
   - AI technique and Algorithm

3. Development Scope:
   - Android Studio
   - Google Play Store
   - Android
   - Teachable Machine

1.5 Significance of Project

1. Customer
   - They can easily and quickly find their preferred product based on the implementation apply to this e-commerce application.
   - They can make an online purchase on fashion e-commerce in a short time without interrupting their tasks.
2. Fashion Company
   - Increase the visiting rate of the customer to this e-commerce through the implementation of an image recognition system.
   - Increase the profit of the business as the increasing purchase is made by the customer through the e-commerce application.

3. Staff Company
   - Have more time to do other tasks such as the implementation of image recognition to this system because it reduces the customer's service rate when customers fail to find their preferred products.

1.6 Report Organization

This report includes five chapters. Chapter 1 is the overview of the project which describes the Introduction, Problem Statement, Objective, Scope, Significance of the Project, and Report Organization.

Chapter 2 describes the literature review on the existing system of Fashion E-commerce Mobile Based Applications.

Chapter 3 describes the methodology used in this project. This project is implemented with an AI system which is an image recognition system. The flowchart/prototype will also describe in this chapter.

Chapter 4 describes the outcome of this project. The implemented works and results of the project will also be described in this chapter.

The last chapter which is Chapter 5 will summarise this project.

Chapter 2

Literature Review

2.1 Introduction

Chapter 2 cover the review of the available application in the fashion field of e-commerce. The chosen three existing applications will be reviewed, explain, discuss point-by-point, and compare with the proposed application. Besides that, the advantage and disadvantages of the comparison between the three chosen existing applications and the proposed application will also be discussed in more detail based on their platform, feature, function, and other relevant aspects. The definition of this chapter is to define each existing application's strengths and weaknesses which bring the implementation of the proposed application to future needs.

2.1.1 Machine Learning (Teachable Machine)

In this project, I use the Teachable Machine (TM), a new, easily available web-based tool from Google, for its potential use in Image recognition. Tensorow.js, an open-source Javascript library used by the new platform to create and train machine learning (ML) models, is used. TM makes use of the transfer learning technique, allowing users to build their machine learning models on top of the Google Mobilenets architecture using their datasets. Convolutional neural networks (CNNs) are a class of deep neural networks used in this system primarily for the analysis of visual information. CNNs also are mostly utilized in medical image analysis, image classification, and image and video recognition.[8]–[10]

The machine learning method of TensorFlow and Teachable Machine will be used to develop the image recognition system. The machine learning system of TensorFlow operates in heterogeneous and large-scale environments. It represents the shared state, the operation which mutates that state, and the computation by using a dataflow graph. Hence, TensorFlow is suitable to develop the image recognition system for the proposed application. For example, TensorFlow maps the dataflow graph nodes within a machine across multiple computational devices, and to many machines in the cluster which include general-purpose GPUs, custom-designed ASICs also known as Tensor Processing Units (TPUs), and multicore CPUs. [11] Next, the Teachable machine with the help of a Convolutional Neural Network will be used to train the image dataset and export it to TensorFlow Lite which is suitable for Android Studio.

Convolutional Neural Network

The convolutional neural network is a type of deep neural network that build to calculate the data which have multiple arrays and grid-like topology such as image, video, audio, or text. This type of deep neural network contains three main substructures which are convolutional layers, pooling layers, and fully connected layers as shown in figure 2.0.

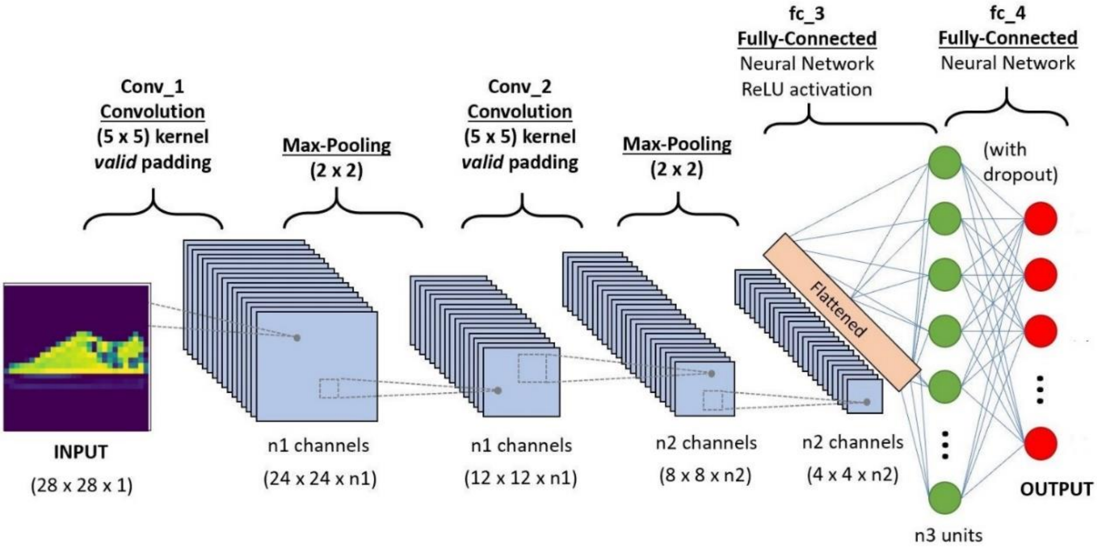


Figure 2.0 Architecture of Convolutional Neural Network

In the convolutional layer which is the first layer, there appear several feature maps, and each of them is made from the convolving of a small area of the local receptive field which calls as input data. For example, the local receptive field will slide over the input data to create a new feature map.[12] Figure 2.1 shows the idea of the convolutional layer.

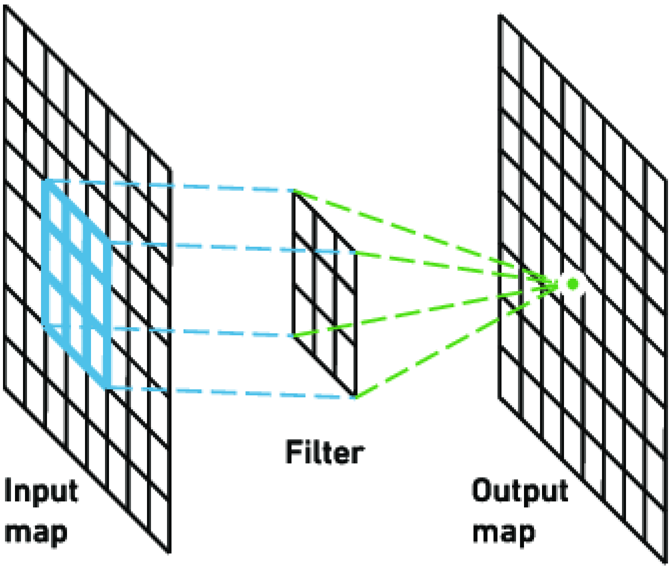


Figure 2.1 Outline of the Convolutional Layer

After the convolution layer, the input data will proceed to the pooling layers. The feature map by a convolutional layer generated the information and the scale of the maps will then be reduced and simplified into the pooling layers. The pooling layer aims to reduce the overfitting issues and computational time which appear in the convolutional neural network. The operation used in the pooling layer is average-pooling and max-pooling which are the two most frequently used.

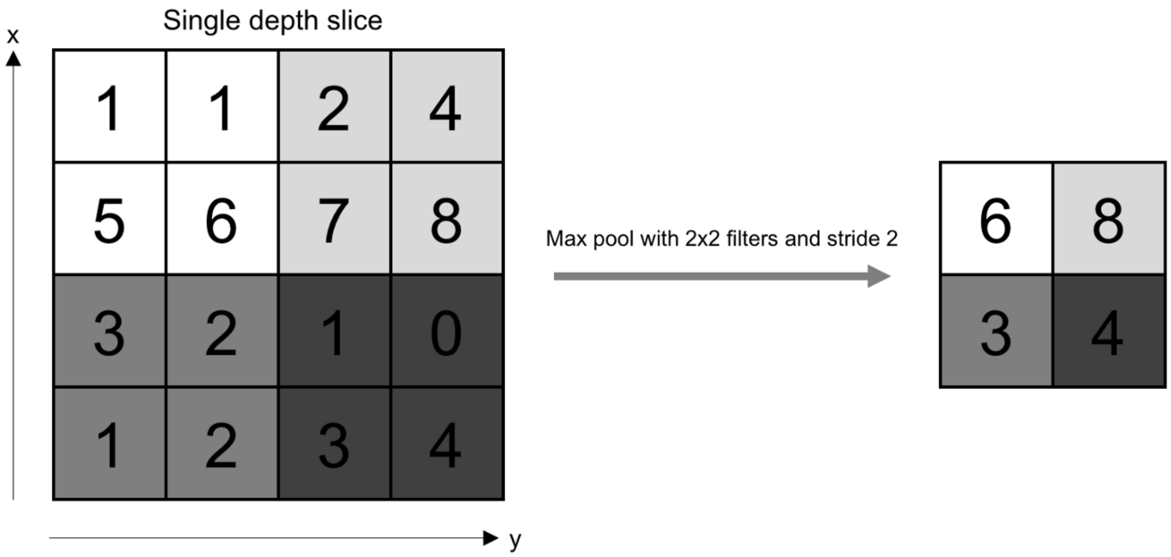


Figure 2.2 Outline of the Pooling Layer

Next, the fully connected layers which are the last layers of the convolutional neural network where will undergo the composition and aggregation of the most important information from all the procedures by the convolutional neural network. After the process above, the produced feature vector of the input data can be used for machine learning tasks such as classification. Training from scratch and performing transfer learning are the two methods to apply Convolutional Neural Network models by use of pre-trained models such as AlexNet, GoogleNet, SqueezNet, and ResNet. Training from scratch is time-consuming because of the number of layers needed and a massive amount of data is used compared to performing transfer learning by use of a pre-trained model method.

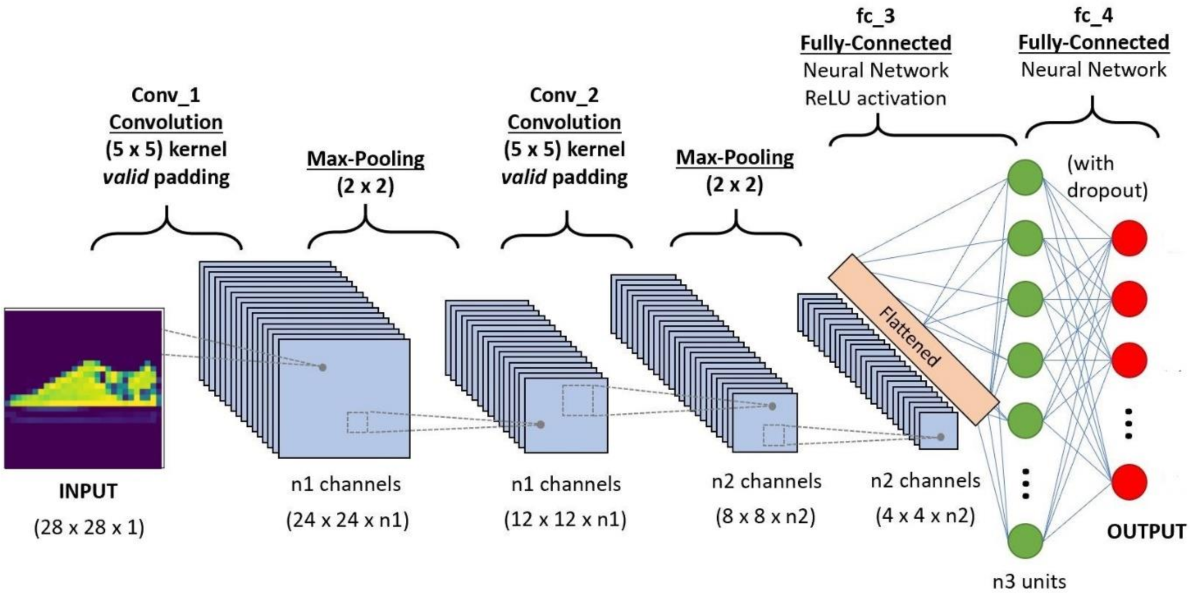


Figure 2.3 Simplified Convolutional Neural Network Architecture for Shoes Image Recognition

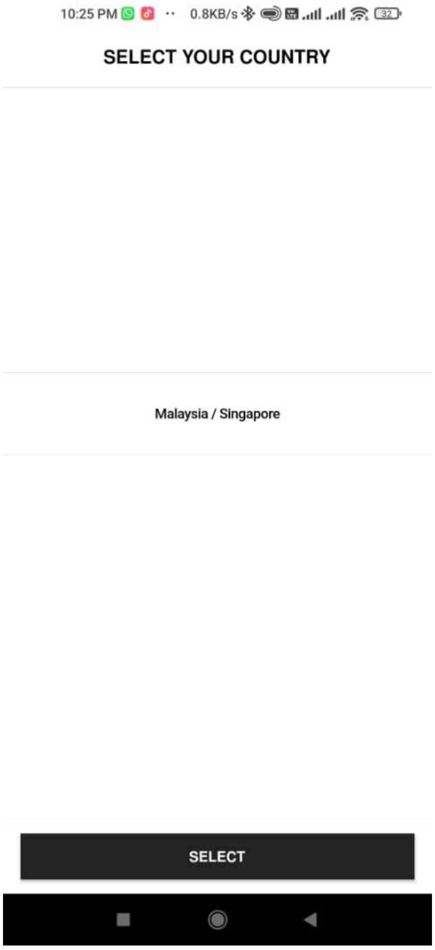
2.2 Existing Application

This part will review, explain, and discuss the chosen existing application which are Padini, JD Sports, and UNIQLO. For example, each existing application's advantages and disadvantages will also be discovered in more detail. This is because in this many e-commerce competitors especially in fashion e-commerce, the user experience and the enhancement feature need to be implemented to ensure the proposed application have possible to get the benefit through this competition.

2.2.1 Padini

This application is support Android and IOS operating systems, the application can be found and downloaded in Android Google Play Store at the link: https://play.google.com/store/apps/details?id=com.padini.pmcmobile , and also in IOS App Store with the link: https://apps.apple.com/my/app/padini/id1536408603 . Padini is a fashion e-commerce application that developed by the Padini Company (Padini Holding Bhd) for the user who’s decided to see the latest products and purchase them online.

This application is developed to let user shop online for the most fashionable and latest trends through the smartphone. The products sold in this application is wide that include shoes, pants, shorts, t-shirt, and other. After the user downloaded the Padini, the application will ask the user to select their country whether Malaysia or Singapore as shown in Figure 2.4.



10:25 PM 0.8KB/s

SELECT YOUR COUNTRY

Malaysia / Singapore

SELECT

Figure 2.4

After selecting the country, the application will display the home page of the Padini as shown in Figure 2.5.

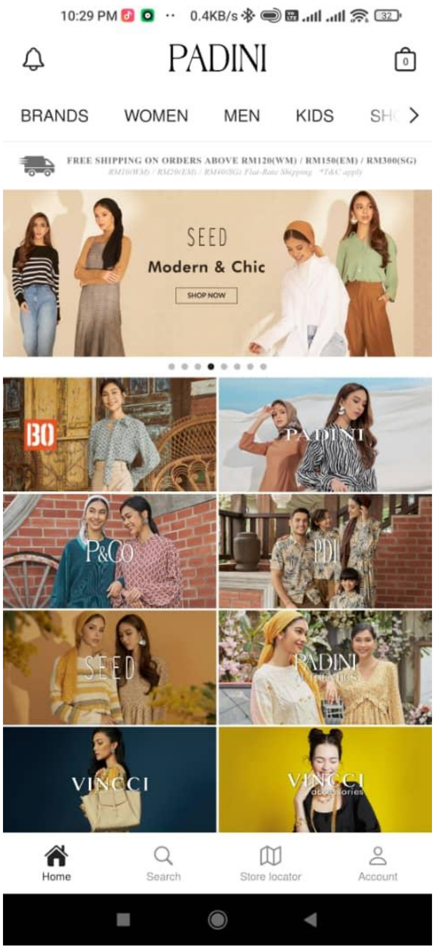
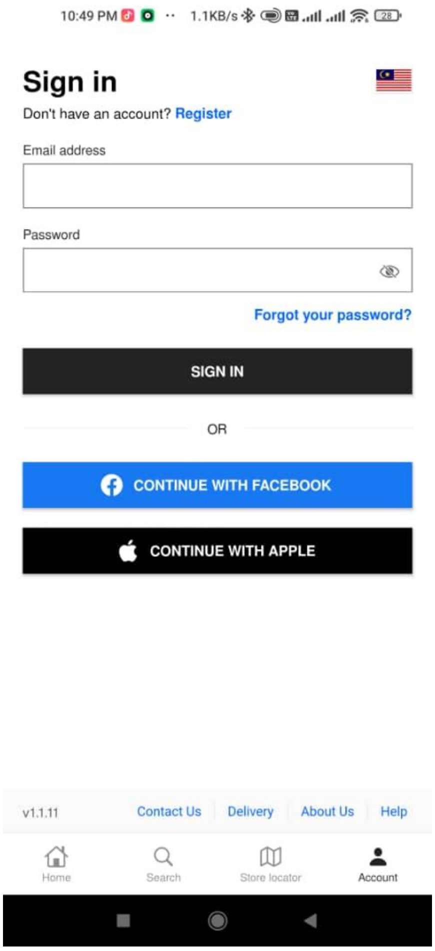


Figure 2.5

The design of the template Padini is a White layout which can create a balance on the home page, especially in a fashion e-commerce application. On the upper home page, we can see the notification icon, cart icon, category list which has brands, women, men, kids, shoes, bags & accessories, and deals, and the promotion list. On the middle home page, we can see there is a list of the vendor of the Padini such as Brand Outlet, Seed, Vincci, and Miki. On the lower home page, we can see the home icon, search icon, store locator icon, and account icon. To continue to purchase the items of the application, the application will need users to sign in to their account also for applying another feature of the app such as getting the promotion notice through email and purchasing the product. The login page is shown in figure 2.6.



Sign in

Don't have an account? Register

Email address

Password

Forgot your password?

Figure 2.6

As shown in Figure 2.6, the application has given 3 alternative ways to users select which are sign in or register an account by the application, link to the Facebook account, or link to the Apple account.

Next for the search page, as shown in figure 2.7, the application needs the user to enter the keyword of the product which the user wants. The recommendation of the products provides to the new user which doesn't have any data on purchase activity and review of a product. For example, the recommendation provided is based on the popular search by the customer of the application.

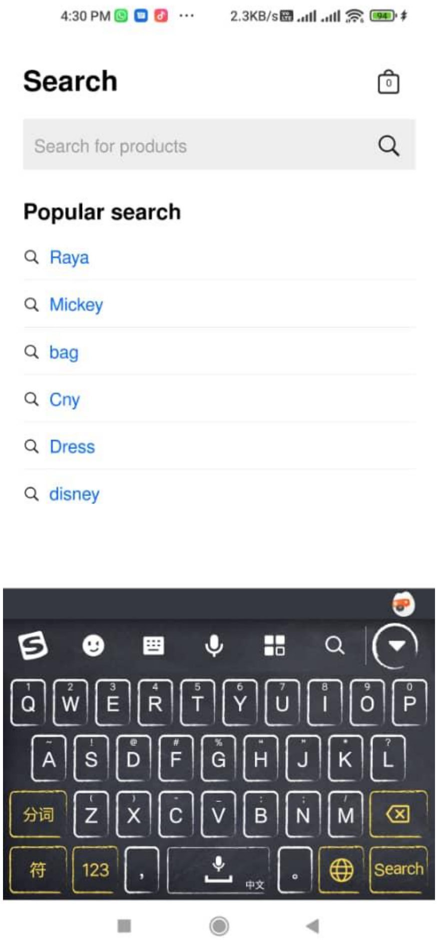
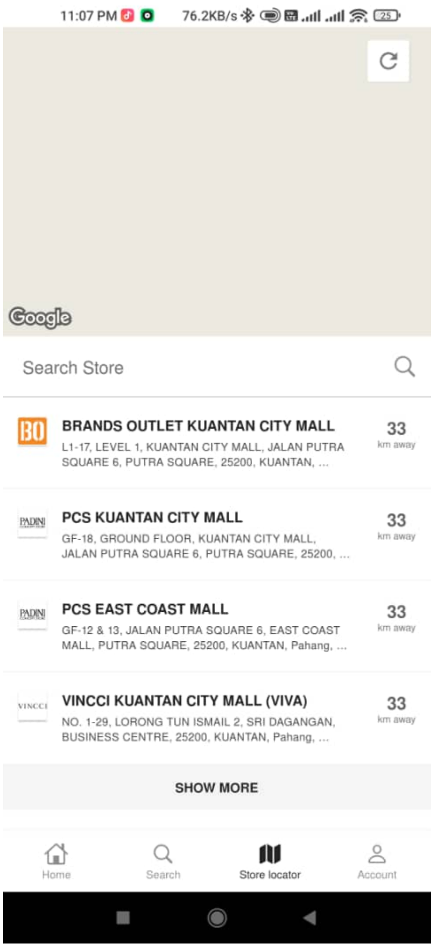


Figure 2.7

As shown in figure 2.8, we can see that the unique feature that appears in this application is the Store locator icon which can help the user find nearby Padini stores and vendor stores such as Brands Outlet and Vincci through getting permission for location data by the user.



BRANDS OUTLET KUANTAN CITY MALL
L1-17, LEVEL 1, KUANTAN CITY MALL, JALAN PUTRA SQUARE 6, PUTRA SQUARE, 25200, KUANTAN, ...
33 km away

PCS KUANTAN CITY MALL
GF-18, GROUND FLOOR, KUANTAN CITY MALL, JALAN PUTRA SQUARE 6, PUTRA SQUARE, 25200, ...
33 km away

PCS EAST COAST MALL
GF-12 & 13, JALAN PUTRA SQUARE 6, EAST COAST MALL, PUTRA SQUARE, 25200, KUANTAN, Pahang, ...
33 km away

VINCCI KUANTAN CITY MALL (VIVA)
NO. 1-29, LORONG TUN ISMAIL 2, SRI DAGANGAN, BUSINESS CENTRE, 25200, KUANTAN, Pahang, ...
33 km away

Figure 2.8

2.2.2 JD Sports

This application is support Android and IOS operating systems, the application can be found and be downloaded in Android Google Play Store with the link: https://play.google.com/store/apps/details?id=com.jd.jdsports , and also in IOS App Store with the link: https://apps.apple.com/my/app/jd-sports/id690602681 . JD Sports is a fashion e-commerce application which developed by JD Sports Fashion Plc for the user who's decided to see the latest products and purchase them online.

This application is developed to let user shop the latest sports fashion, clothing, and trainers for women, men, and kids through the smartphone. The products sold in this application is wide which include sport shoes, sportswear, and other. After the user downloaded JD Sports, the application will ask the user to select their country whether the United Kingdom, Italy, Malaysia, or the other as shown in Figure 2.9. This is because JD Sports was the available business for many countries nowadays.

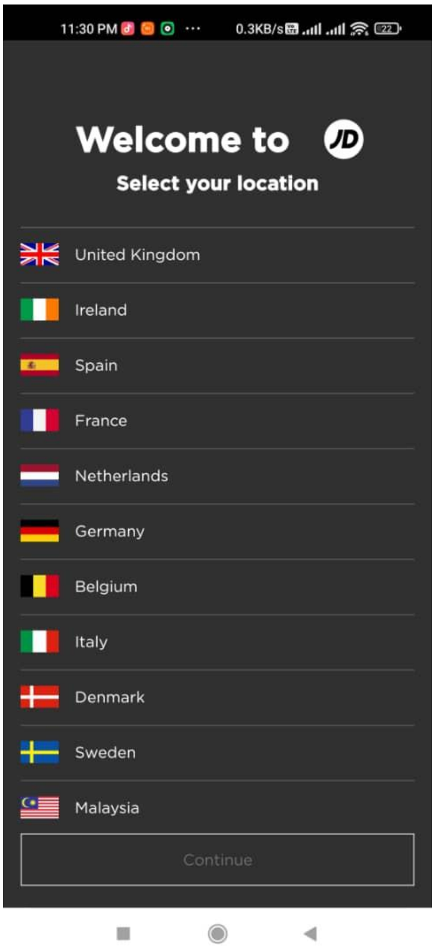
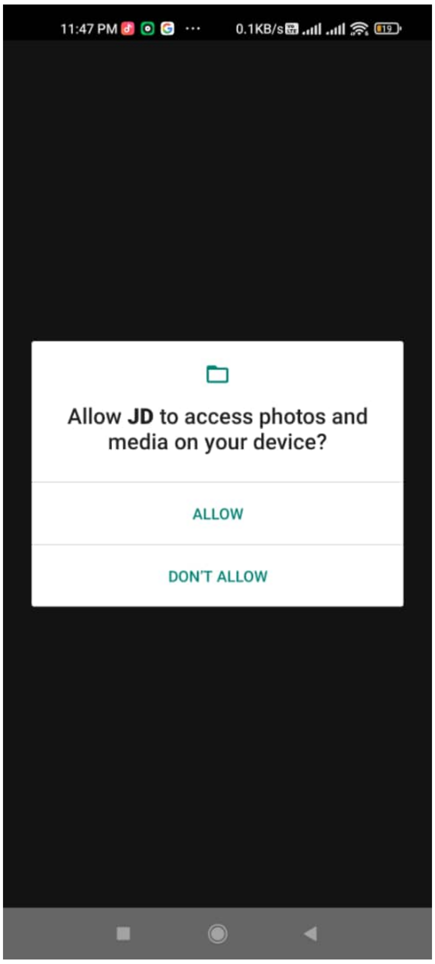


Figure 2.9

After selecting the country, the application will ask permission to access the media and photos on the user's device as shown in Figure 2.10.



Allow **JD** to access photos and media on your device?

Figure 2.10

After the user allows the permission, the application will display the home page which is shown in Figure 2.11. The design of the template JD Sports is the white layout which can create a balance on the home page, especially in a fashion e-commerce application. At the upper home page, we can see the search icon and cart icon which let users easily search and see their cart of products. On the middle home page, it displays the trending product list to let the user find the trending product by just clicking on the application. Next, under the trend product list, it displays the shop by category which has 3 alternatives such as a shop for men, women, and kids. Besides that, under the shop category, it displays the brands of the vendor such as Addidas, Nike, Jordan, Vans, New Balance, and Puma. At the lower home page, it shows the JD Home icon which helps the user come back to the home page quickly, search by category icon, wish list icon which helps the user save their reviewed product that user like or prefers, and the account icon.

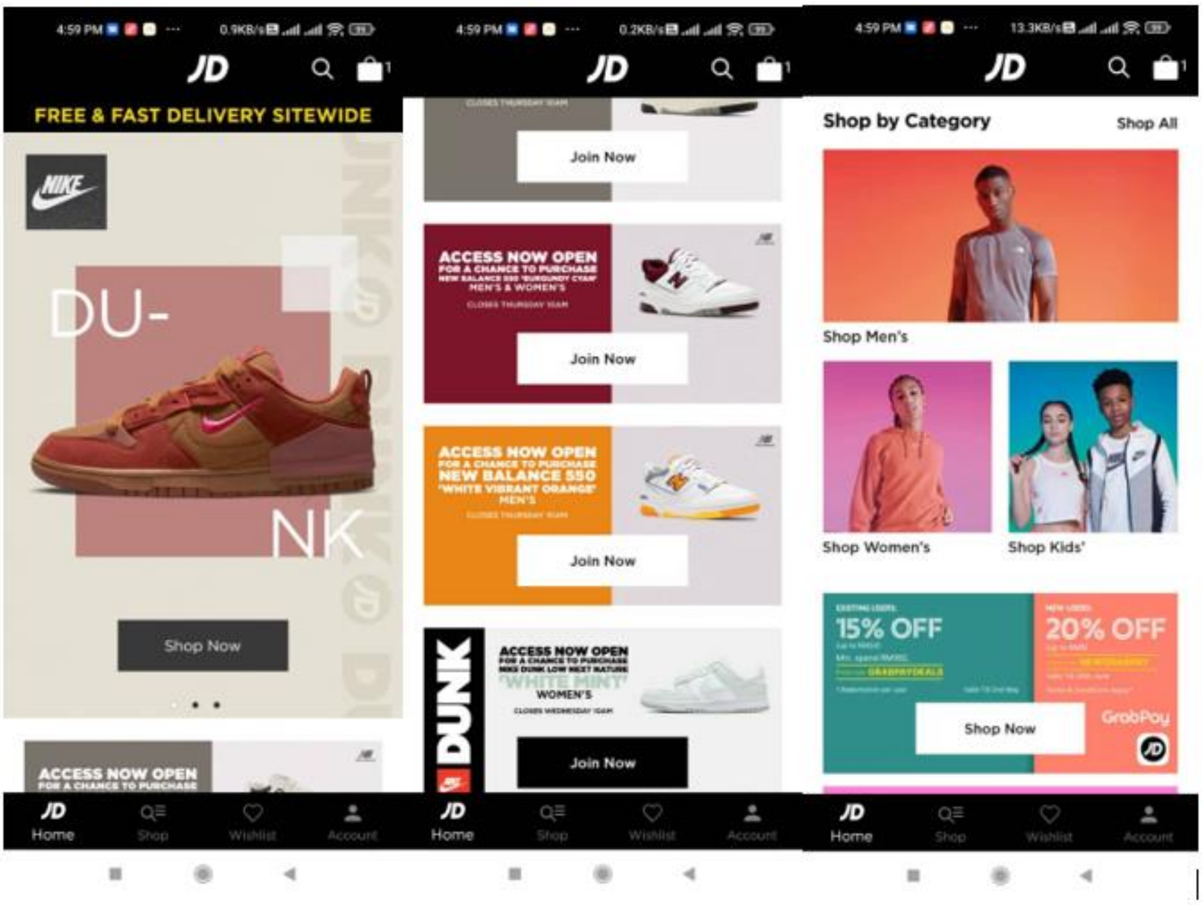


Figure 2.11

For the search page as shown in Figure 2.12, the application needs the user to enter the keyword of the product which the user wants. The recommendation of the product such as a trending product is provided to the new user which doesn't have any data on purchase activity and review of a product. The recently viewed products by the user will also show on the search page.

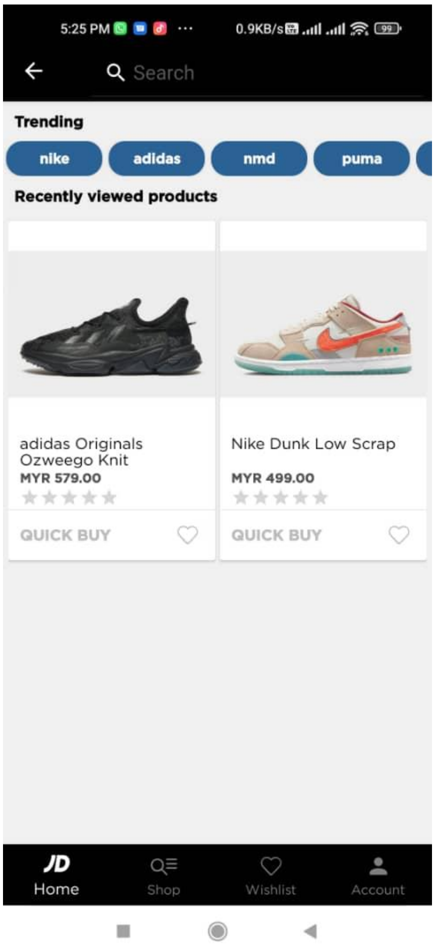


Figure 2.12

As shown in Figure 2.13, on the account page, the user can log in or register to an account which to continue purchasing and make payments to the items of the application, the application will need the user to sign in to their account also to apply another feature of the app such as get the promotion notice through the email and purchase the product.

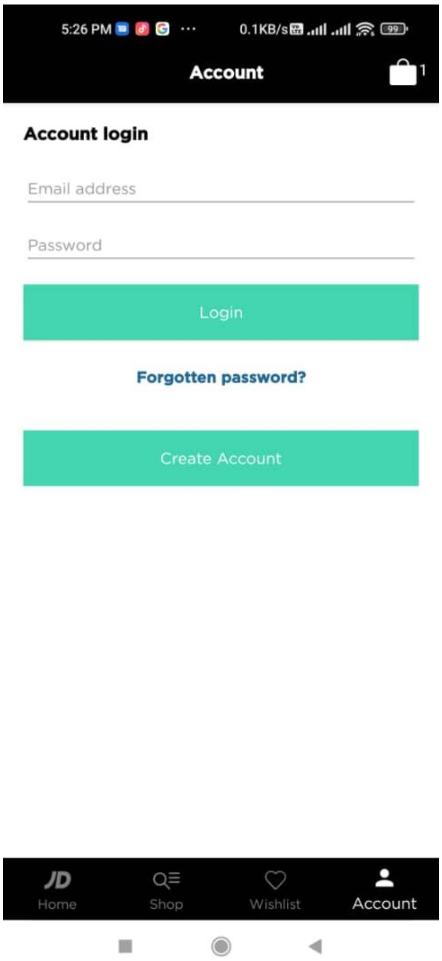


Figure 2.13

In the search category page as shown in Figure 2.14, display the list of category such as shop category like men, women, kids, accessories, and brands, Store locator which need the permission of the user to get the location of the user for display the list and map of the nearby store around the user, track my order which helps the user to track their purchased product delivery status, QR code scanner which helps a user scan the QR code that promotion appear in the store or through email, and Customer service which guide user while the user-facing problem using this application.

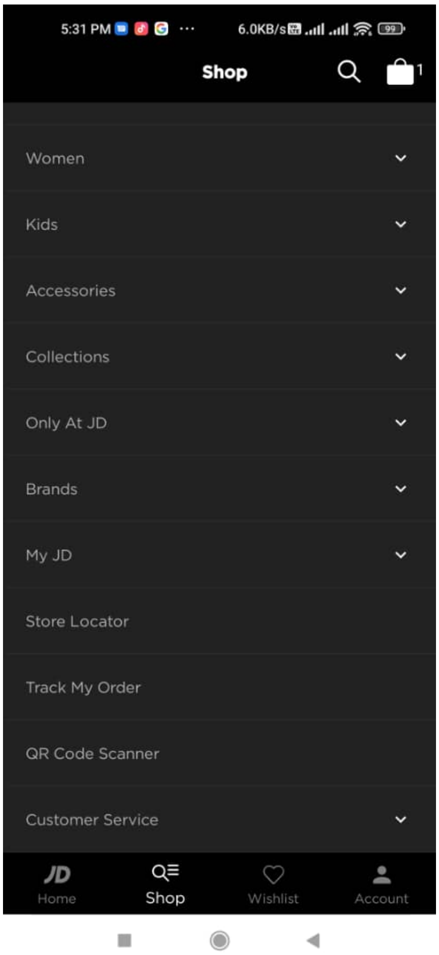
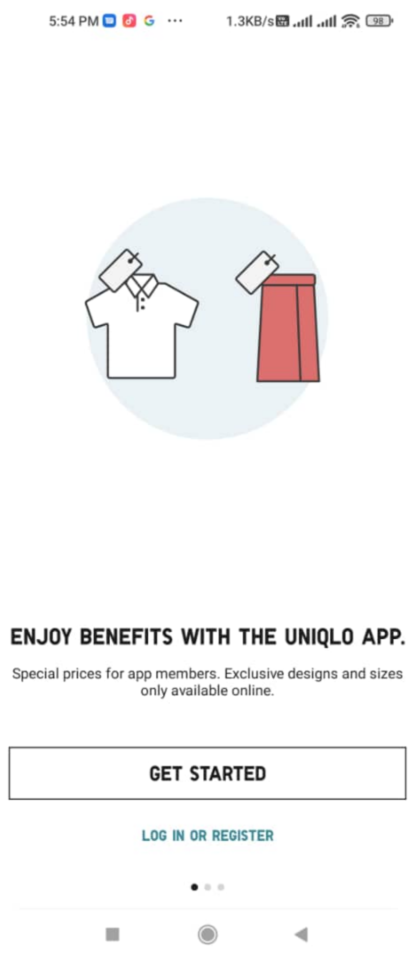


Figure 2.14

2.2.3 UNIQLO

This application is support Android and IOS operating systems the application can be found and downloaded in Android Google Play Store with the link: https://play.google.com/store/apps/details?id=com.uniqlo.my.catalogue&hl=en&gl=US , and also in IOS App Store with the link: https://apps.apple.com/my/app/uniqlo-my/id867492228 . UNIQLO is a fashion e-commerce application developed by the Uniqlo Company (UNIQLO CO., LTD.) for the user who’s decided to see the latest products and purchase them online.

This application is developed to let user shop online for Smart Shopping and apply for membership through a smartphone. The products sold in this application is wide which include shoes, pants, shorts, t-shirt, and other. After the user downloaded the UNIQLO, the application will ask the user to log in or register to an account which is shown in Figure 2.15. Meanwhile, the user can also go to the home page of the application without login into the account by just clicking the button (GET STARTED).

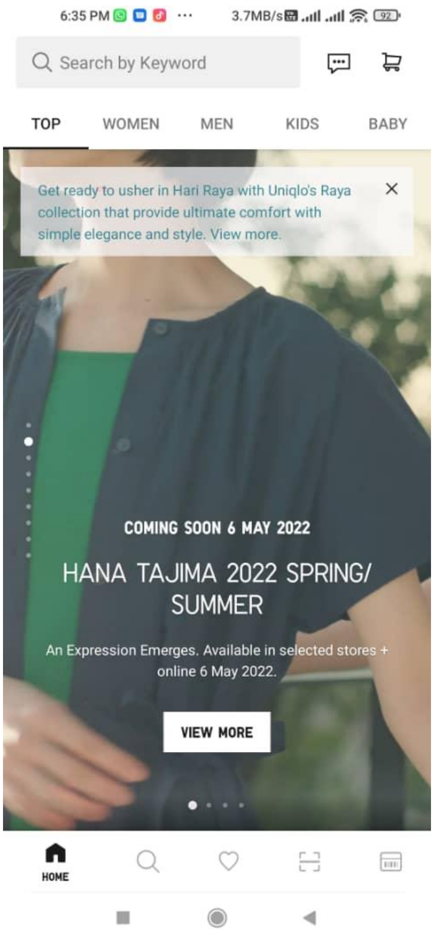


ENJOY BENEFITS WITH THE UNIQLO APP.

Special prices for app members. Exclusive designs and sizes only available online.

Figure 2.15

As shown in Figure 2.6, the design of the template UNIQLO is the white layout which can create a balance on the home page, especially in a fashion e-commerce application. At the upper home page, we can see a search box, a notification icon that will notify the user of every promotion, membership promotion, and trending product, and a cart icon that needs the user to log in to get this feature. Below the search box is the category list such as TOP, WOMEN, MEN, KIDS, and BABY. Each category has its page which help user easily find their product. On the lower home page, it appears the icons such as Home which help the user come back to the home page quickly, search, wish list which displays all the products that the user added to the wish list, a scan which helps the user to scan the product's barcode to check its available, sizes, inventory and colors, and membership.



Get ready to usher in Hari Raya with Uniqlo's Raya collection that provide ultimate comfort with simple elegance and style. View more.

COMING SOON 6 MAY 2022

HANA TAJIMA 2022 SPRING/ SUMMER

An Expression Emerges. Available in selected stores + online 6 May 2022.

Figure 2.16

In Figure 2.17, we can see the search page of the UNIQLO that needs the user to enter the keyword of the product which the user wants. There is no recommendation for the user and just displays the search history which is the data of the user's review of the product. Meanwhile, for the search page shown in Figure 2.18 which the button lower, the application is display the category list such as Women, Men, Kids, and Babies.

9:57 PM
2.8MB/s
Search by Keyword
HOME

SEARCH HISTORY

You can see your search history here.

Figure 2.17

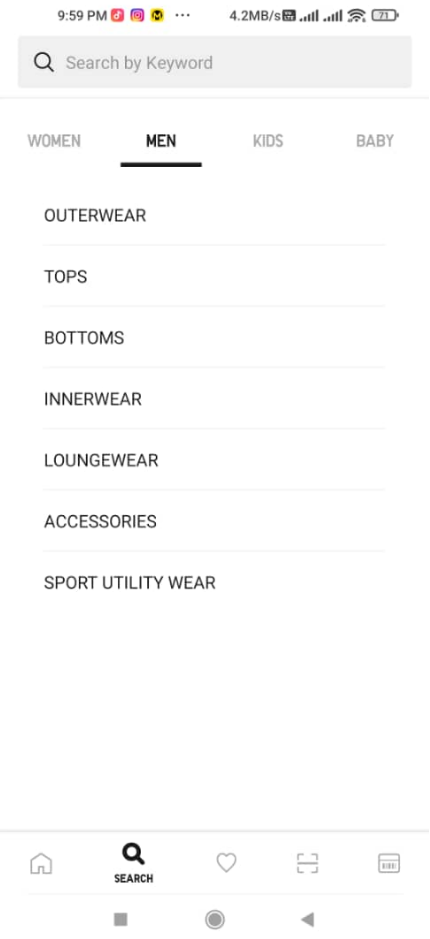


Figure 2.18

Next, the application has a unique feature that allows the user to apply for the membership as shown in Figure 2.19 to let the user enjoy the exclusive member prices and get discounts on the products while the E-Member Special event.

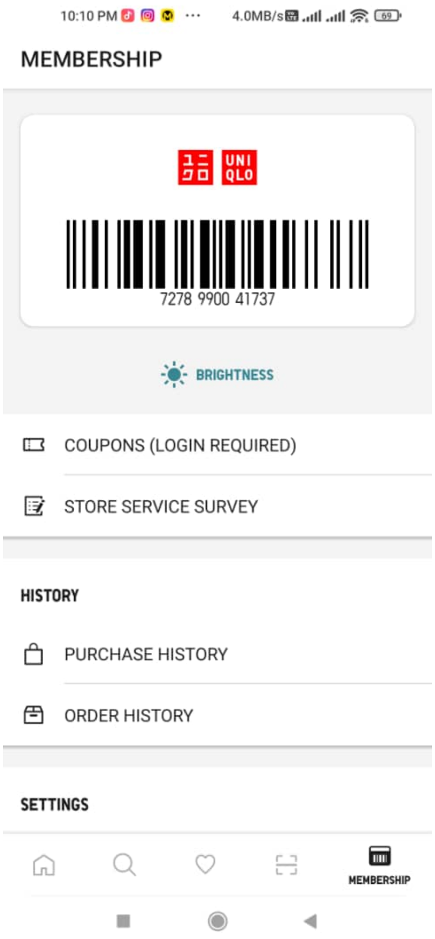


Figure 2.19

2.3 Comparison of Existing Application and the Proposed Application

In this part, the comparison table will be presented based on their different aspect and feature by existing applications and proposed application as summarised in Table 2.0. Table 2.1 will present a discussion about the advantage and disadvantages of the existing application.

Specification	Padini	JD Sports	UNIQLO	Proposed Application (KJ Fashion Shoes E-Commerce)
Platform	IOS and Android	IOS and Android	IOS and Android	Android
Compatibility	- Requires IOS 12.0 or later - Requires Android 6.0 or later	- Requires IOS 13.0 or later - Requires Android 5.1 or later	- Requires IOS 13.0 or later - Requires Android 6.0 or later	Requires Android 6.0 or later

Application Size	- IOS size 53.7MB - Android size 29MB	- IOS size 73.8MB - Android size 35MB	- IOS size 34.8MB - Android size 12MB	- Android size 15MB
Application Category	Fashion	Sport Fashion	Fashion	Shoes
User Category	- 4-year-old and above in IOS - all ages in Android	- 4-year-old and above in IOS - all ages in Android	- 4-year-old and above in IOS - all ages in Android	- all ages in Android
Hardware	Devices running with IOS or Android	Devices running with IOS or Android	Devices running with IOS or Android	Devices running with Android with a camera
Language	English	English, Danish, Dutch, Finnish, French, German, Italian, Polish, Spanish, Swedish	English	English
Recommendation Search System	√	√	X	X
Image Recognition Search System	X	X	X	√
Locate Store System	√	√	X	X
Membership Feature	X	X	√	X
Price	Free	Free	Free	Free

Table 2.0 Comparison of Existing Application and the Proposed Application

Application	Advantage	Disadvantage
Padini	**Price** - Free to download and use **Result** - Provide recommendation system - Provide search history - Provide a store locator feature	- Too many products which take time to discover - Do not have an image recognition search method - Only available in the English language

	- Provide category list search **Ease of use** - Easy to use - Neat and clean template - Attractive template **Other** - Provide the account which links to the Facebook account and Apple account - provide many fashion products to be visit	
JD Sports	**Price** - Free to download and use **Result** - Provide recommendation search - Provide search history - Provide category list search - Provide a store locator feature **Ease of use** - Easy to use - Neat and clean template - More language availability - Attractive template **Other** - Provide customer service - provide many sport fashion products to be visit	- Too many products which take time to discover - Do not have an image recognition search method

	- provide tracking order feature - provide a QR Code Scanner feature	
UNIQLO	**Price** - Free to download and use **Result** - Provide search history - Provide promotion video - Provide category list search - Provide a store locator feature **Ease of use** - Easy to use - Neat and clean template - Attractive template **Other** - Provide membership feature - Provide a scanner feature to find the availability of the product in store	- Too many products which take time to discover - Do not have a recommendation system - Do not have an image recognition search method - Only available in the English language
KJ Fashion Shoes E-commerce	**Price** - Free to download and use **Result** - Provide image recognition search - Provide category list search	- Only for Android - Do not have a recommendation system - Only available in the English language

	Ease of use - Easy to use - Neat and clean template - Attractive template - Simple **Other** - Provide only shoe product - Can support Android version 6.0 and the latest	

Table 2.1 Advantages and Disadvantages of Existing Application

2.5 Summary

Based on the comparison and analysis done among the three chosen existing applications such as Padini, JD Sports, and UNIQLO, each application got its unique feature, and some may need to do some improvements. Generally, every existing application is good and can be released to the public. The main function of these three existing applications is to let users online buying fashion products by using a smartphone. From the discussion, the proposed application shall have unique features which make it special such as the user can search for the product through real-time capture known as visual search.

Chapter 3

Methodology

3.1 Introduction

This chapter will discuss the methodology for developing this image recognition system for e-commerce which is more about the framework, requirements, and design. The flow chart of this application also will further be discussed. After studied on the methodologies, the Agile development model has been chosen as the development model because it is suitable to be used in this project application which is a mobile-based application.

3.2 Methodology

The software development process is well known as the set of the activity or methods to ensure that outcomes or results are delivered better and faster but more cheaply and simply. The method is the iterative model, waterfall model, spiral model, prototype model, rapid development model, agile model, and others. In this application, the method used is the Agile model, which features more in customer satisfaction, produces suitable size in amount working codes, and the development process structured into iterations. For example, to gain more efficiency, Agility is able easily to help the development process and move it quickly. The main basis of agile methods is customer satisfaction and development of the software by continuing delivery of the software or application which means it can continue to change according to the requirement.[13] The agile method consists of 5 processes which are Requirements, Design, Develop, Test and Deploy as shown in Figure 3.0.

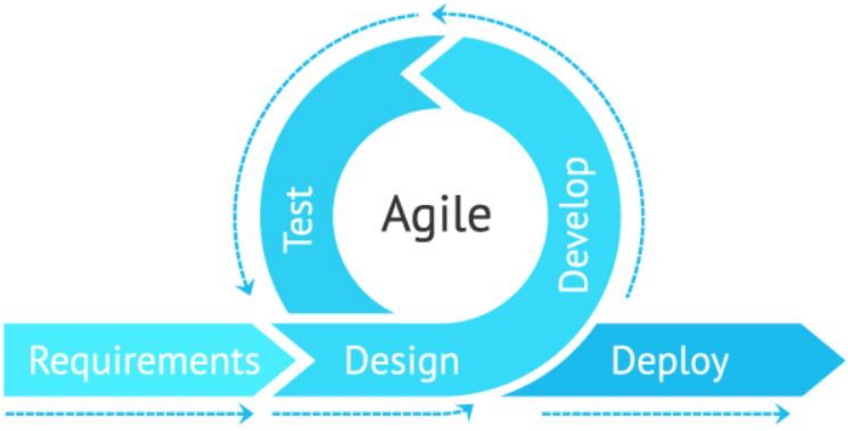


Figure 3.0 Agile Methodology

Table 3.0 Advantages and Disadvantages of the Agile Method

Advantage	Disadvantage
Ensure customer satisfaction which follows the changes in customer requirements and demands immediately.	The longer delivery time of the project which due to low productivity and flexibility as well as always changes while the development of the project.
Can add features or characteristics to maintain the application as the up to date with industry to simpler the recent innovation	The plan does not have to consider the implementation, evolving, or changing requirements of a customer throughout its whole project cycle.
Can quickly detect the issue and faults.	Confusing results as the project is a continuous cycle that never ends.
Cheaper and more efficient.	The expected cost will be unknown because of the constant change in requirements.[14]

3.2.1 Requirement Phase

The first phase of the Agile development model is the requirement phase which all the needs and requirements will be collected. For example, to determine the expected time and resources to conduct this development process. Next, to determine the problem which needs to be solved through this application, how to improve the user experience and how the performance of this system.

Indeed, the requirement has two types which are functional requirements and non-functional requirements. The functional requirements are defined as particular actions of the function of the application of the system when met certain conditions such as authentication of a user account when the user tries to log in and access the system or to make a payment. Meanwhile, the non-functional requirements are defined as quality requirements that how the system requirements described it should perform. For example, software requirements which about usability, performance, reliability, security, and maintainability. The verification email must send with a response time of no greater than a half day which is twelve hours.

In this project, the requirement is collected through a survey answered by 20 persons UMP students to gain the information and specific requirement such like increase the user experience through a recommendation system and visual search. The survey form can refer to **Appendix A**.

3.2.2 Design Phase

The second phase of the Agile development model is the design phase which contains all the designs of the software based on the requirements at the requirement phase. For example, the design such as frameworks, storyboard, and flowchart of the system. The programming language and system architecture will also be determined which help the project development run smoothly.

In this project, the flowchart of the idea system is designed to let stakeholder more understand the flow of the application, and the prototype is designed to let stakeholders know what each page of the application interface looks like. The flowchart can refer to **Appendix B** and the prototype can refer to Figure 5.0.

3.2.3 Development Phase

The third phase of the Agile development model is the development phase which contains implementing code and translation software design documents for the development of the project. The implementation code is based on the flow design which is according to the previous phase such as the requirement phase and design phase. Hence, this phase is the most consuming because it is the foundation for the entire process. The interface of the e-commerce application and its function need to develop in this phase.

In this project, the entire requirement is gained, and the basic idea such as flowchart and storyboard are designed first before the development phase to ensure the KJ fashion shoes e-commerce is built with the stated requirement.

3.2.4 Test Phase

The fourth phase of the Agile development model is the test phase which defines as testing for the application built in the development phase which to ensure the e-commerce application is free of error and compatible with every documented requirement and its function. For example, a series of test will apply to ensure the code is the free of error and meet the requirement before releasing it such like test whether the image recognition of the e-commerce system is functional or not.

In this project, the UAT which is the User Acceptance Test will be made to test the source code of this application whether it can be run without error and ensure the entire module function well. Hence, the UAT form will apply to this methodology. The UAT form can refer to **Appendix C** and **Appendix D**.

3.2.5 Deploy Phase

The fifth and final phase of the Agile development model is deployed phase which defines as the finalized and complete application that passes the test phase without any error and meet the documentation requirement and is ready to be launched and released to the end user. The feedback and support from the user will be collected to decide the next implementation or new features to meet customer satisfaction.

In this project, after the checklist of the UAT form is checked, the KJ fashion shoes e-commerce will be released to Google Play Store to let user download and experience it. The feedback on this application will gather in Google Play Store through the Rating and reviews by the user.

3.3 Project Requirement Defining Phase

In this section, a survey form was created and sent out to UMP students. The total sample gathered will be set to 20 persons. The definition of this survey form is to gather the demographic background and the requirements of the proposed KJ fashion shoes e-commerce to collect a more detailed definition of the system requirement. The Google survey form and the responses from the 20 respondents will be attached in **Appendix A**.

Category A: Demographic Background

This category question is aimed to get the demographic background of the users of this type of e-commerce which is specific to fashion e-commerce. The question of this survey also aims to investigate how far the user like e-commerce, and which purchase activity they prefer whether online or in-store buying.

Question 1

Based on the result of question one, we can conclude that most of the respondents know what fashion e-commerce is. From the analysis, 90% of them chose the “Yes” option and 10% of the respondents chose “No” which represents 18 respondents and 2 respondents respectively. This result can tell us most of the UMP students are well-known or familiar with fashion e-commerce. This is because, in this internet era, many activities can be done on the internet such as e-commerce.

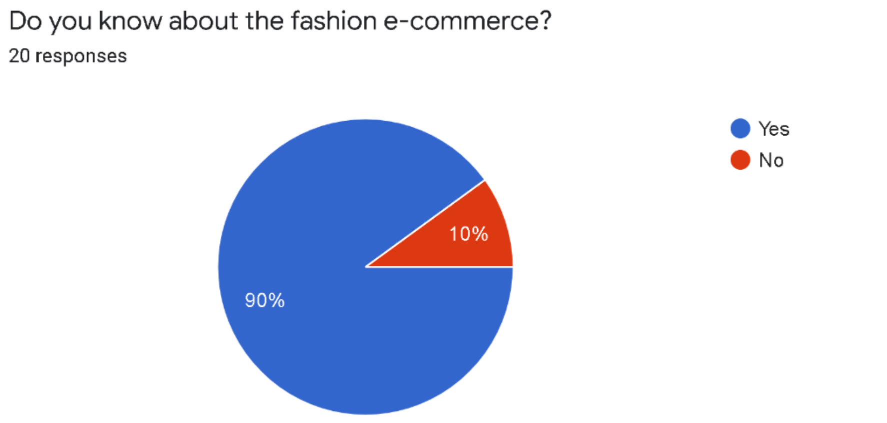


Figure 3.1 Do you know about the fashion e-commerce

Question 2

Based on the result in question two, we can conclude that most of the respondents prefer online or in-store to buy a shoe. From the analysis, 80% of them chose the "Yes" option and 20% of the respondents chose "No" which represents 16 respondents and 4 respondents respectively. This result can tell us most UMP students prefer online buying shoes compared to walk-in store buying. This is because the UMP student from Pekan needs to take around 10-15 km to go out from campus to Pekan Town to find the shoe store.

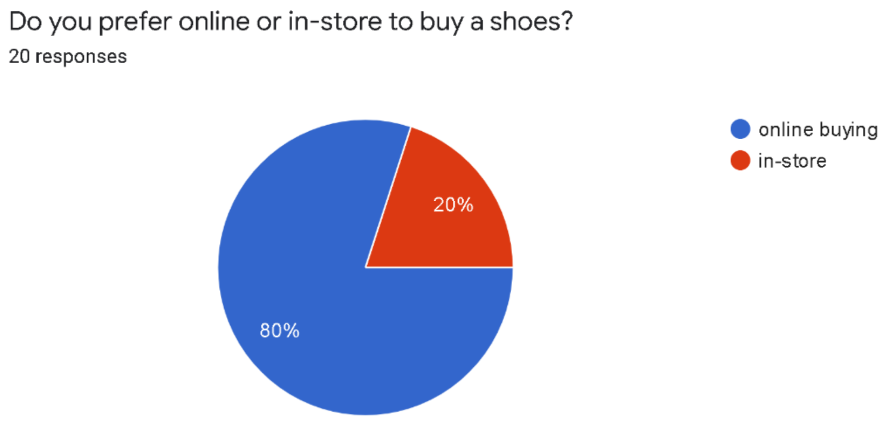


Figure 3.2 Do you prefer online or in-store to buy a shoes

Question 3

Based on the result of question three, we can conclude that most of the respondents agree with the statement which is online buying shoes is cheaper. From the analysis, 90% of them chose the "Yes" option, and 10% of the respondents chose "No" which represents 18 respondents and 2 respondents respectively. This result can tell us most of the UMP students know the price of the shoes will be a bit different while buying online compared to buying in-store. This is because the in-stored buying needs to charge more especially in the service charge and the store rent. Meanwhile, for the online store, the promotion will be always made such as every month to attract more customers to visit it.

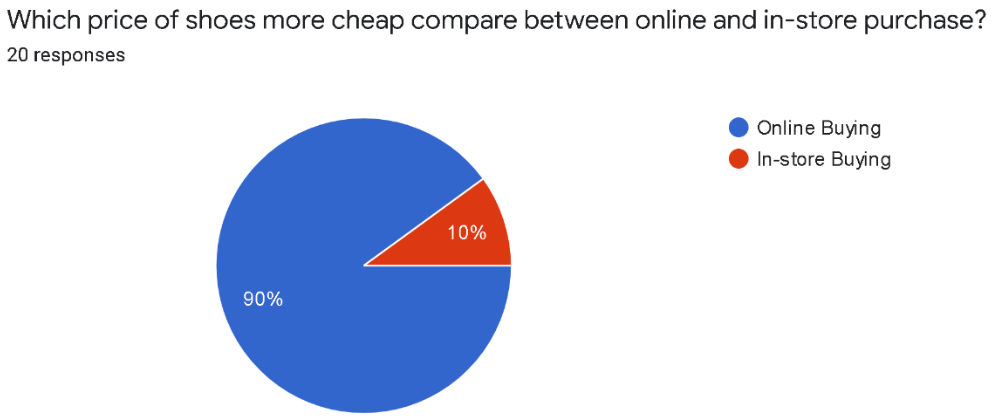


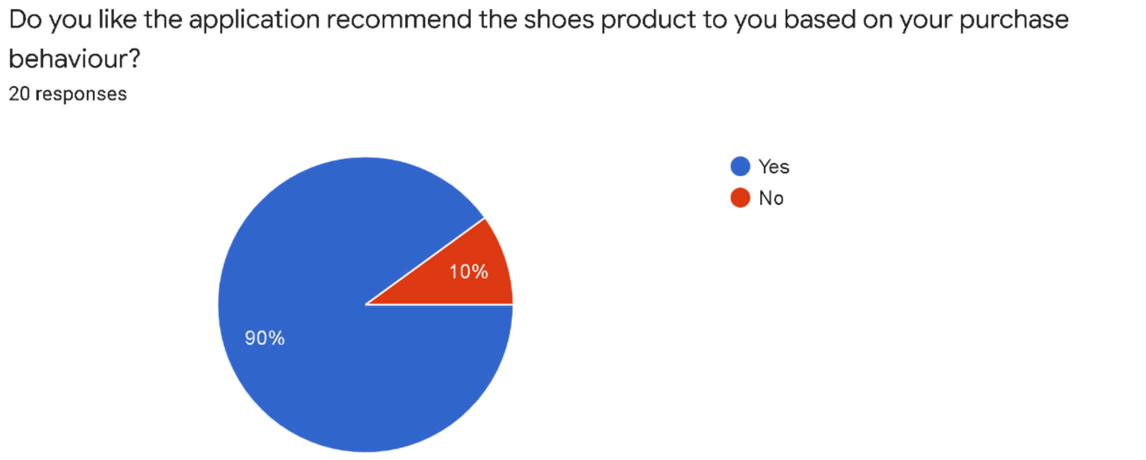
Figure 3.3 Which price of shoes more cheap compare between online and in-store purchase

Category B: Feature Requirement

In this section, the question asked in the survey form is to gather the requirements for the proposed application.

Question 4

Based on the result in question four, we can conclude that most of the respondents like the application and recommend the shoe product to us based on our purchase behavior. From the analysis, 90% of them chose the "Yes" option and 10% of the respondents chose "No" which represents 18 respondents and 2 respondents respectively. This result can tell us most of the UMP like the fashion shoes e-commerce recommend the product shoes to them based on their purchase behavior. This is because the recommendation system can save the user time in browsing the product shoes.



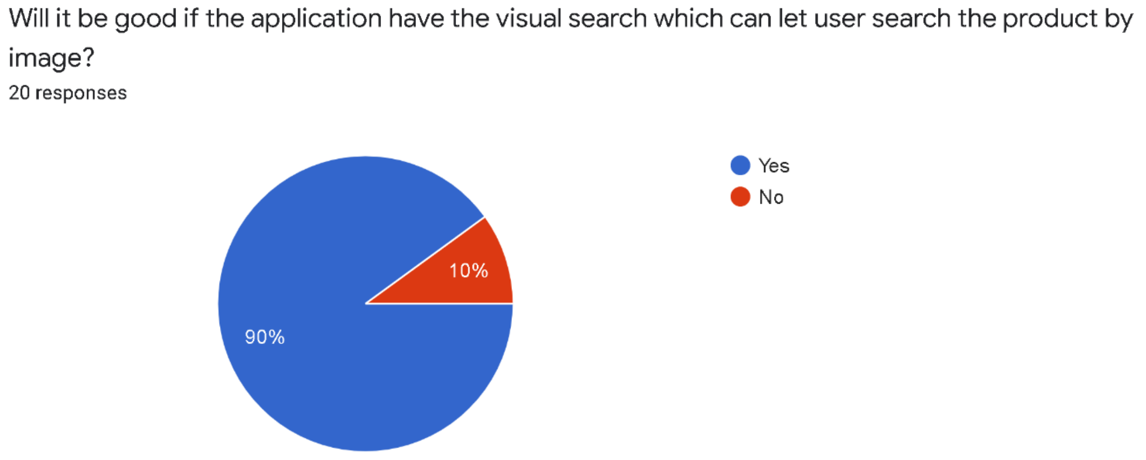
Do you like the application recommend the shoes product to you based on your purchase behaviour?

20 responses

Figure 3.4 Do you like the application recommend the shoes product to you based on your purchase behaviour

Question 5

Based on the result of question five, we can conclude that most of the respondents think that the feature of visual search is needed in the proposed application. From the analysis, 90% of them chose the "Yes" option and 10% of the respondents chose "No" which represents 18 respondents and 2 respondents respectively. By referring to the pie chart, the respondents were glad to see the proposed application has the feature of visual search in fashion e-commerce. This is because the visual search can easily find out the product that the user needs to search for without knowing the product shoes keyword.



Will it be good if the application have the visual search which can let user search the product by image?

20 responses

Figure 3.5 Will it be good if the application have the visual search which can let user search the product by image

Question 6

Based on the result of question six, we can conclude that most of the respondents think that the black and white background color is needed in the proposed application. From the analysis, 90% of them chose the “Yes” option and 10% of the respondents chose “No” which represents 18 respondents and 2 respondents respectively. By referring to the pie chart, the respondents were glad to see the proposed application has a black-and-white background color. This is because the black and white background color can create a balance on the home page, especially in a fashion e-commerce application.

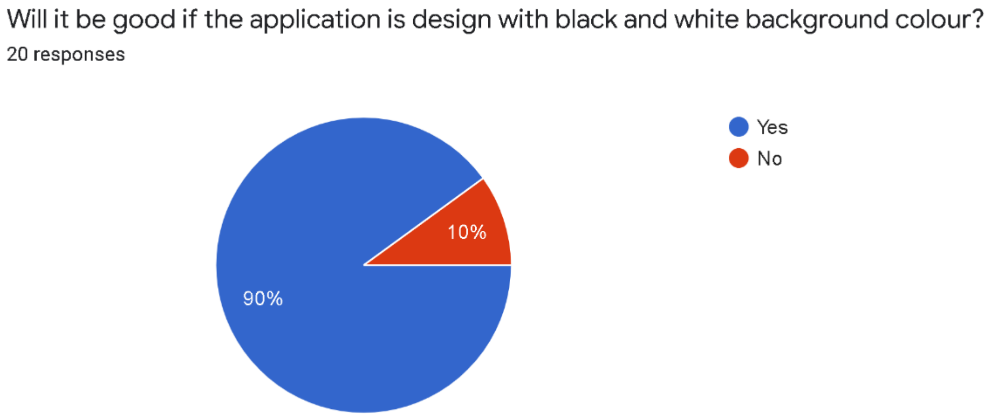
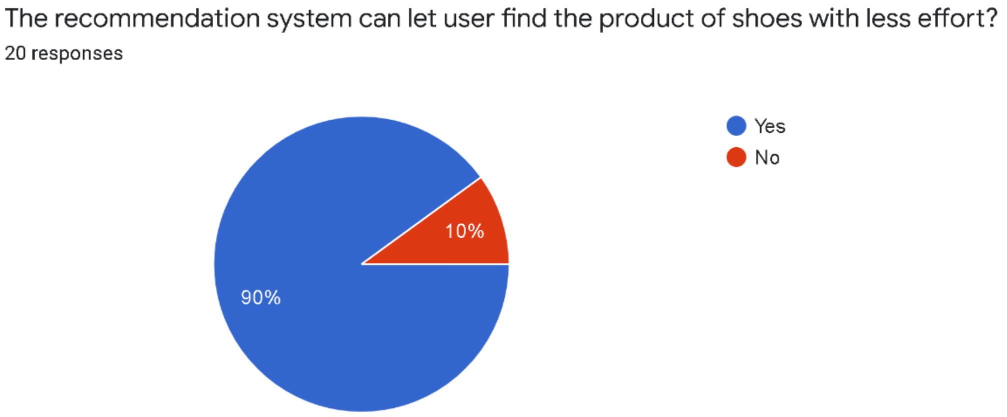


Figure 3.6 Will it be good if the application is design with black and white background colour

Question 7

Based on the result in question seven, we can conclude that most of the respondents think that the recommendation system can let user find the product of shoes with less effort. From the analysis, 90% of them chose “Yes” option and 10% of the respondents chose “No” which represent 18 respondents and 2 respondents respectively. By referring to the pie chart, basically, the respondents were glad to see the proposed application to have feature of recommendation system which able the user find the product of shoes with less effort.



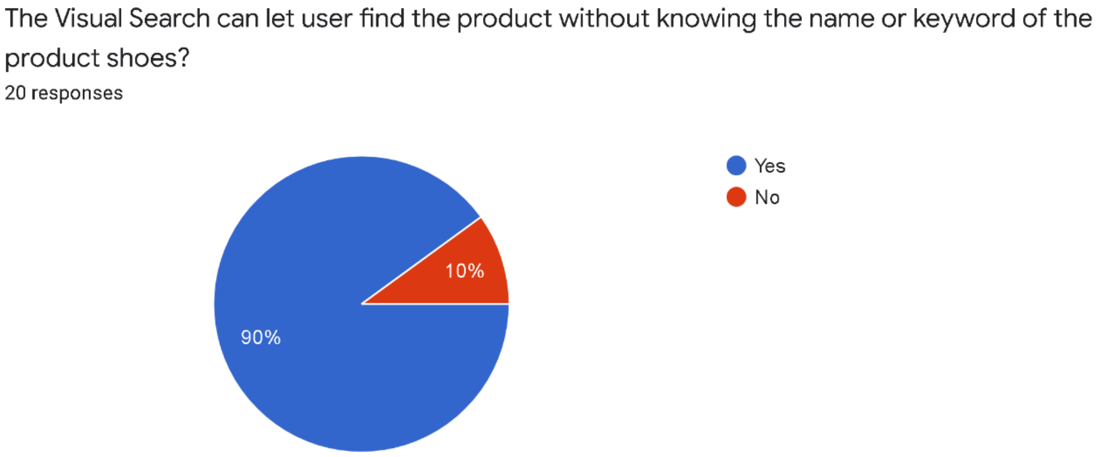
The recommendation system can let user find the product of shoes with less effort?

20 responses

Figure 3.7 The recommendation system can let user find the product of shoes with less effort

Question 8

Based on the result in question eight, we can conclude that most of the respondents think that the Visual Search can let user find the product without knowing the name or keyword of the product shoes. From the analysis, 90% of them chose "Yes" option and 10% of the respondents chose "No" which represent 18 respondents and 2 respondents respectively. By referring to the pie chart, basically, the respondents were glad to see the proposed application to have feature of visual search which able the user find the product by using camera or image.



The Visual Search can let user find the product without knowing the name or keyword of the product shoes?

20 responses

Figure 3.8 The Visual Search can let user find the product without knowing the name or keyword of the product shoes

3.4 Preliminary Diagram

3.4.1 Context Diagram

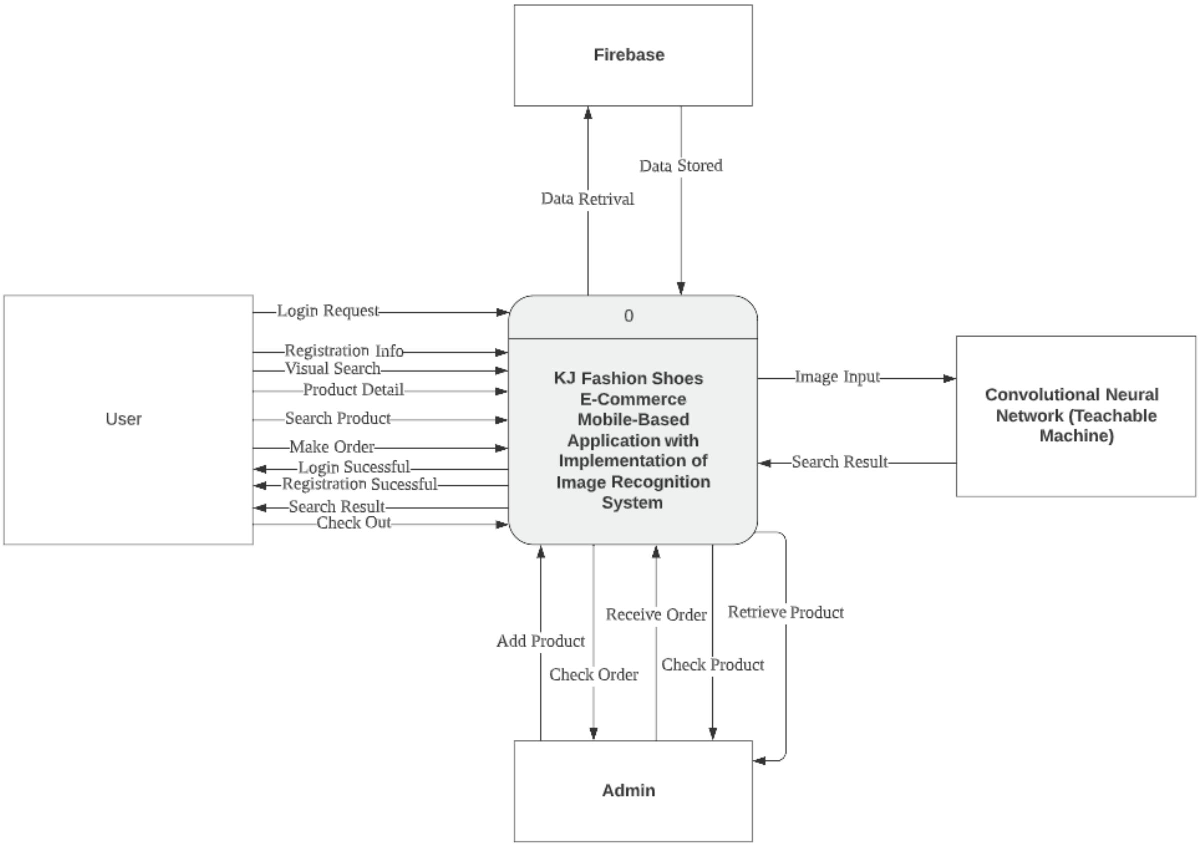


Figure 3.9 Context Diagram of KJ Fashion Shoes E-Commerce Mobile-Based Application

The figure above shows the context diagram used to define the confines of the application system. The single process of the context diagram will present the entire system. The context diagram also defines as a data flow diagram that only shows level 0 otherwise knowns as a top level.

3.4.2 Flowchart

Flowchart of KJ Fashion Shoes E-Commerce Mobile-Based Application (Proposed application)

Appendix B shows the flowchart of user activity and admin activity for the KJ Fashion Shoes E-Commerce Mobile Based Application from start to end. Firstly, the user activity of the application will let the user log in or register an account first before accessing the system. After login, the system will display the Home page which includes the button to change to other intent pages such as the Search page, Category page, Mycart page, and

Setting page. Lastly, the user can select the product they want to buy and proceed to check out. Meanwhile, for the admin activity of the application, the admin is needed to request an account for the technical support staff to get access. After logging in to the application, the system will display Home Page which includes the brand category which the admin wants to add, and the button to Check Order Page and Logout.

User Activity

Manage Login

Figure 3.10 shows the Manage Login flowchart of the application. The user needs to fill in the correct username and password to log in successfully, either the user can proceed to the Registration Page to register an account. After successful login to the application, the user will access the system and the application will display the splash and proceed with the home page.

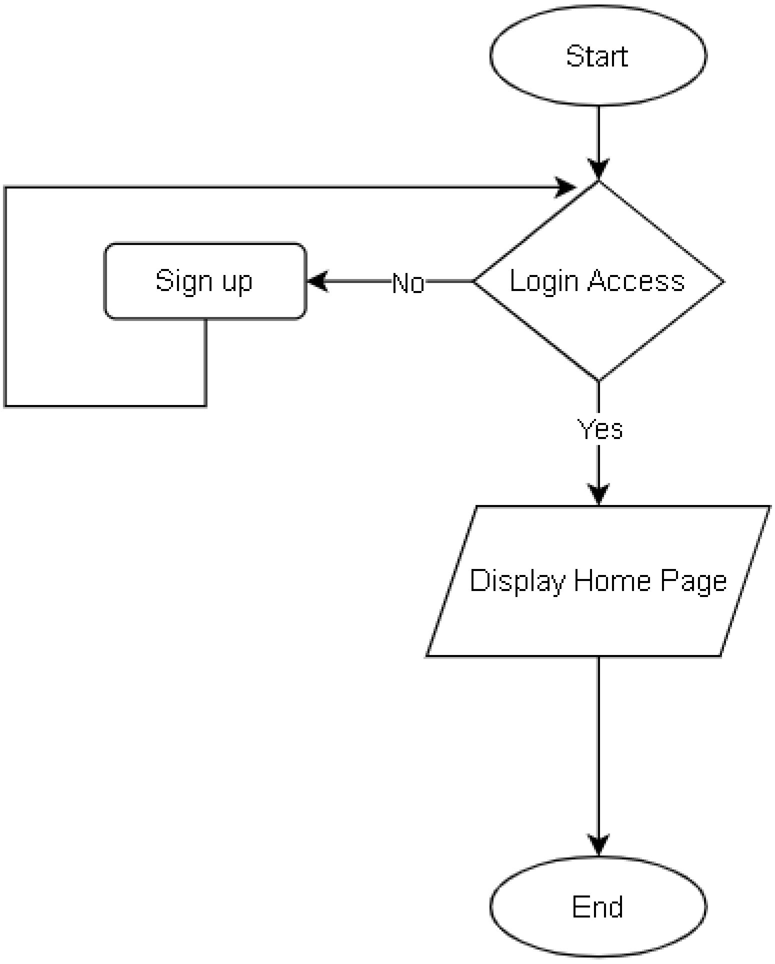


Figure 3.10 Manage Login Flowchart

Manage Search Page

Figure 3.11 shows the manage search page module of the application that consists of two search type which is search by key-in and visual search. The search by key-in is the traditional search in which the user needs to type the keyword of the product to find the product. Meanwhile, visual search is able the user to search by using the camera in real-time to capture the product or upload the product photo from the gallery that uses the CNN algorithm to predict and display the product which has the most similarity prediction.

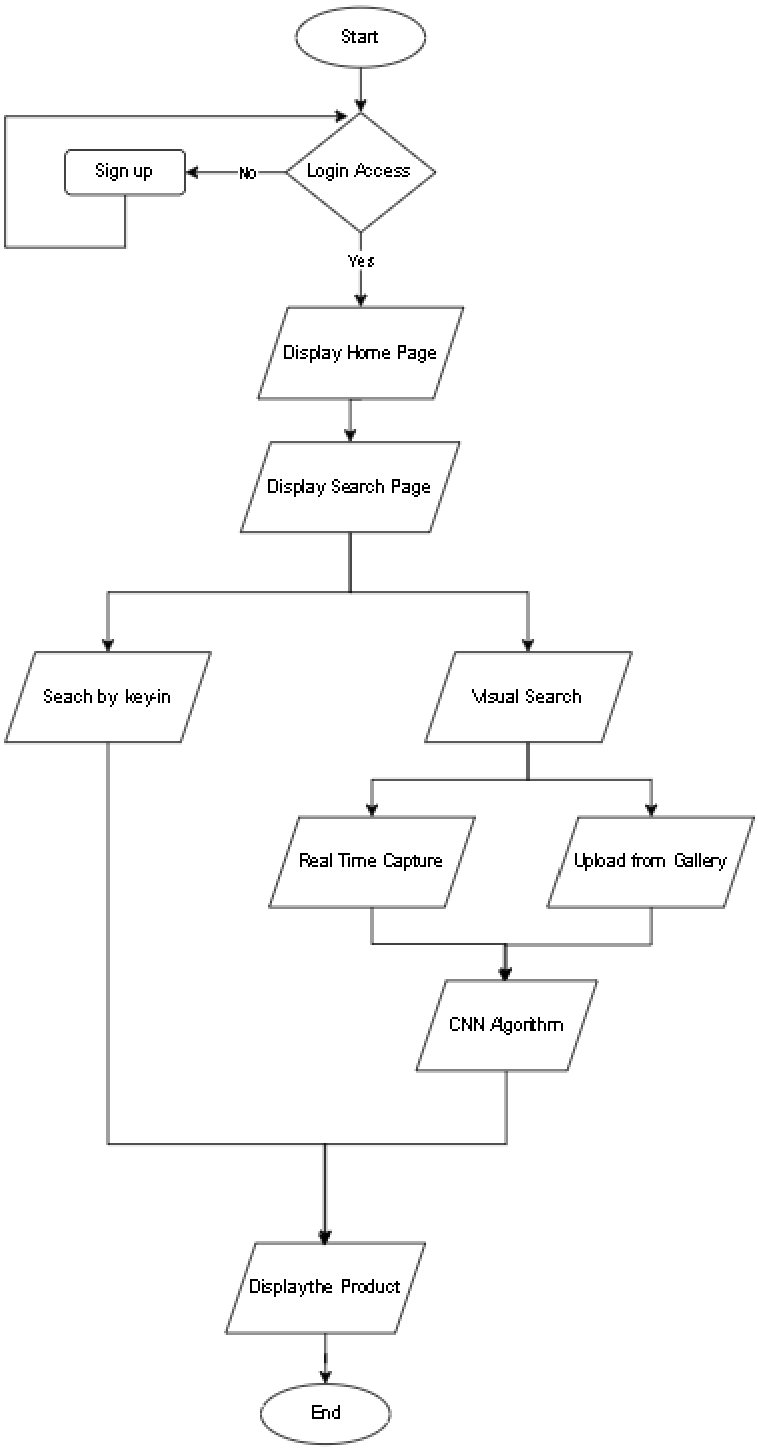


Figure 3.11 Search Page Flowchart

Category Page

Figure 3.12 shows the category page flowchart which will display the band category such as Nike and Adidas for the shoe brand products.

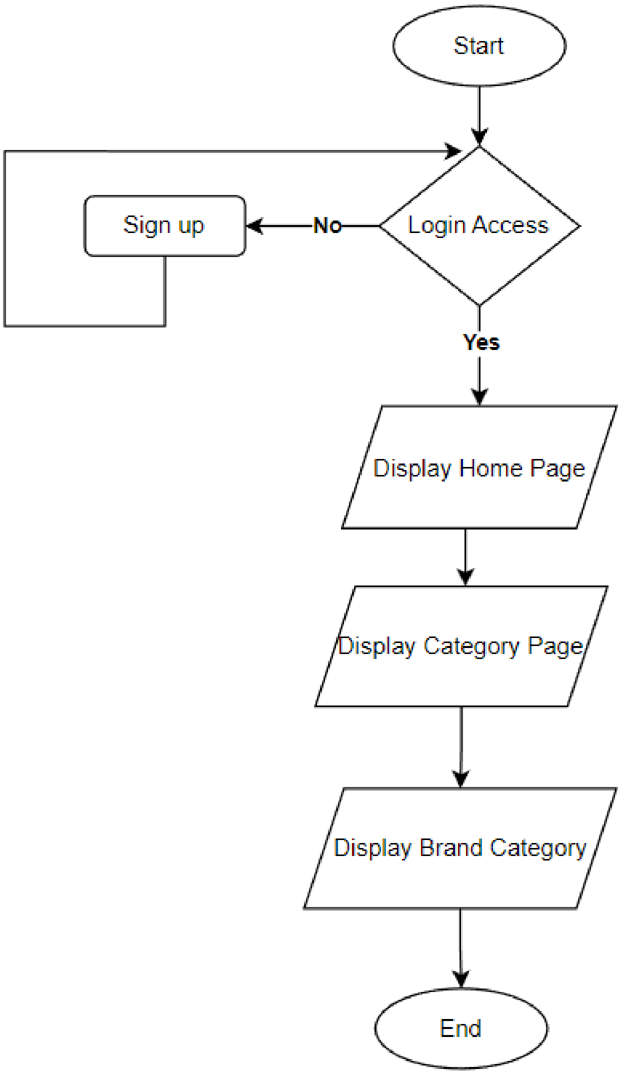


Figure 3.12 Category Page Flowchart

Setting Page

Figure 3.13 shows the flowchart of the setting page. Firstly, the user can update their profile such as phone number, profile image, name, and address. Secondly, manage password able the user changes their password.

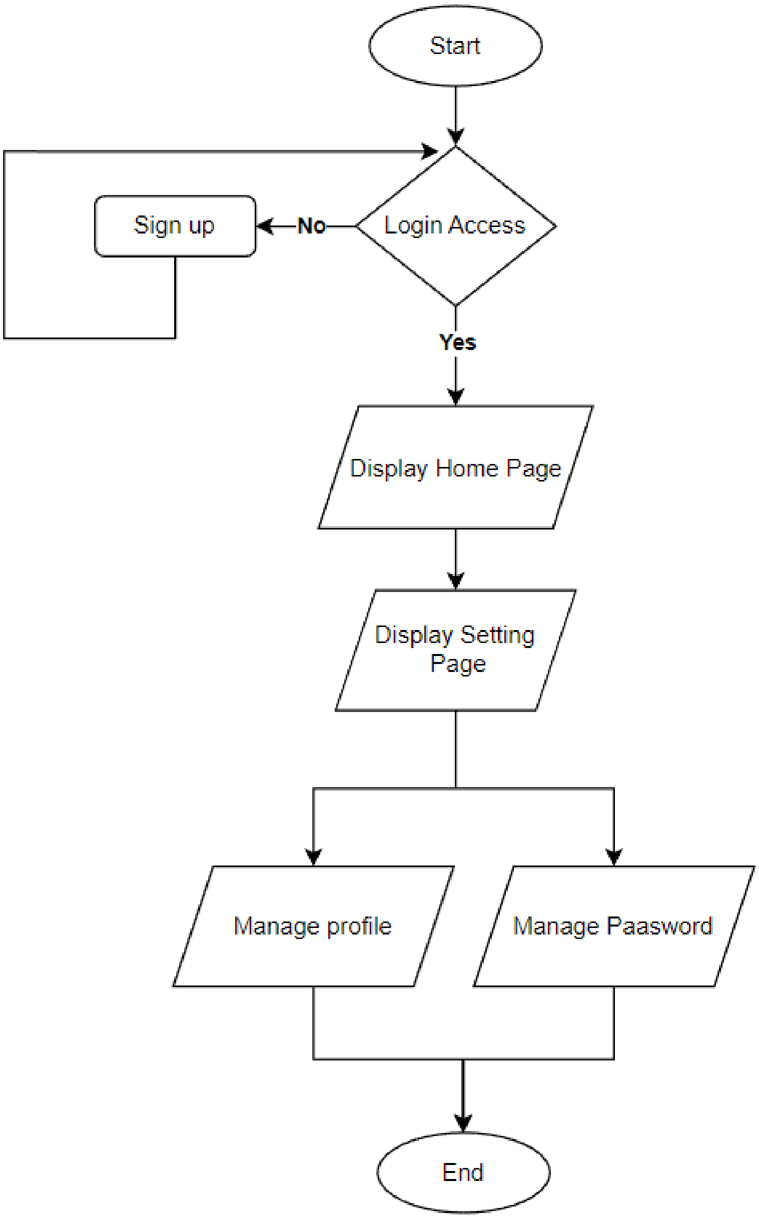


Figure 3.13 Setting Page Flowchart

Mycart Page

Figure 3.14 shows the flowchart of Mycart which will consist of the product that the user put into the cart. Then, the user needs to select the chart item which wants to check out.

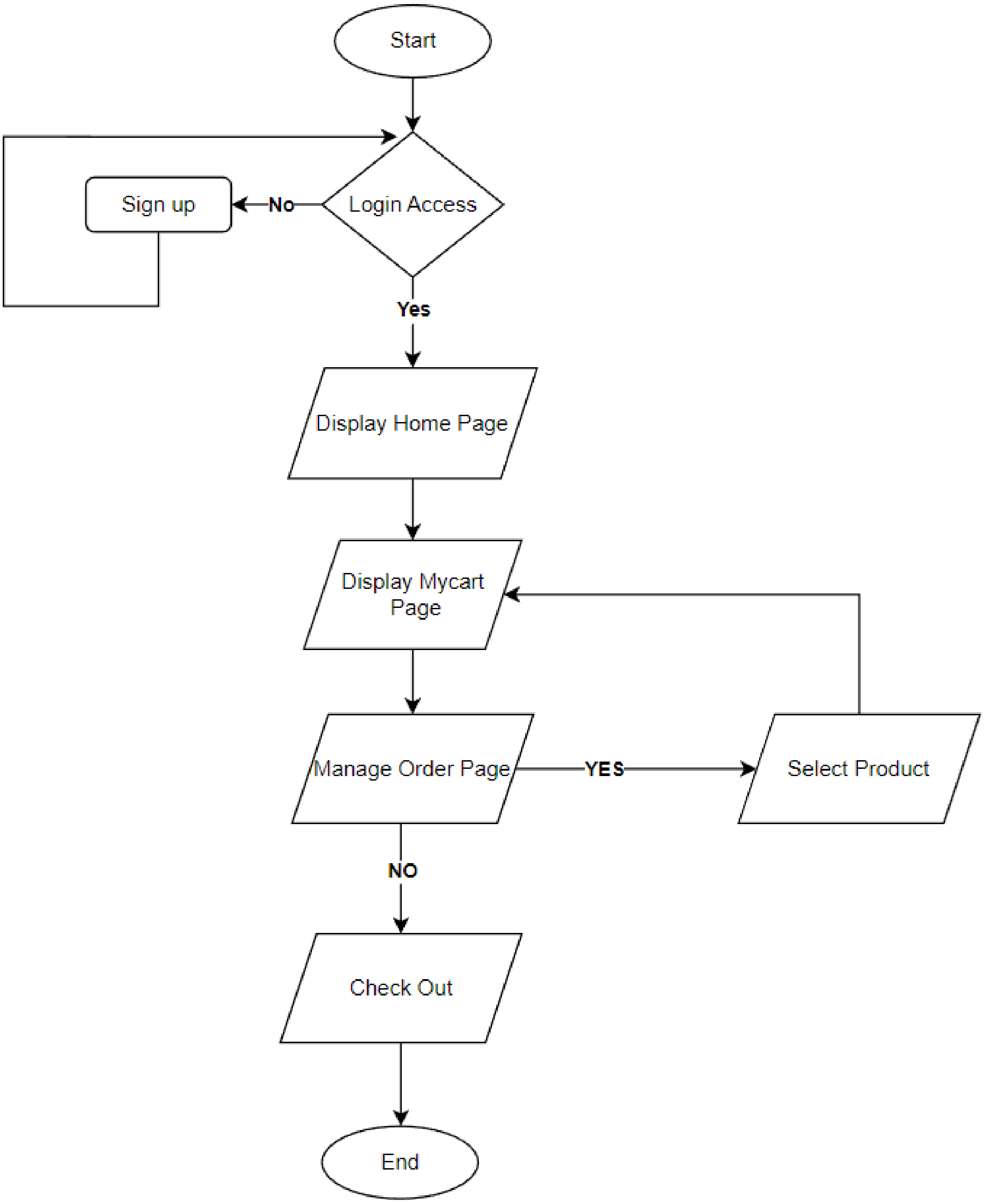


Figure 3.14 Mycart Page Flowchart

Admin

<u>Add Product Page</u>

Figure 3.15 shows the add product page which the admin can add the product based on the brand category. After that, the admin is required to upload the product image followed by the product detail suck like price, size, and description.

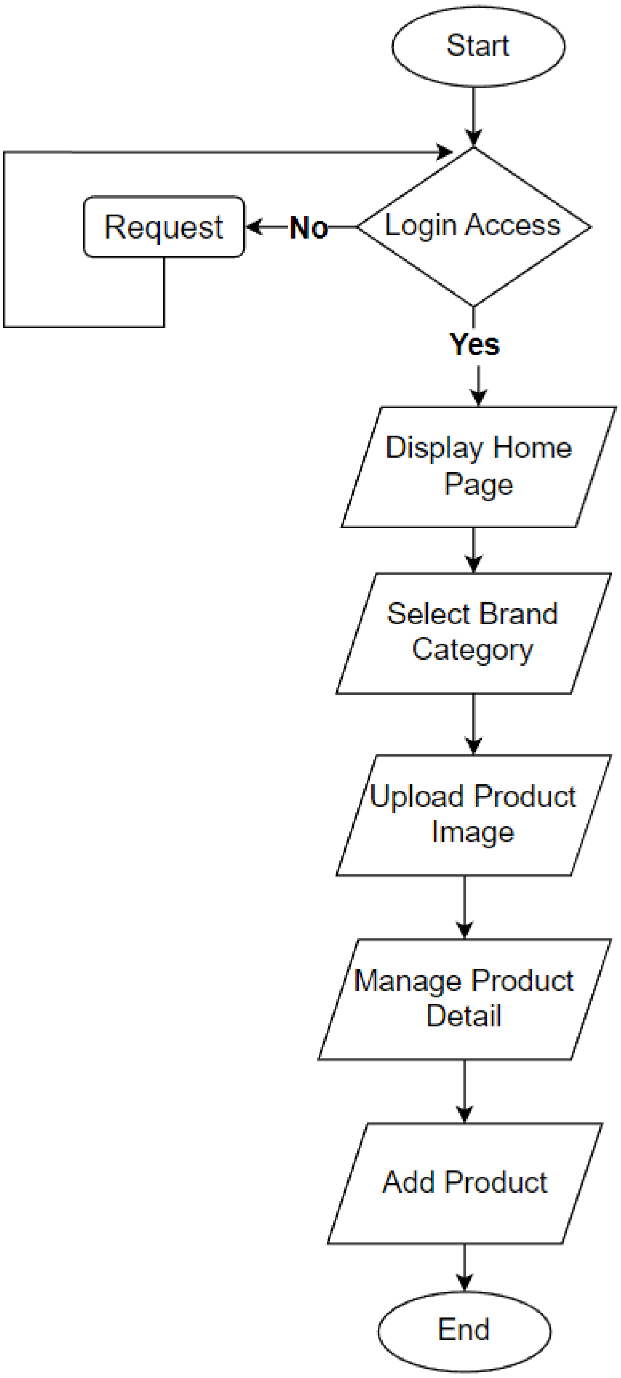


Figure 3.15 Add Product Page Flowchart

Check Order Page

Figure 3.16 shows the check order page where the admin can check the order detail and the product detail which want to ship. After that admin can confirm the shipping order.

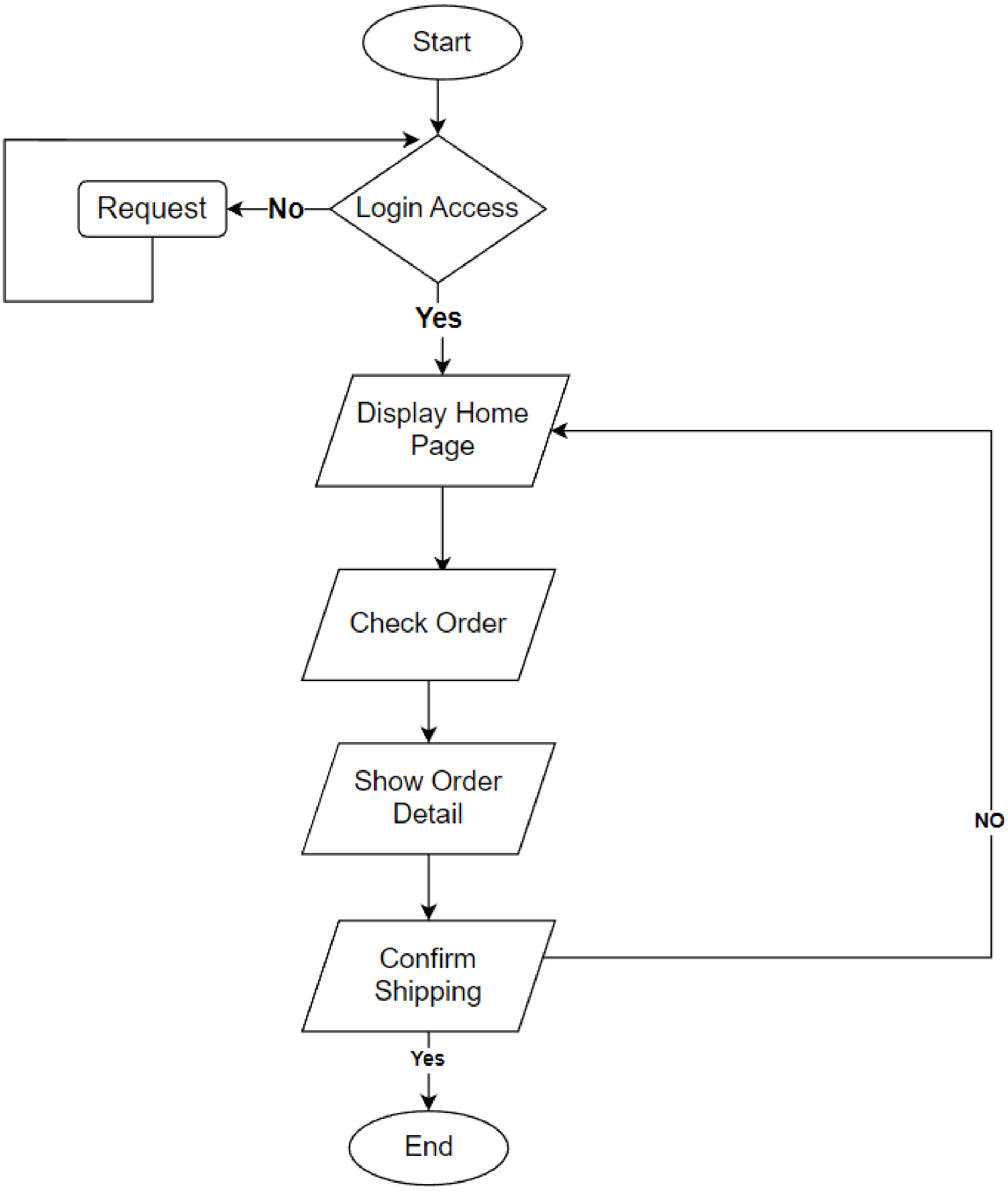


Figure 3.16 Check Order Page Flowchart

3.4.3 Use Case Diagram

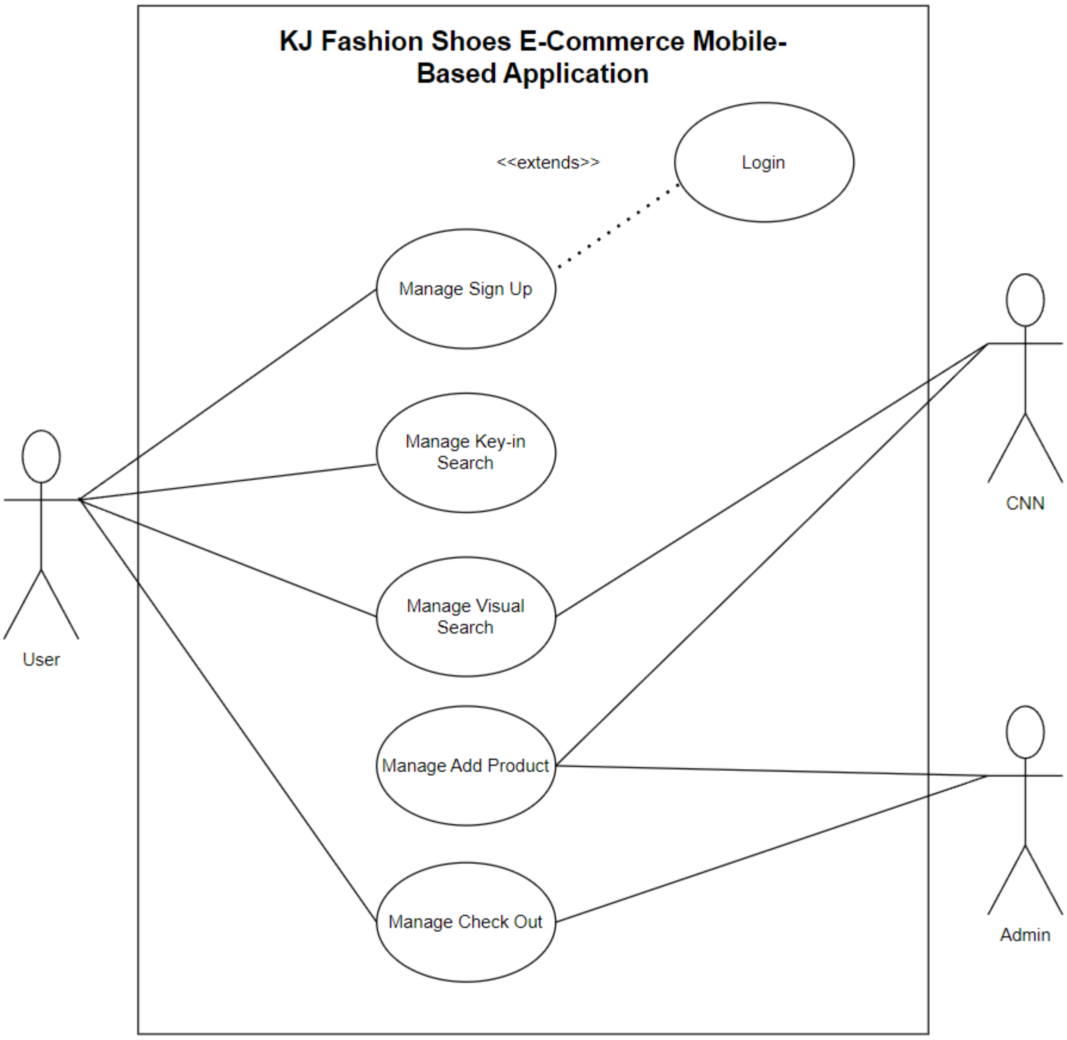


Figure 3.17 Use Case Diagram of KJ Fashion Shoes E-Commerce Mobile-Based Application

Figure 3.17 above shows the use case diagram of the KJ Fashion Shoes E-Commerce Mobile-Based Application. The function of the use case diagram is to gather the requirement of a system such as the design requirement of the application which includes external and internal influences. Hence the system has been analyzed by gathering its use case functionalities and the identified actors. [15] For this application, three actors which are the User, Convolutional Neural Network, and Admin there are not included in the boundary of the application. This application has five modules which are Manage Sign up, Manage Key-in Search, Manage Visual Search, Manage Add Product and Manage Check Out.

3.4.4 General Architecture

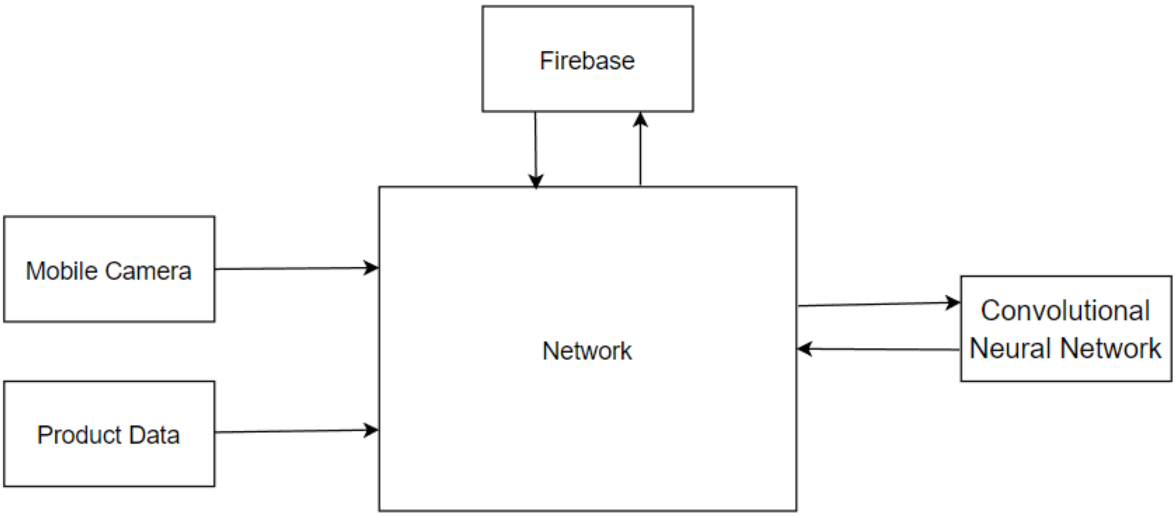


Figure 3.18 General Architecture of KJ Fashion Shoes E-Commerce Mobile-Based Application

Figure 3.18 above shows the general architecture of the KJ Fashion Shoes E-Commerce Mobile-Based Application. Firstly, the system will collect the product data and send it to the Firebase, then the data will retrieve and send to Convolutional Neural Network for data mining and reprocessing. Next, the system will let the user choose whether to capture a picture in real-time or upload the picture to visually search for the product. Then, the image data will retrieve the data and send to Convolutional Neural Network. The CNN will predict the most similar product based on the data sent by Firebase. The entire process will do under the network.

3.5 Data Design

3.5.1 Entity Relationship Diagram (ERD)

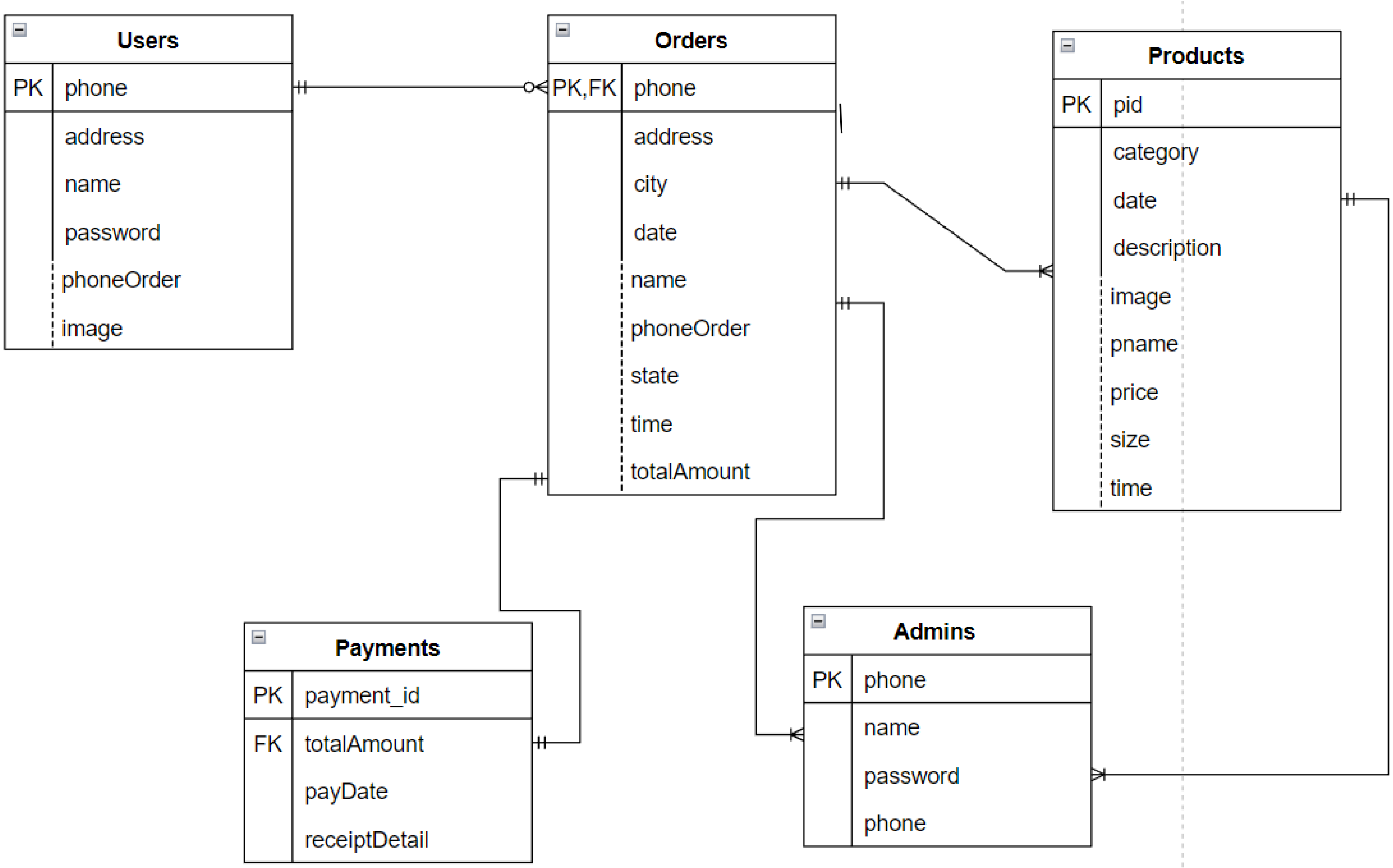


Figure 3.19 ERD of KJ Fashion Shoes E-commerce

Figure 3.19 shows the ERD of the proposed application, we can see that have 5 entity which is Users, Orders, Products, Admins, and Payments. Each entity has its unique id which is the primary key that use to find and identify unique rows of each database table more easily. For example, when a user or customer makes an order and paid the order in KJ fashion shoe e-commerce, the Admins will take action to ship the Products based on the Orders.

3.5.2 Data Dictionary

3.5.2.1 Data Dictionary of Users

ENTITY	ATTRIBUTE	TYPE/SIZE	DESCRIPTION	EXAMPLE
Users	phone (PK)	int(15)	Identification for Users	01120080748
Users	address	varchar(30)	Identification for address of user	No.14
Users	name	varchar(30)	Identification for name of user	Chanhuewah
Users	password	varchar(15)	Identification for password of user	A11111
Users	phone Order	Int(15)	Identification for phone of user	01120080748

			in order	
Users	Image	varchar(50)	Identification for profile image URL	https://firebasestorage.googleapis.com/v0/b/fypsadsad.appspot.com/o/Profile%20pictures%2F01120080748.jpg?alt=media&token=1638e5f5-b350-407f-82e3-111e3b06dd9d

Table 3.1 Data Dictionary of Users

3.5.2.2 Data Dictionary of Orders

ENTITY	ATTRIBUTE	TYPE/SIZE	DESCRIPTION	EXAMPLE
Orders	phone (PK, FK)	int(15)	Identification for orders	R119
Orders	address	varchar(30)	Identification for shipping address	No.44
Orders	city	varchar(30)	Identification for shipping city	Kuantan
Orders	date	date	Identification for order create date	Jan 13, 2023
Orders	name	varchar(30)	Identification for shipping order name	Soh
Orders	phoneOrder	int(15)	Identification for shipping order phone number	011
Orders	state	varchar(30)	Identification for state of orders	Not Shipped
Orders	time	Time	Identification for order create time	05:39:52 AM
Orders	totalAmount	float(15)	Identification for total amount of order	450.00

Table 3.2 Data Dictionary of Orders

3.5.2.3 Data Dictionary of Products

ENTITY	ATTRIBUTE	TYPE/SIZE	DESCRIPTION	EXAMPLE
Products	pid	varchar(50)	Identification for product	Dec 01, 202200:06:31 AM
Products	category	varchar(30)	Identification for brand	Nike
Products	date	date	Identification for product added date	Dec 01, 2022
Products	description	varchar(30)	Identification For product description	A TRUSTED TRAINER FOR EVERY MILE. When running becomes a daily habit, stability and comfort are crucial. The Nike React Miler 2 delivers—bringing back the cushioning and intuitive design of its predecessor.
Products	image	varchar(30)	Identification For product image URL	https://firebasestorage.googleapis.com/v0/b/fypsadsad.appspot.com/o/Product%20Images%2Fimage%3A1000011626Dec%2001%2C%20202200%3A06%3A31%20AM.jpg?alt=media&token=0e937f87-47b4-4e1d-a91b-7af536dbba1f
Products	pname	varchar(50)	Identification For product name	Nike Men's React Miler 2 Running Shoes
Products	price	numeric(10, 2)	Identification For product price	327.00
Products	size	varchar(30)	Identification For product size	6,7,8,9,10
Products	time	time	Identification For product added time	00.06.31 AM

Table 3.3 Data Dictionary of Products

3.5.2.4 Data Dictionary of Payments

ENTITY	ATTRIBUTE	TYPE/SIZE	DESCRIPTIO	EXAMPLE

			N	
Payments	payment_id(PK)	varchar(6)	Identification For payment ID	PP0102
Payments	totalAmount	numeric(10,2)	Identification For total payment	150.00
Payments	payDate	date	Identification For pay date	2020-08-08
Payments	receiptDetail	varchar(30)	Identification For receipt detail	Receipt of a Nike shoes

Table 3.4 Data Dictionary of Payments

3.5.2.6 Data Dictionary of Admins

ENTITY	**ATTRIBUTE**	**TYPE/SIZE**	**DESCRIPTIO N**	**EXAMPLE**
Admins	phone(PK)	int(15)	Identification for admin	0000000000
Admins	name	varchar(30)	Identification for admin name	admin0
Admins	password	varchar(15)	Identification for admin password	A00000

Table 3.5 Data Dictionary of Admins

3.6 Prototype

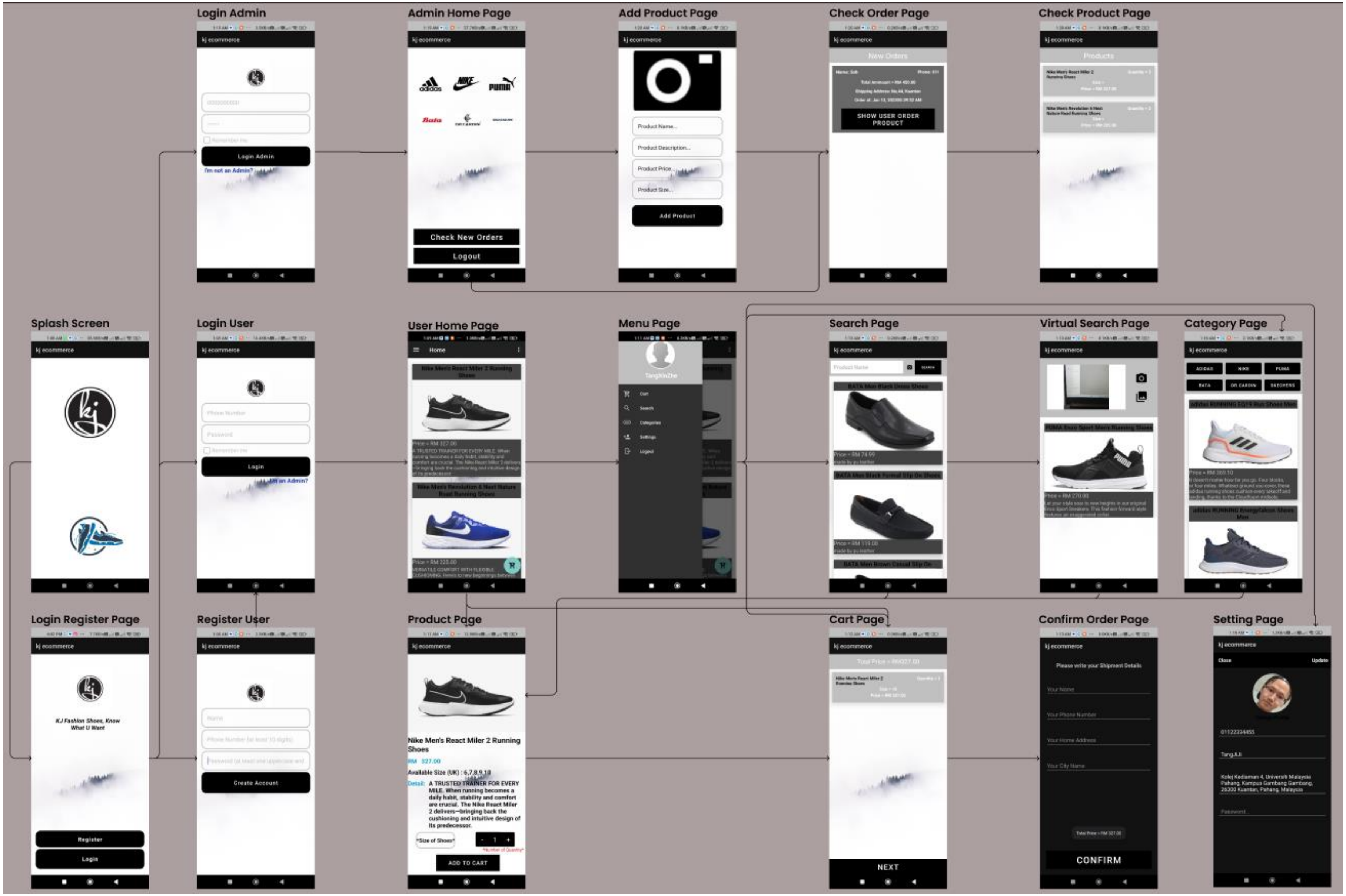

Login Admin
Admin Home Page
Add Product Page
Check Order Page
Check Product Page
Splash Screen
Login User
User Home Page
Menu Page
Search Page
Virtual Search Page
Category Page
Login Register Page
Register User
Product Page
Cart Page
Confirm Order Page
Setting Page
kj ecommerce
Login Admin
I'm not an Admin?
Check New Orders
Logout
Add Product
SHOW USER ORDER PRODUCT
Login
I'm an Admin?
Home
KJ Fashion Shoes, Know What U Want
Register
Login
Create Account
Nike Men's React Miler 2 Running Shoes
RM 327.00
ADD TO CART
NEXT
CONFIRM
Close
Update

Figure 3.20 Prototype of KJ Fashion Shoes E-commerce

Firstly, the user clicks the application, and the splash of animation of the KJ logo will display to the user for 2 seconds. Then, the application will display Login Register Page to let the user either click the Login button or Register button. For clicking the Login button, the application will then display the Login User Page to let the user type in the phone number and password in the text field provided, the user also can choose whether log in as Admin by clicking the (I'm an Admin) which will pass to Admin Login Page. For clicking the Register button, the user will pass to the Register User Page where the user can register an account by typing in the text field like name, phone number which must be at least 10 digits, and the password which must be at least 6 characters with at least one uppercase.

After login in successfully as a User, the system will display the User Home Page that includes a menu button, cart button, and a lot of product lists followed by product name, product image, product price, and product description. Users can click the product list to pass to the Product Page which will display the product detail as mentioned in the product list and also the size and quantity that the user can choose it. The User can add to the cart after choosing the size and quantity by clicking the ADD TO CART button which will pass to the Cart Page.

Inside the User Home Page, the user can click the cart button which will direct pass to the Cart Page. Meanwhile, after clicking the menu button, it will display the menu list that includes the user profile and user name followed by the cart button, search button, categories button, setting button, and a logout button.

The cart button which will pass to the Cart Page will display the cart list that includes the order made by the user with detail like product name, quantity, size, and also the total price of the product. At the top of the page, the total amount of the order is been shown. Meanwhile, for the bottom page, it shows the next button which the User can click and able to pass to Confirm Order Page. The Confirm Order Page is the page that gathers the order shipment detail that needs the User key in the text field provided which to get order shipment detail like name, phone number, home address, and city name. After keying in, the User can click CONFIRM button to check out the order and wait until Admin ships their order.

The search button will pass to the Search Page, at the top page it appears the text field that let the User key in the product name and click the search button to find the product. Later the middle page will display the product list that the User typed, and the user can click the product list of a specific product to pass to the Product Page. Meanwhile, the user can visual search the product by clicking the camera icon at the top page which will let the User pass to the Visual Search Page. On the Visual Search Page, the user either can do real-time capture of the image to be visual search by clicking the camera icon or upload the image from the gallery to be visual search by clicking the gallery icon. The page will show the resulting search at the middle page such as the product list that the product with higher similarity which the User can pass to the Product Page by clicking that product in the product list.

The categories button will pass to the Category Page, and at the top page will appear the clickable category brand that will list out the specific brand that the User click. After the result, the product list shows on the middle page, and the user can click the product list of a specific product to pass to the Product Page.

The setting button will pass to the Setting Page, and the middle page will display the text field such as phone number, name, address, and password that the User chooses to update it. The User can update the profile image by uploading the image by clicking the change profile text view. All the text fields and profile image will be updated to Firebase when the User clicks the Update text view. Meanwhile, the User can close the page by clicking close text view.

The logout button will let the User log out of the system and pass to the Login Register Page by clicking it.

After login in successfully as an Admin, the system will display the Admin Home Page that includes category brands such as Adidas, Nike, Puma, Bata, Dr. Cardin, and Sketches follow by the Check New Orders button and the Logout button. By clicking the category brand image view, the system will pass to Add Product Page. On the side of the Add Product Page, the Admin can upload the product image, type the product name, description, price, and also the available size that will save to the Firebase after the Admin click Add Product button. For the Check New Order button after clicking, the system will pass it to the Check Order Page which will display the order list by buyer (User) which is clickable to either confirm shipping or not, and the list includes the order shipment detail such as name, phone number, total amount, shipping address, order date and time, and SHOW USER ORDER PRODUCT button which will pass to the Check Product Page after clicked. Inside the Check product Page, it will display the product list created by the user which includes the product name, quantity, size, and price.

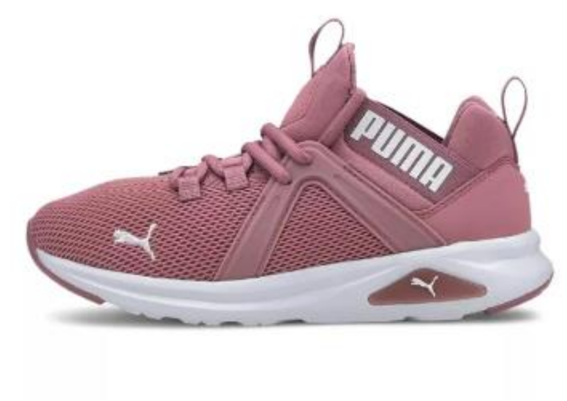
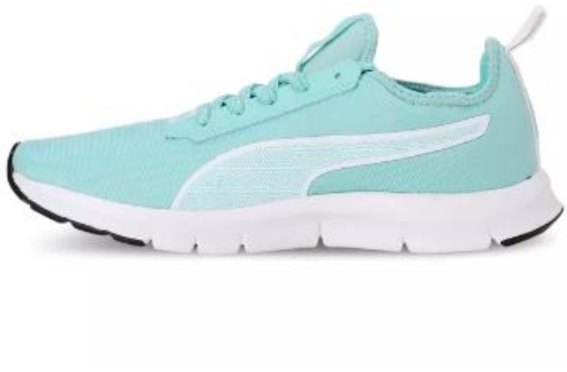
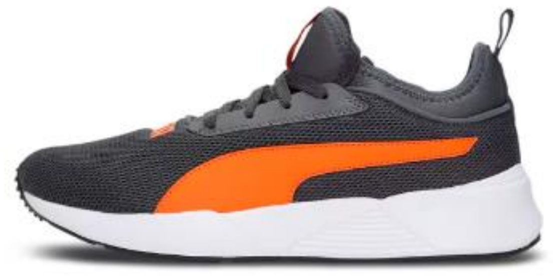
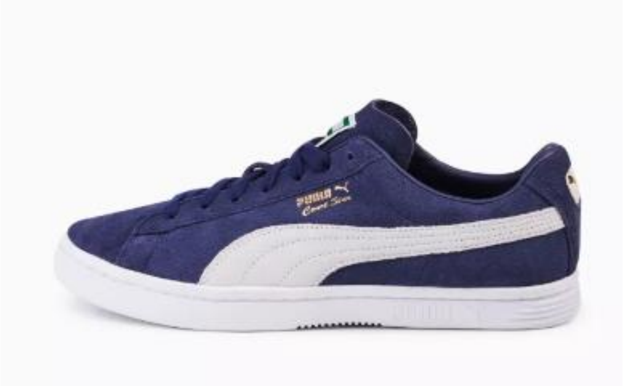
The logout button will let the Admin log out of the system and pass to the Login Register Page by clicking it.

3.8 Machine Learning Dataset to be Train

ID	Product Image	Product Name
n1		Nike Men's React Miler 2 Running Shoes
n2		Nike Men's Revolution 6 Next Nature Road Running Shoes

n3		Nike Women's Downshifter 11 Road Running Shoes
n4		Nike Men's Ebernon Low Premium Shoes
n5		Nike Women's Revolution 6 Next Nature Road Running Shoes
a1		adidas RUNNING EQ19 Run Shoes Men

a2		adidas RUNNING Energyfalcon Shoes Men
a3		adidas RUNNING Lite Racer 3.0 Shoes Men
a4		adidas RUNNING Racer TR21 Shoes Men
a5		adidas RUNNING EQ21 Run Shoes Men

p1		PUMA Enzo 2 Women's Running Shoes
p2		PUMA Harrow Women's Shoes
p3		PUMA Noah Men's Shoes
p4		PUMA Unisex Court Star Suede Shoes

p5		PUMA Enzo Sport Men's Running Shoes
b1		BATA Men Black Dress Shoes
b2		BATA Men Brown Casual Slip On

b3		BATA Men Black Formal Slip On Shoes
b4		PATA-PATA Men Grey Sandals
b5		North Star Men White Sandals

d1		Dr Cardin Men Ultra Light Lace-Up Sneaker
d2		DC Home Men Buttery Soft Comfort Sandals
d3		Dr Cardin Ladies Comfort Slip on Sandal

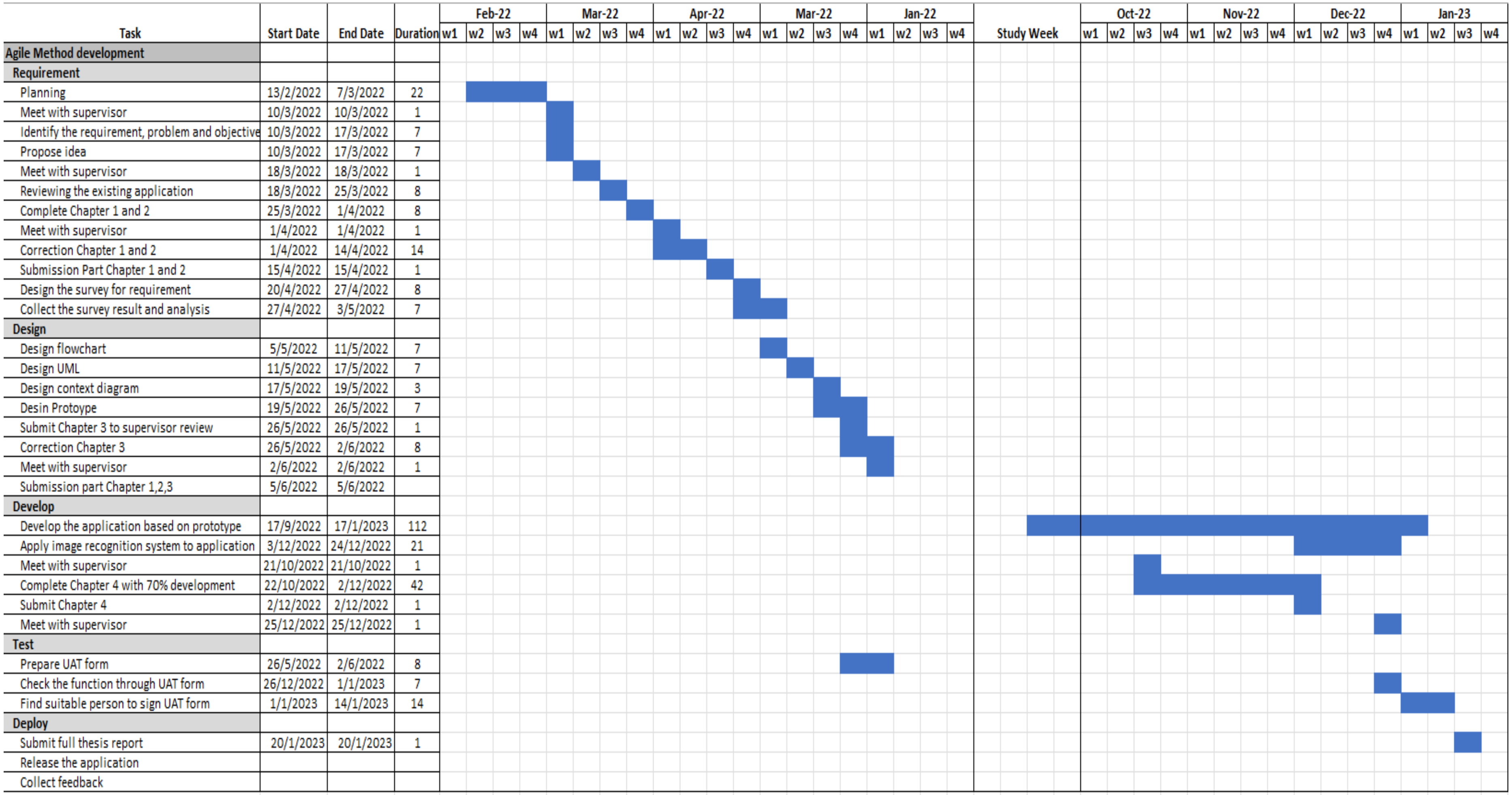
d4		Dr Cardin Ladies Comfort Slip on Sandal
d5		Dr Cardin Women Sandal Slip On L-8A-A262
s1		Skechers Women Sport Dynamight 2.0 Shoes

s2		Skechers Women GOwalk 5 Shoes
s3		Skechers Women On-The-GO Flex Shoes
s4		Skechers Girls Modern Jogger Shoes

s5		Skechers Girls Microspec Shoes

Table 3.6 Dataset to be Train in Teachable Machine

3.9 Gantt Chart



Task	Start Date	End Date	Duration
Agile Method development			
Requirement			
Planning	13/2/2022	7/3/2022	22
Meet with supervisor	10/3/2022	10/3/2022	1
Identify the requirement, problem and objective	10/3/2022	17/3/2022	7
Propose idea	10/3/2022	17/3/2022	7
Meet with supervisor	18/3/2022	18/3/2022	1
Reviewing the existing application	18/3/2022	25/3/2022	8
Complete Chapter 1 and 2	25/3/2022	1/4/2022	8
Meet with supervisor	1/4/2022	1/4/2022	1
Correction Chapter 1 and 2	1/4/2022	14/4/2022	14
Submission Part Chapter 1 and 2	15/4/2022	15/4/2022	1
Design the survey for requirement	20/4/2022	27/4/2022	8
Collect the survey result and analysis	27/4/2022	3/5/2022	7
Design			
Design flowchart	5/5/2022	11/5/2022	7
Design UML	11/5/2022	17/5/2022	7
Design context diagram	17/5/2022	19/5/2022	3
Desin Protoype	19/5/2022	26/5/2022	7
Submit Chapter 3 to supervisor review	26/5/2022	26/5/2022	1
Correction Chapter 3	26/5/2022	2/6/2022	8
Meet with supervisor	2/6/2022	2/6/2022	1
Submission part Chapter 1,2,3	5/6/2022	5/6/2022	
Develop			
Develop the application based on prototype	17/9/2022	17/1/2023	112
Apply image recognition system to application	3/12/2022	24/12/2022	21
Meet with supervisor	21/10/2022	21/10/2022	1
Complete Chapter 4 with 70% development	22/10/2022	2/12/2022	42
Submit Chapter 4	2/12/2022	2/12/2022	1
Meet with supervisor	25/12/2022	25/12/2022	1
Test			
Prepare UAT form	26/5/2022	2/6/2022	8
Check the function through UAT form	26/12/2022	1/1/2023	7
Find suitable person to sign UAT form	1/1/2023	14/1/2023	14
Deploy			
Submit full thesis report	20/1/2023	20/1/2023	1
Release the application			
Collect feedback			

Figure 3.21 Gantt Cart of Agile development

3.10 Potential Use of Proposed Solution

The KJ fashion Shoes mobile-based application with the implementation of an image recognition system can let the user online shop for in-trend fashion shoes by just clicking the downloaded application on the smartphone. Furthermore, the implementation of an image recognition system in this application able the user to search for their preferred product without typing any keyword of the product. For example, the user can capture the shoes just to see around them and visual search that image to get the similarity of the product just captured before.

Chapter 4

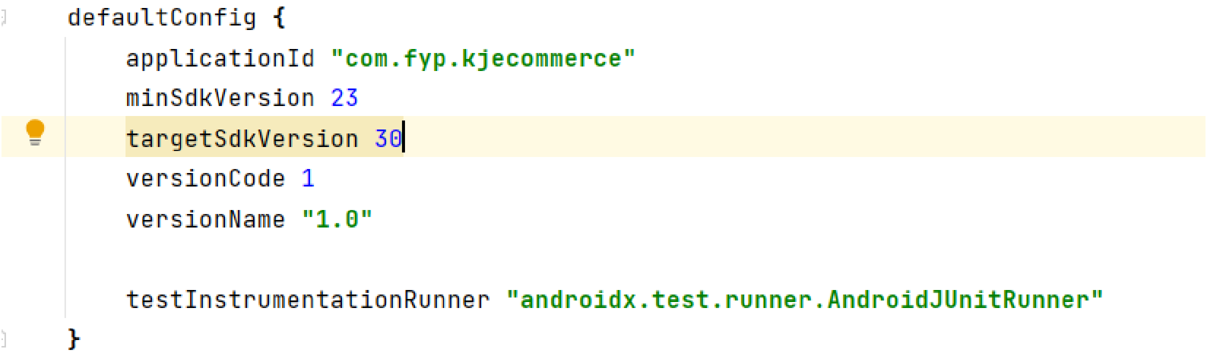
IMPLEMENTATION, RESULT, AND DISCUSSION

4.1 Introduction

In this chapter, the discussion of implementation and development of the proposed mobile application has been discussed. As the problem stated in Chapter 1, the solution of the information will be provided in more detail and accurately for the proposed mobile application. The functionality of the application will also be discussed in the description provided.

4.2 Development Environment

In this chapter, the main two parts will be discussed which are artificial intelligence implementation and Integrated Development Environment (IDE). The mobile device is required to be at least Android 6.0 (Marshmallow) which is similar to Android API 23 as shown in Figure 4.0 that can run the proposed application smoothly.



```
defaultConfig {
    applicationId "com.fyp.kjecommerce"
    minSdkVersion 23
    targetSdkVersion 30
    versionCode 1
    versionName "1.0"

    testInstrumentationRunner "androidx.test.runner.AndroidJUnitRunner"
}
```

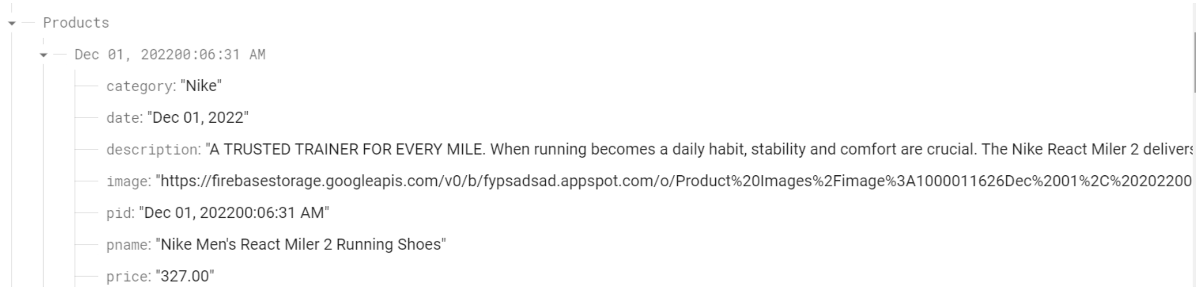
Figure 4.0 Module Build Gradle

4.2.1 Artificial Intelligence (AI) Implementation

Google's Teachable Machine is a quick and simple model for anyone who is interested in artificial intelligence but is not an expert in it. There is no requirement for coding. It is easy to use online, therefore it doesn't use up any computational resources. Teachable Machine 2.0, the follow-up to the 2017 version, was made available in November 2019. Along with learning visuals, we may also learn sounds and positions.[16] Convolutional Neural Networks (CNNs) are mostly utilized in image recognition, video recognition, sound recognition, and image classification.

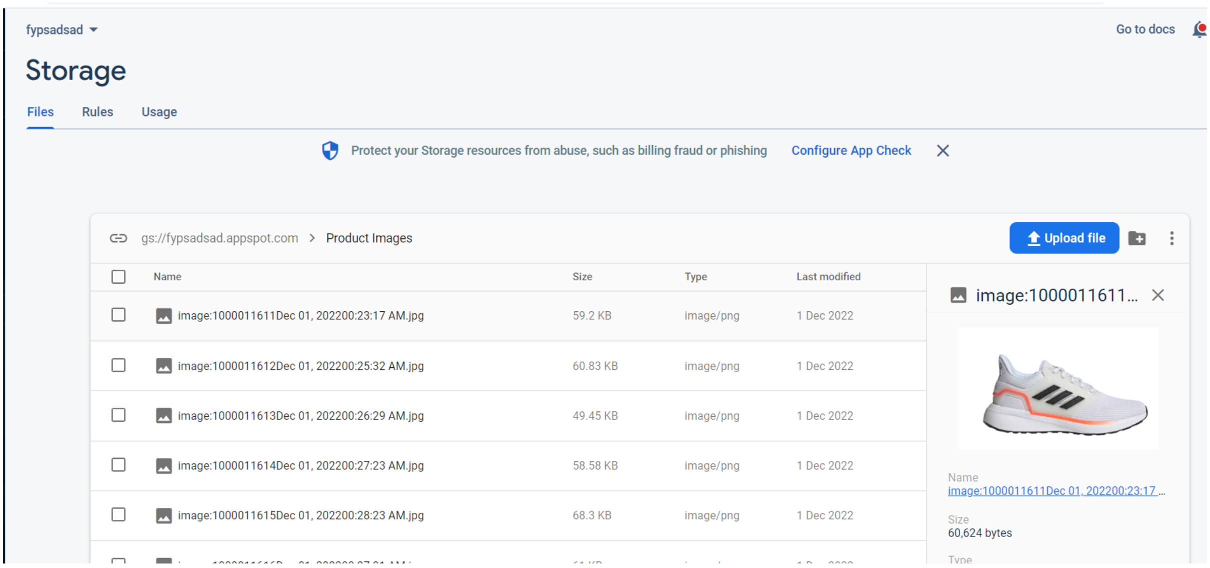
Collection

Firstly, the image product and the product name will be collected from firebase which is uploaded by the admin. For every 24 hours, the entity of Products from the Realtime Database is checked, and ensure the new products are been added by the admins are on the database, then collect the name of the product which is shown in Figure 4.1. Then, by referring to the product id, the image products will be collected in the Storage of the Firebase which is shown in Figure 4.2. Next, the collected image is been uploaded to the Teachable Machine, and repeat upload until they have 10 samples for each class to ensure the accuracy of the output which is shown in Figure 4.3.



```
Products
  Dec 01, 202200:06:31 AM
    category: "Nike"
    date: "Dec 01, 2022"
    description: "A TRUSTED TRAINER FOR EVERY MILE. When running becomes a daily habit, stability and comfort are crucial. The Nike React Miler 2 delivers
    image: "https://firebasestorage.googleapis.com/v0/b/fypsadsad.appspot.com/o/Product%20Images%2Fimage%3A1000011626Dec%2001%2C%20202200
    pid: "Dec 01, 202200:06:31 AM"
    pname: "Nike Men's React Miler 2 Running Shoes"
    price: "327.00"
```

Figure 4.1 Products in Realtime Database



Storage

Protect your Storage resources from abuse, such as billing fraud or phishing

gs://fypsadsad.appspot.com > Product Images

Name	Size	Type	Last modified
image:1000011611Dec 01, 202200:23:17 AM.jpg	59.2 KB	image/png	1 Dec 2022
image:1000011612Dec 01, 202200:25:32 AM.jpg	60.83 KB	image/png	1 Dec 2022
image:1000011613Dec 01, 202200:26:29 AM.jpg	49.45 KB	image/png	1 Dec 2022
image:1000011614Dec 01, 202200:27:23 AM.jpg	58.58 KB	image/png	1 Dec 2022
image:1000011615Dec 01, 202200:28:23 AM.jpg	68.3 KB	image/png	1 Dec 2022

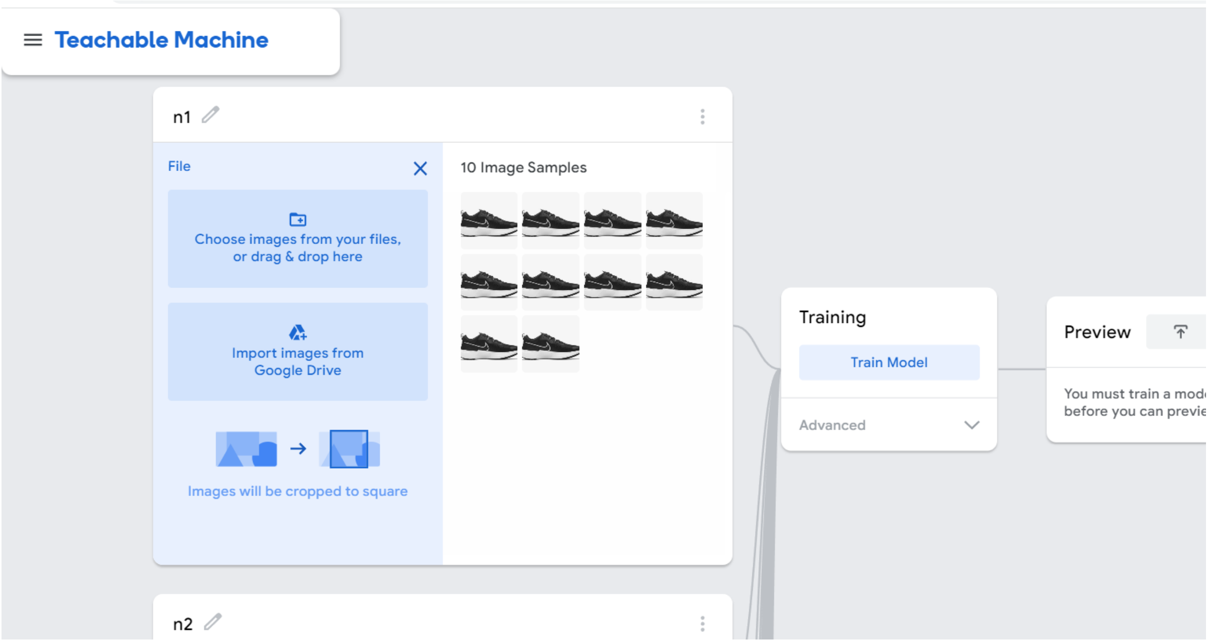
image:1000011611...

Name
image:1000011611Dec 01, 202200:23:17 ...

Size
60,624 bytes

Type

Figure 4.2 Storage of Firebase



Choose images from your files, or drag & drop here

Import images from Google Drive

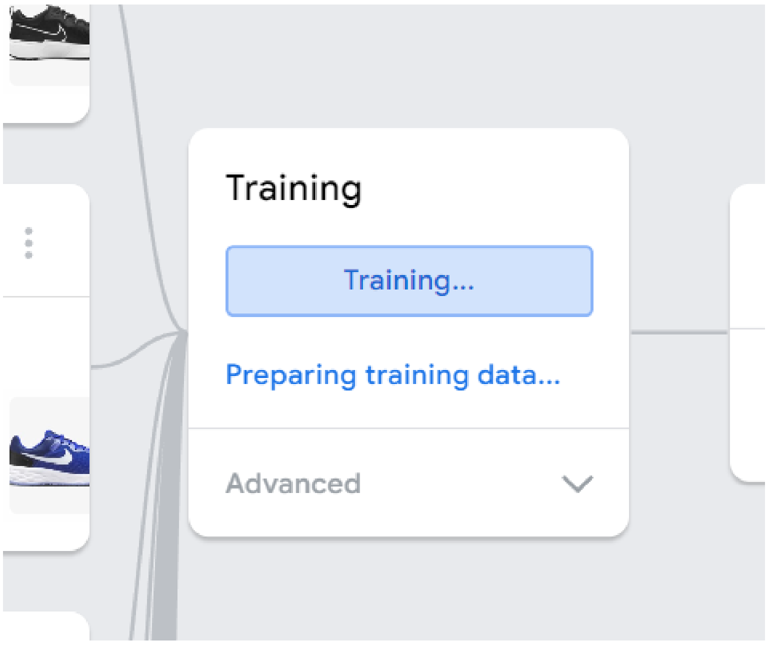
Images will be cropped to square

You must train a mod
before you can previe

Figure 4.3 Upload image to Teachable Machine

Training

After the image dataset is been uploaded, the training will start when clicking the Train Model button. Then the button will turn to Training… and notice the dataset is preparing training data which is shown in Figure 4.4. After the training is done, on the preview side, we can test the result and see the similarity in percentage which is shown in Figure 4.5.



Preparing training data...

Figure 4.4 Training

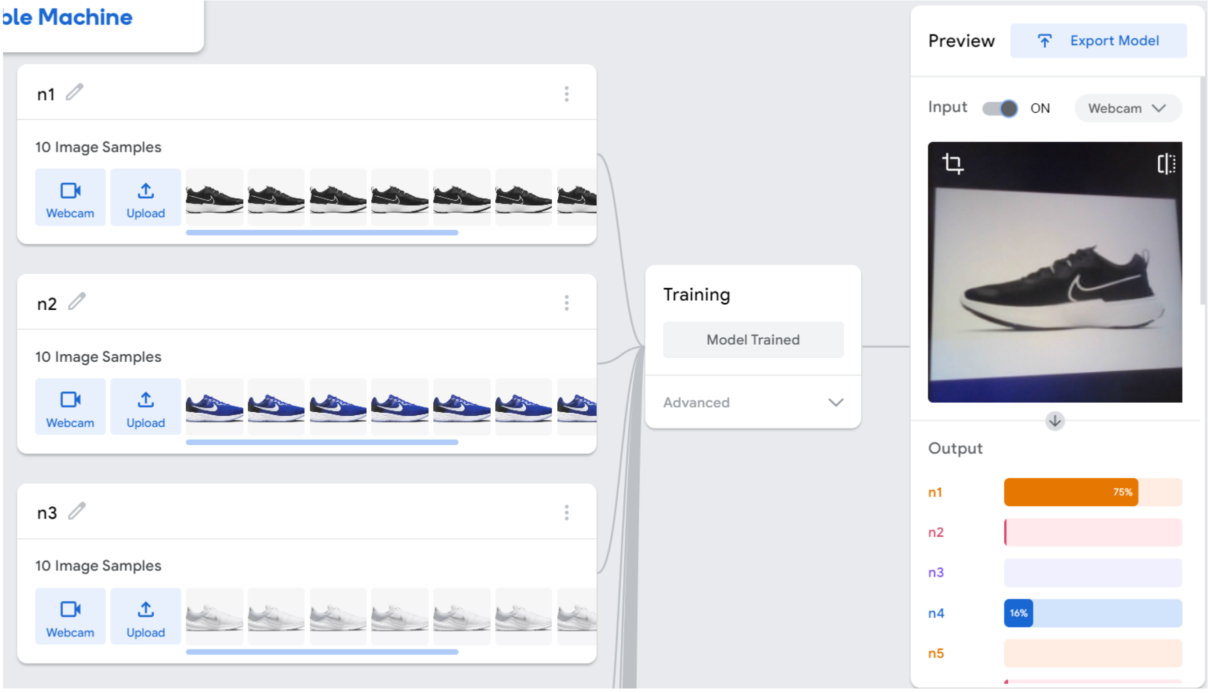
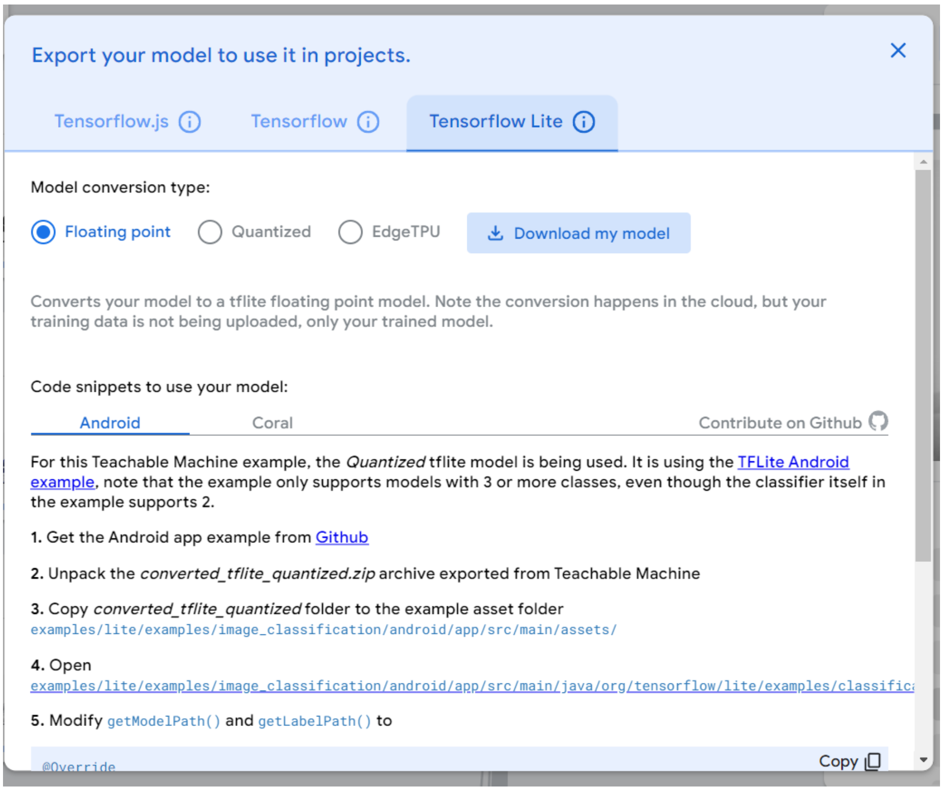


Figure 4.5 Model Trained

Export

Next, the model will be exported to the Tensorflow Lite model and downloaded which is suitable for Android Studio that implements the recognition system to the existing application as shown in Figure 4.6.



Export your model to use it in projects.

Tensorflow.js ⓘ | Tensorflow ⓘ | Tensorflow Lite ⓘ

Model conversion type:

● Floating point ○ Quantized ○ EdgeTPU Download my model

Converts your model to a tflite floating point model. Note the conversion happens in the cloud, but your training data is not being uploaded, only your trained model.

Code snippets to use your model:

Android | Coral | Contribute on Github

For this Teachable Machine example, the *Quantized* tflite model is being used. It is using the TFLite Android example, note that the example only supports models with 3 or more classes, even though the classifier itself in the example supports 2.

1. Get the Android app example from Github

2. Unpack the *converted_tflite_quantized.zip* archive exported from Teachable Machine

3. Copy *converted_tflite_quantized* folder to the example asset folder `examples/lite/examples/image_classification/android/app/src/main/assets/`

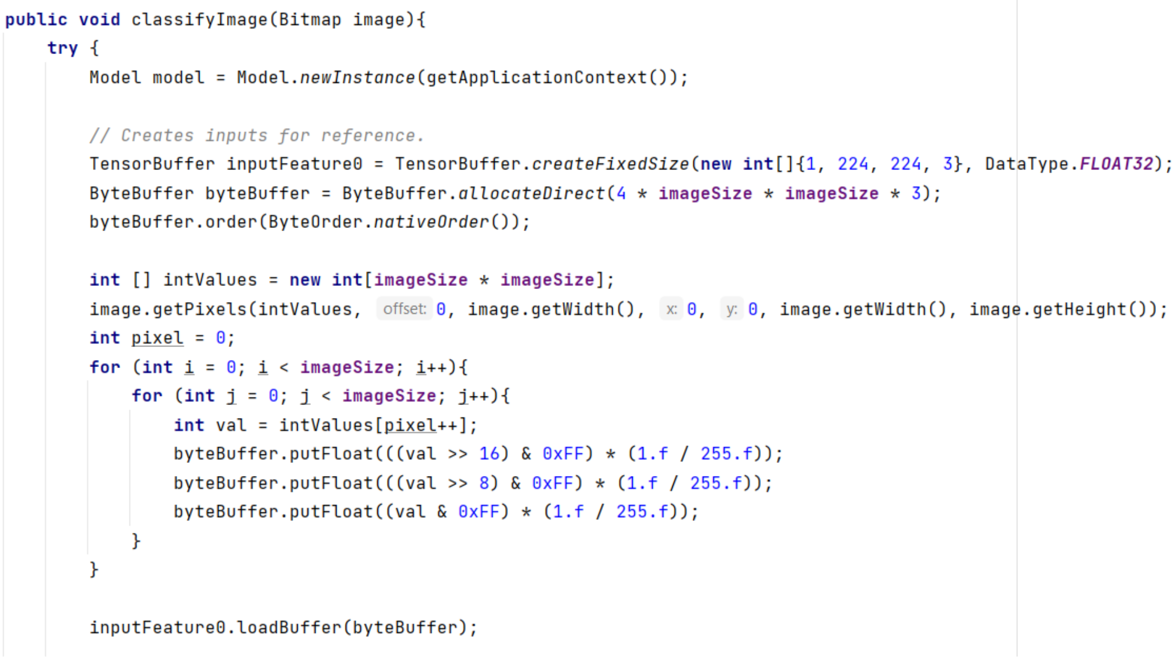
4. Open `examples/lite/examples/image_classification/android/app/src/main/java/org/tensorflow/lite/examples/classific`

5. Modify `getModelPath()` and `getLabelPath()` to

```
@Override
```

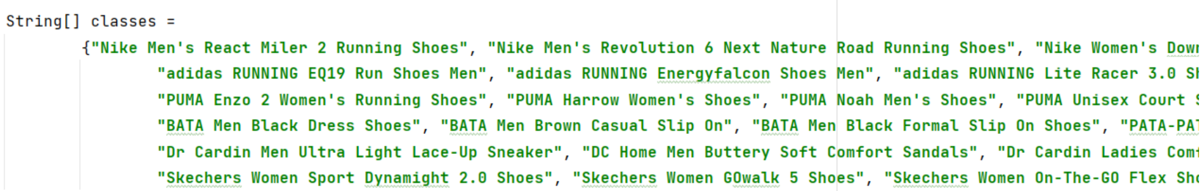
Figure 4.6 Download Model type

After downloading the model, the model.tf will be added to the Android Studio as TensorFlow Lite Model. By using the code in model.tf, the code will be added to ensure the captured image data can be suited to the dimension of the input in the model as shown in Figure 4.7. Then added the product name to the String array classes which is shown in Figure 4.8.



```
public void classifyImage(Bitmap image){
    try {
        Model model = Model.newInstance(getApplicationContext());

        // Creates inputs for reference.
        TensorBuffer inputFeature0 = TensorBuffer.createFixedSize(new int[]{1, 224, 224, 3}, DataType.FLOAT32);
        ByteBuffer byteBuffer = ByteBuffer.allocateDirect(4 * imageSize * imageSize * 3);
        byteBuffer.order(ByteOrder.nativeOrder());

        int [] intValues = new int[imageSize * imageSize];
        image.getPixels(intValues,  offset: 0, image.getWidth(),  x: 0,  y: 0, image.getWidth(), image.getHeight());
        int pixel = 0;
        for (int i = 0; i < imageSize; i++){
            for (int j = 0; j < imageSize; j++){
                int val = intValues[pixel++];
                byteBuffer.putFloat(((val >> 16) & 0xFF) * (1.f / 255.f));
                byteBuffer.putFloat(((val >> 8) & 0xFF) * (1.f / 255.f));
                byteBuffer.putFloat((val & 0xFF) * (1.f / 255.f));
            }
        }

        inputFeature0.loadBuffer(byteBuffer);
```

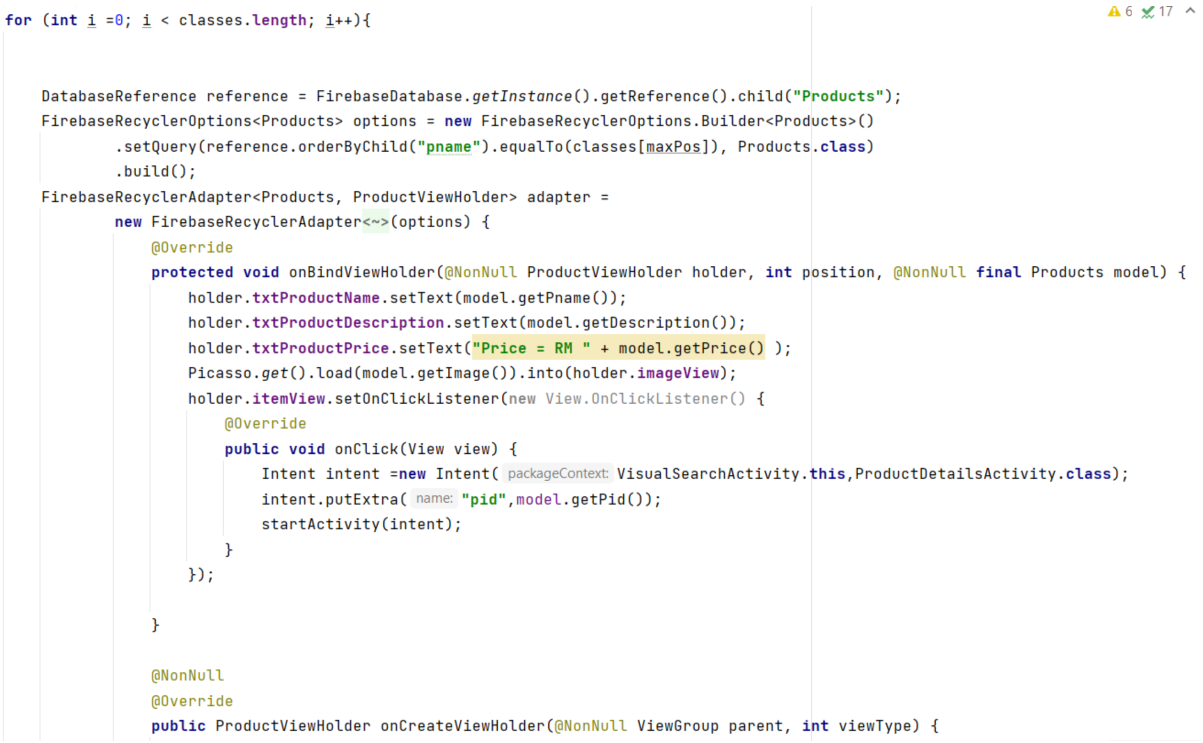
Figure 4.7 Input Image Data



```
String[] classes =
        {"Nike Men's React Miler 2 Running Shoes", "Nike Men's Revolution 6 Next Nature Road Running Shoes", "Nike Women's Dow
                "adidas RUNNING EQ19 Run Shoes Men", "adidas RUNNING Energyfalcon Shoes Men", "adidas RUNNING Lite Racer 3.0 Sh
                "PUMA Enzo 2 Women's Running Shoes", "PUMA Harrow Women's Shoes", "PUMA Noah Men's Shoes", "PUMA Unisex Court 
                "BATA Men Black Dress Shoes", "BATA Men Brown Casual Slip On", "BATA Men Black Formal Slip On Shoes", "PATA-PA
                "Dr Cardin Men Ultra Light Lace-Up Sneaker", "DC Home Men Buttery Soft Comfort Sandals", "Dr Cardin Ladies Com
                "Skechers Women Sport Dynamight 2.0 Shoes", "Skechers Women GOwalk 5 Shoes", "Skechers Women On-The-GO Flex Sh
```

Figure 4.8 String Array classes

Finally, the output will display as a list of which product has the higher similarity with the image captured by the user by using the code in Figure 4.9.

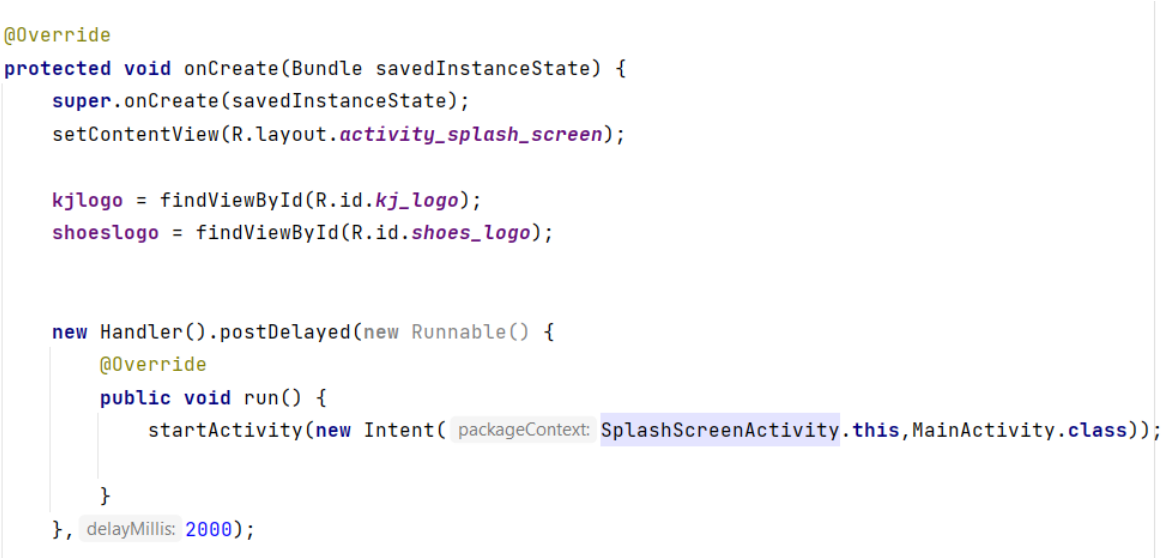


```
for (int i =0; i < classes.length; i++){


    DatabaseReference reference = FirebaseDatabase.getInstance().getReference().child("Products");
    FirebaseRecyclerOptions<Products> options = new FirebaseRecyclerOptions.Builder<Products>()
            .setQuery(reference.orderByChild("pname").equalTo(classes[maxPos]), Products.class)
            .build();
    FirebaseRecyclerAdapter<Products, ProductViewHolder> adapter =
            new FirebaseRecyclerAdapter<~>(options) {
                @Override
                protected void onBindViewHolder(@NonNull ProductViewHolder holder, int position, @NonNull final Products model) {
                    holder.txtProductName.setText(model.getPname());
                    holder.txtProductDescription.setText(model.getDescription());
                    holder.txtProductPrice.setText("Price = RM " + model.getPrice() );
                    Picasso.get().load(model.getImage()).into(holder.imageView);
                    holder.itemView.setOnClickListener(new View.OnClickListener() {
                        @Override
                        public void onClick(View view) {
                            Intent intent =new Intent( packageContext: VisualSearchActivity.this,ProductDetailsActivity.class);
                            intent.putExtra( name: "pid",model.getPid());
                            startActivity(intent);
                        }
                    });

                }

                @NonNull
                @Override
                public ProductViewHolder onCreateViewHolder(@NonNull ViewGroup parent, int viewType) {
```

Figure 4.9 Output of Model

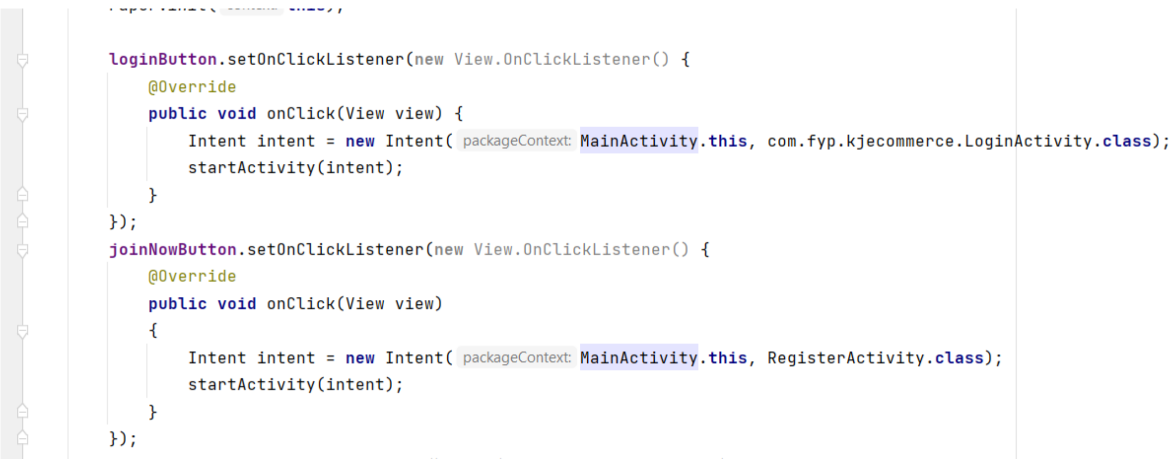
4.2.2 Integrated Development Environment (IDE)

For this software implementation, there are Android Studio IDE and Firebase used. Android Studio is an integrated development environment that is suitable to develop android applications. There are 2 types of programming languages inside the Android Studio which are Java and Kotlin. In this mobile application, I used Java programming language to develop and build the proposed mobile application. Next, a cloud service database which is Firebase will be used also as the API of android Studio to store and retrieve the database of the application.



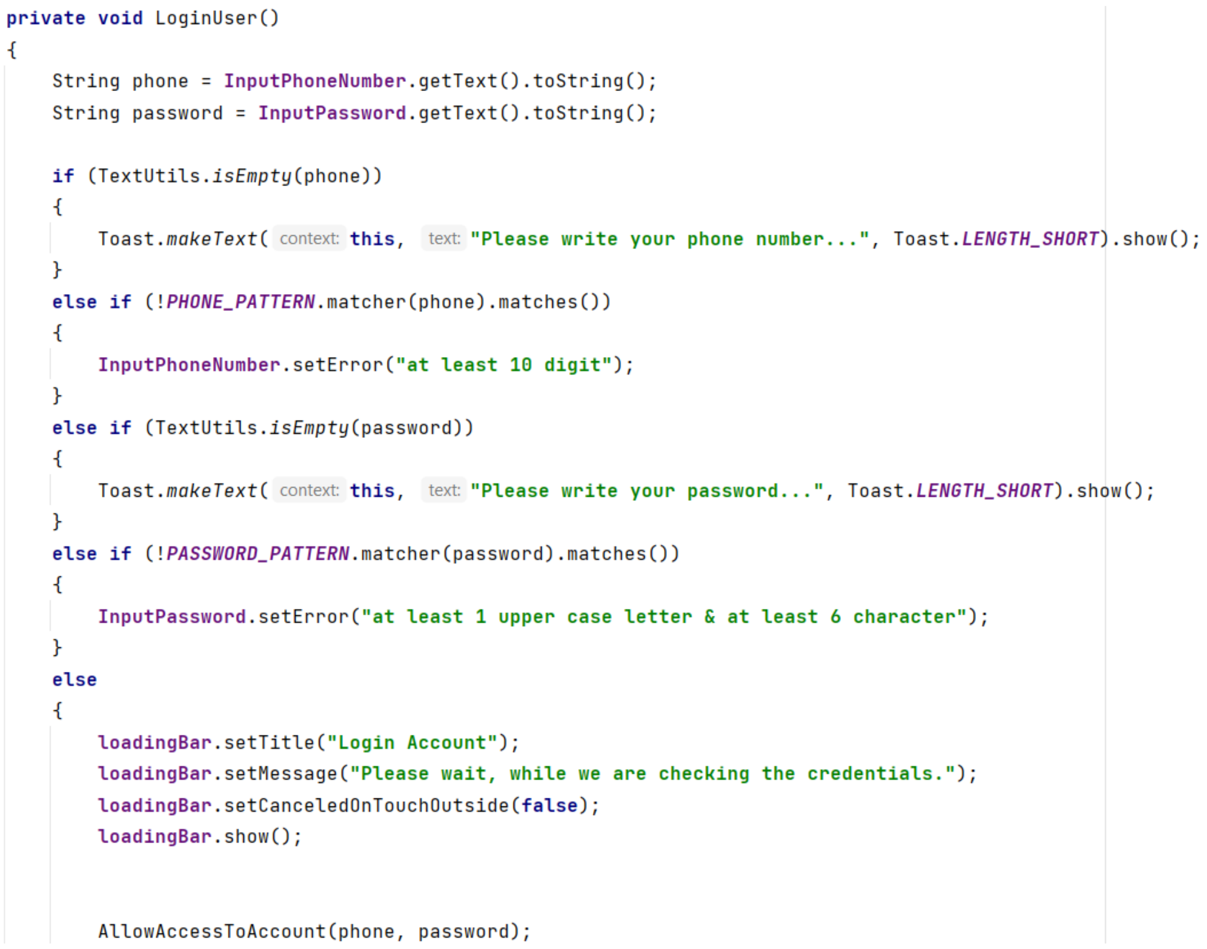
```
@Override
protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.activity_splash_screen);

    kjlogo = findViewById(R.id.kj_logo);
    shoeslogo = findViewById(R.id.shoes_logo);


    new Handler().postDelayed(new Runnable() {
        @Override
        public void run() {
            startActivity(new Intent( packageContext: SplashScreenActivity.this,MainActivity.class));

        }
    }, delayMillis: 2000);
```

Figure 4.10 Splash Screen Activity



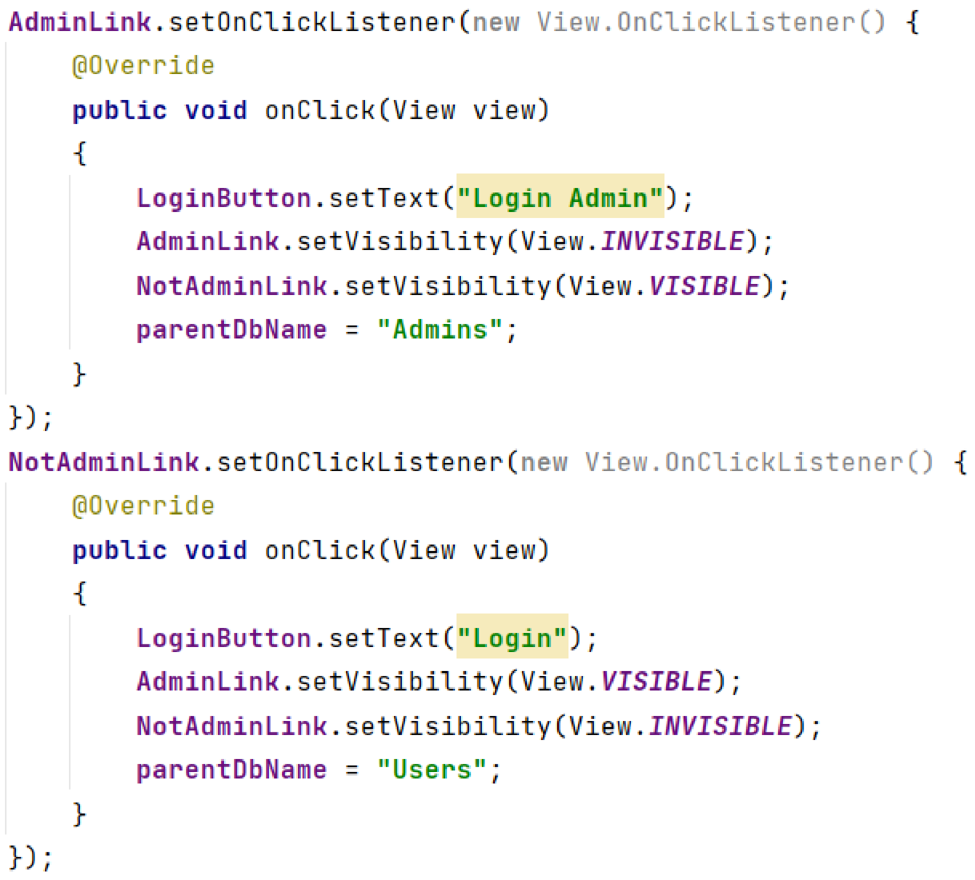
```
    Paper.init( context: this);

    loginButton.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View view) {
            Intent intent = new Intent( packageContext: MainActivity.this, com.fyp.kjecommerce.LoginActivity.class);
            startActivity(intent);
        }
    });
    joinNowButton.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View view)
        {
            Intent intent = new Intent( packageContext: MainActivity.this, RegisterActivity.class);
            startActivity(intent);
        }
    });
```

Figure 4.11 Select Login and Register Activity



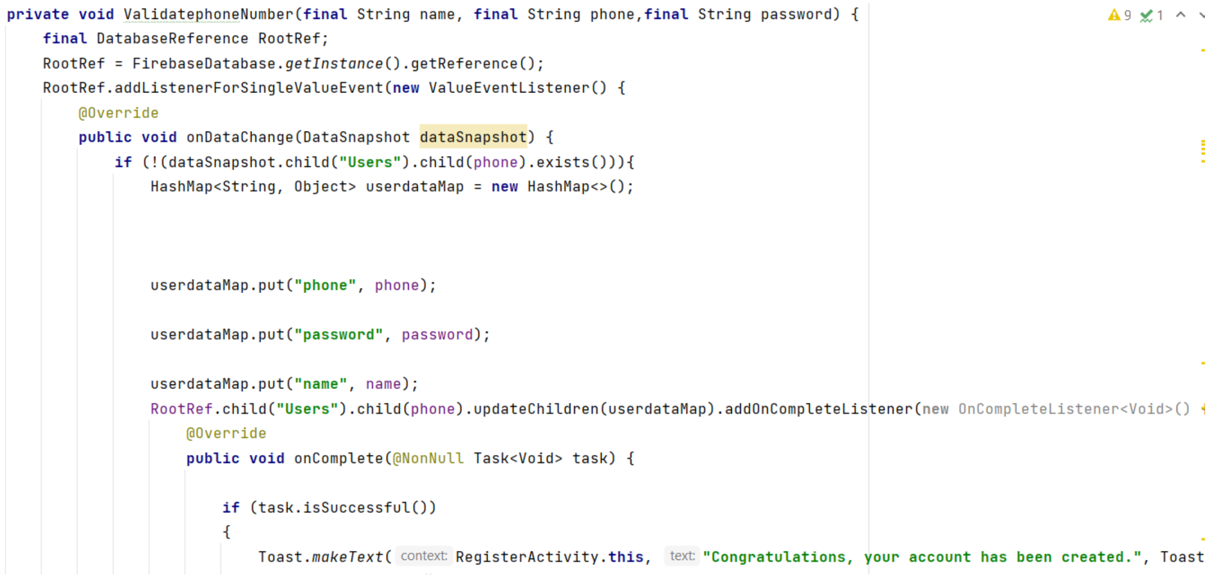
```
private void LoginUser()
{
    String phone = InputPhoneNumber.getText().toString();
    String password = InputPassword.getText().toString();

    if (TextUtils.isEmpty(phone))
    {
        Toast.makeText( context: this,  text: "Please write your phone number...", Toast.LENGTH_SHORT).show();
    }
    else if (!PHONE_PATTERN.matcher(phone).matches())
    {
        InputPhoneNumber.setError("at least 10 digit");
    }
    else if (TextUtils.isEmpty(password))
    {
        Toast.makeText( context: this,  text: "Please write your password...", Toast.LENGTH_SHORT).show();
    }
    else if (!PASSWORD_PATTERN.matcher(password).matches())
    {
        InputPassword.setError("at least 1 upper case letter & at least 6 character");
    }
    else
    {
        loadingBar.setTitle("Login Account");
        loadingBar.setMessage("Please wait, while we are checking the credentials.");
        loadingBar.setCanceledOnTouchOutside(false);
        loadingBar.show();


        AllowAccessToAccount(phone, password);
```

Figure 4.12 Login Activity



```
AdminLink.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View view)
    {
        LoginButton.setText("Login Admin");
        AdminLink.setVisibility(View.INVISIBLE);
        NotAdminLink.setVisibility(View.VISIBLE);
        parentDbName = "Admins";
    }
});
NotAdminLink.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View view)
    {
        LoginButton.setText("Login");
        AdminLink.setVisibility(View.VISIBLE);
        NotAdminLink.setVisibility(View.INVISIBLE);
        parentDbName = "Users";
    }
});
```

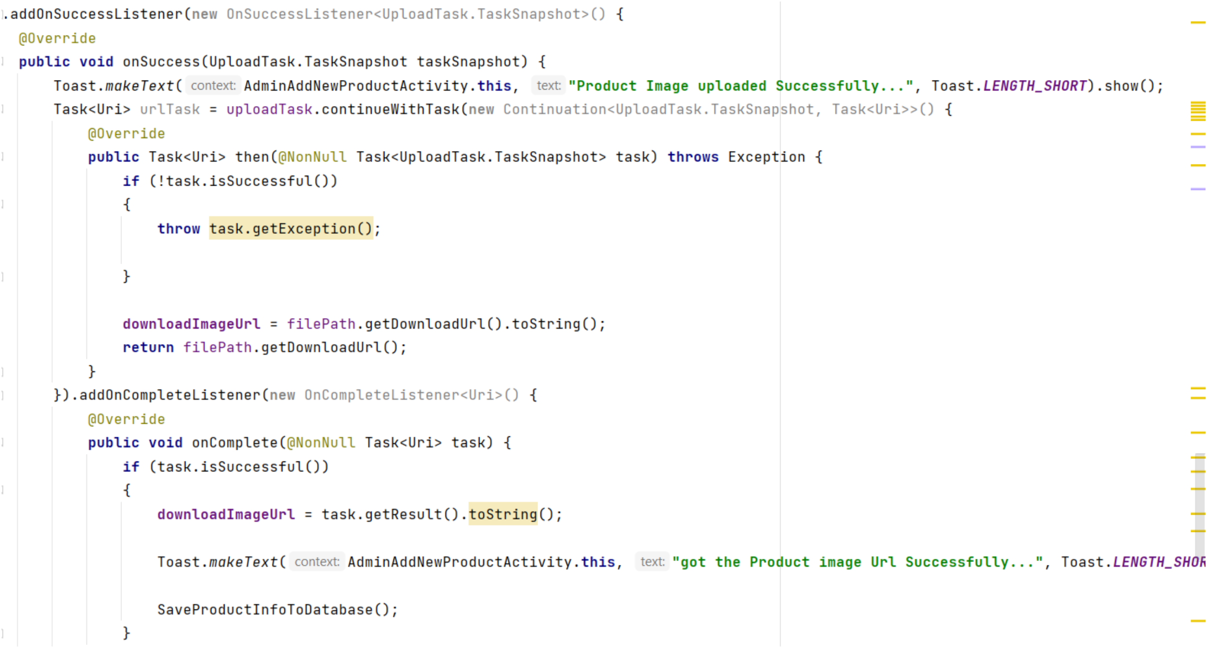
Figure 4.13 Login Activity (either Admins or Users)



```
private void ValidatephoneNumber(final String name, final String phone,final String password) {
    final DatabaseReference RootRef;
    RootRef = FirebaseDatabase.getInstance().getReference();
    RootRef.addListenerForSingleValueEvent(new ValueEventListener() {
        @Override
        public void onDataChange(DataSnapshot dataSnapshot) {
            if (!(dataSnapshot.child("Users").child(phone).exists())){
                HashMap<String, Object> userdataMap = new HashMap<>();



                userdataMap.put("phone", phone);

                userdataMap.put("password", password);

                userdataMap.put("name", name);
                RootRef.child("Users").child(phone).updateChildren(userdataMap).addOnCompleteListener(new OnCompleteListener<Void>()
                    @Override
                    public void onComplete(@NonNull Task<Void> task) {

                        if (task.isSuccessful())
                        {
                            Toast.makeText( context: RegisterActivity.this,  text: "Congratulations, your account has been created.", Toast
```

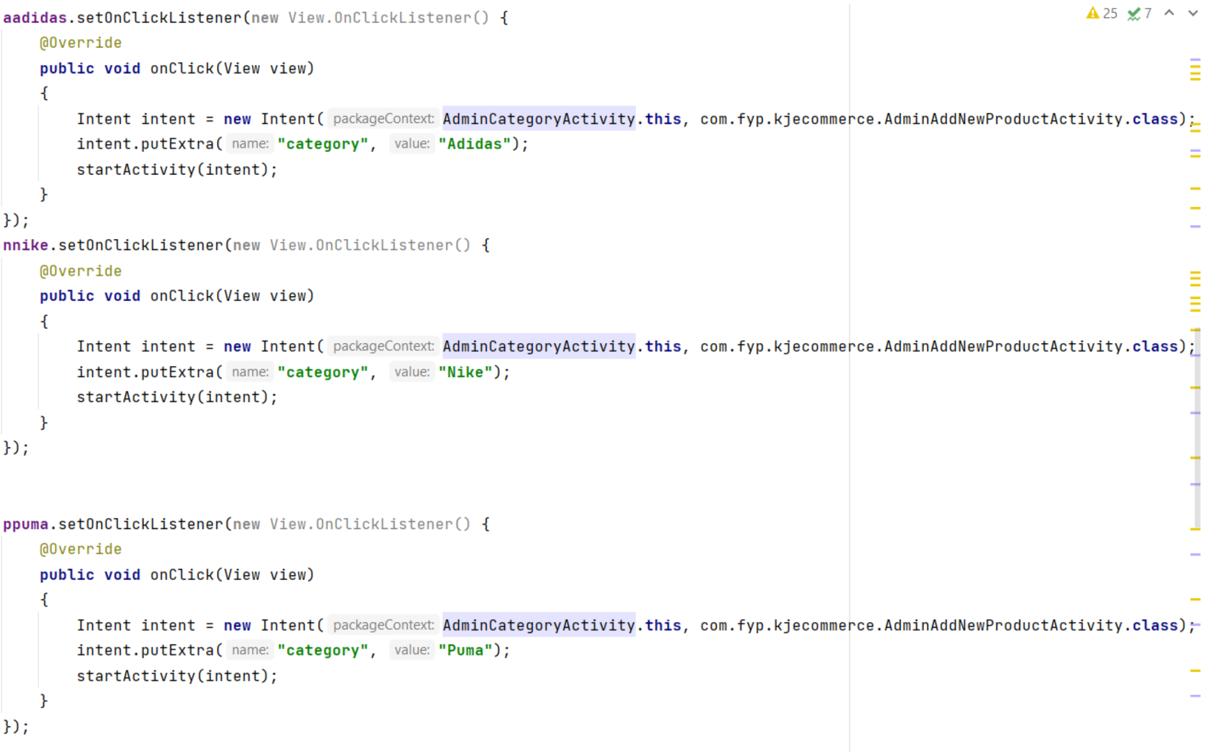
Figure 4.14 Register Activity (just for users)

Admins Page



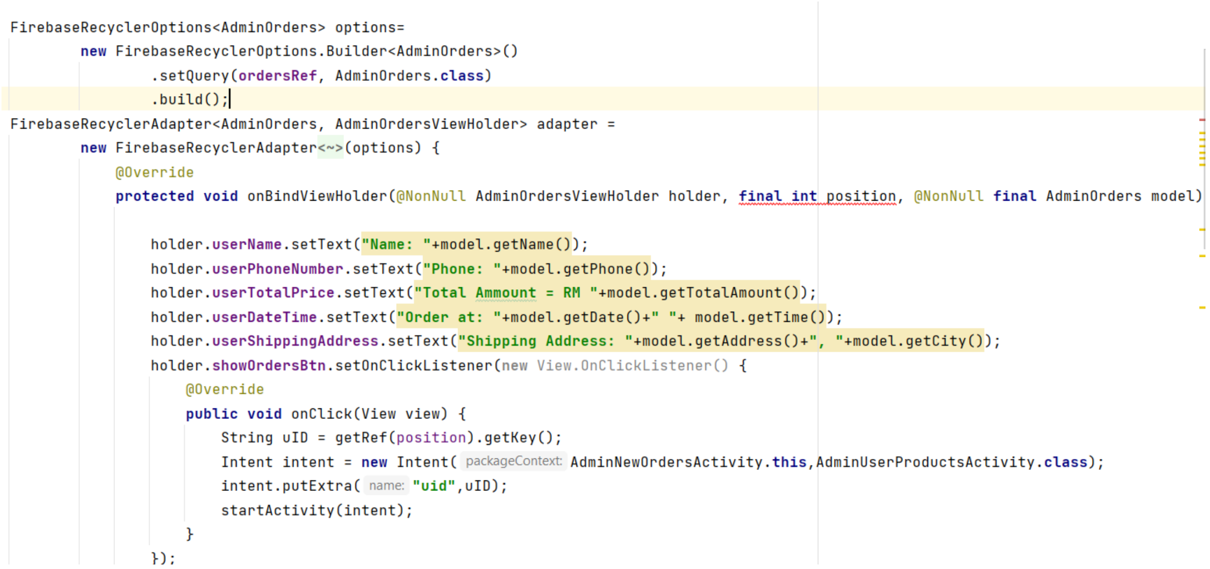
```
.addOnSuccessListener(new OnSuccessListener<UploadTask.TaskSnapshot>() {
  @Override
  public void onSuccess(UploadTask.TaskSnapshot taskSnapshot) {
      Toast.makeText( context: AdminAddNewProductActivity.this,  text: "Product Image uploaded Successfully...", Toast.LENGTH_SHORT).show();
      Task<Uri> urlTask = uploadTask.continueWithTask(new Continuation<UploadTask.TaskSnapshot, Task<Uri>>() {
          @Override
          public Task<Uri> then(@NonNull Task<UploadTask.TaskSnapshot> task) throws Exception {
              if (!task.isSuccessful())
              {
                  throw task.getException();

              }

              downloadImageUrl = filePath.getDownloadUrl().toString();
              return filePath.getDownloadUrl();
          }
      }).addOnCompleteListener(new OnCompleteListener<Uri>() {
          @Override
          public void onComplete(@NonNull Task<Uri> task) {
              if (task.isSuccessful())
              {
                  downloadImageUrl = task.getResult().toString();

                  Toast.makeText( context: AdminAddNewProductActivity.this,  text: "got the Product image Url Successfully...", Toast.LENGTH_SHOR

                  SaveProductInfoToDatabase();
              }
```

Figure 4.15 Admin Add New Product Activity



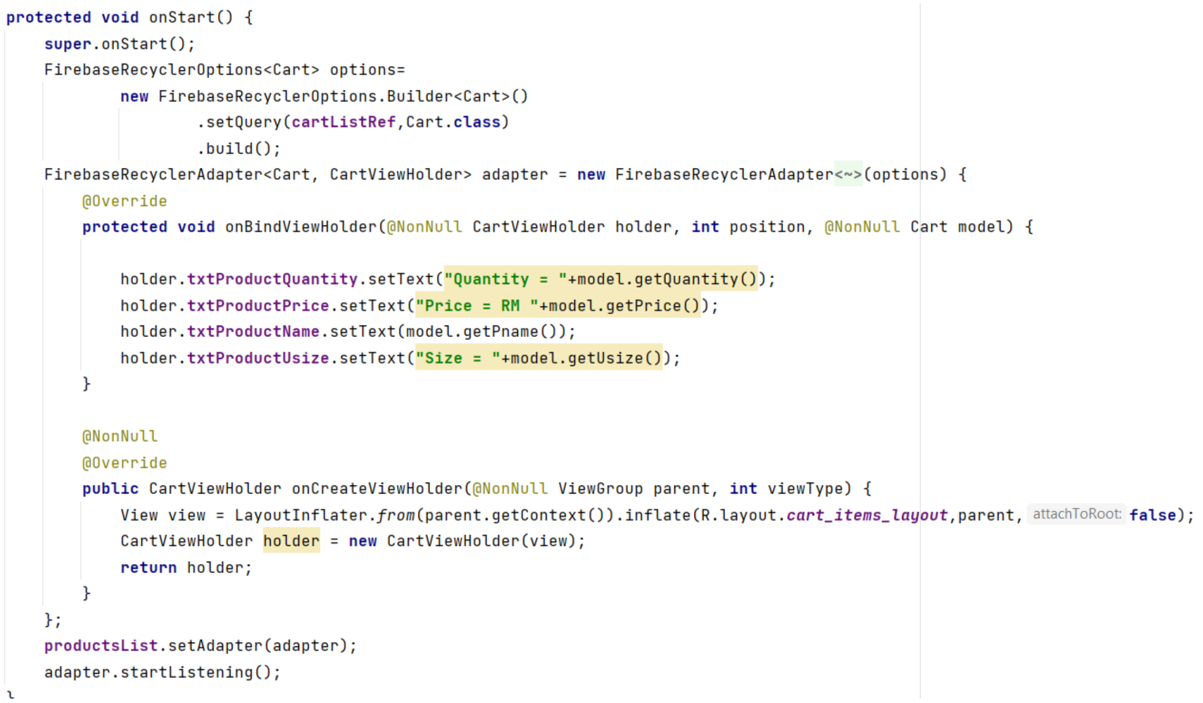
```
aadidas.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View view)
    {
        Intent intent = new Intent( packageContext: AdminCategoryActivity.this, com.fyp.kjecommerce.AdminAddNewProductActivity.class);
        intent.putExtra( name: "category",  value: "Adidas");
        startActivity(intent);
    }
});
nnike.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View view)
    {
        Intent intent = new Intent( packageContext: AdminCategoryActivity.this, com.fyp.kjecommerce.AdminAddNewProductActivity.class);
        intent.putExtra( name: "category",  value: "Nike");
        startActivity(intent);
    }
});


ppuma.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View view)
    {
        Intent intent = new Intent( packageContext: AdminCategoryActivity.this, com.fyp.kjecommerce.AdminAddNewProductActivity.class);
        intent.putExtra( name: "category",  value: "Puma");
        startActivity(intent);
    }
});
```

Figure 4.16 Admin Category Activity (add product based on product category)



```
FirebaseRecyclerOptions<AdminOrders> options=
        new FirebaseRecyclerOptions.Builder<AdminOrders>()
                .setQuery(ordersRef, AdminOrders.class)
                .build();
FirebaseRecyclerAdapter<AdminOrders, AdminOrdersViewHolder> adapter =
        new FirebaseRecyclerAdapter<~>(options) {
            @Override
            protected void onBindViewHolder(@NonNull AdminOrdersViewHolder holder, final int position, @NonNull final AdminOrders model)

                holder.userName.setText("Name:  "+model.getName());
                holder.userPhoneNumber.setText("Phone:  "+model.getPhone());
                holder.userTotalPrice.setText("Total Ammount = RM  "+model.getTotalAmount());
                holder.userDateTime.setText("Order at:  "+model.getDate()+"  "+ model.getTime());
                holder.userShippingAddress.setText("Shipping Address:  "+model.getAddress()+",  "+model.getCity());
                holder.showOrdersBtn.setOnClickListener(new View.OnClickListener() {
                    @Override
                    public void onClick(View view) {
                        String uID = getRef(position).getKey();
                        Intent intent = new Intent( packageContext: AdminNewOrdersActivity.this,AdminUserProductsActivity.class);
                        intent.putExtra( name: "uid",uID);
                        startActivity(intent);
                    }
                });
```

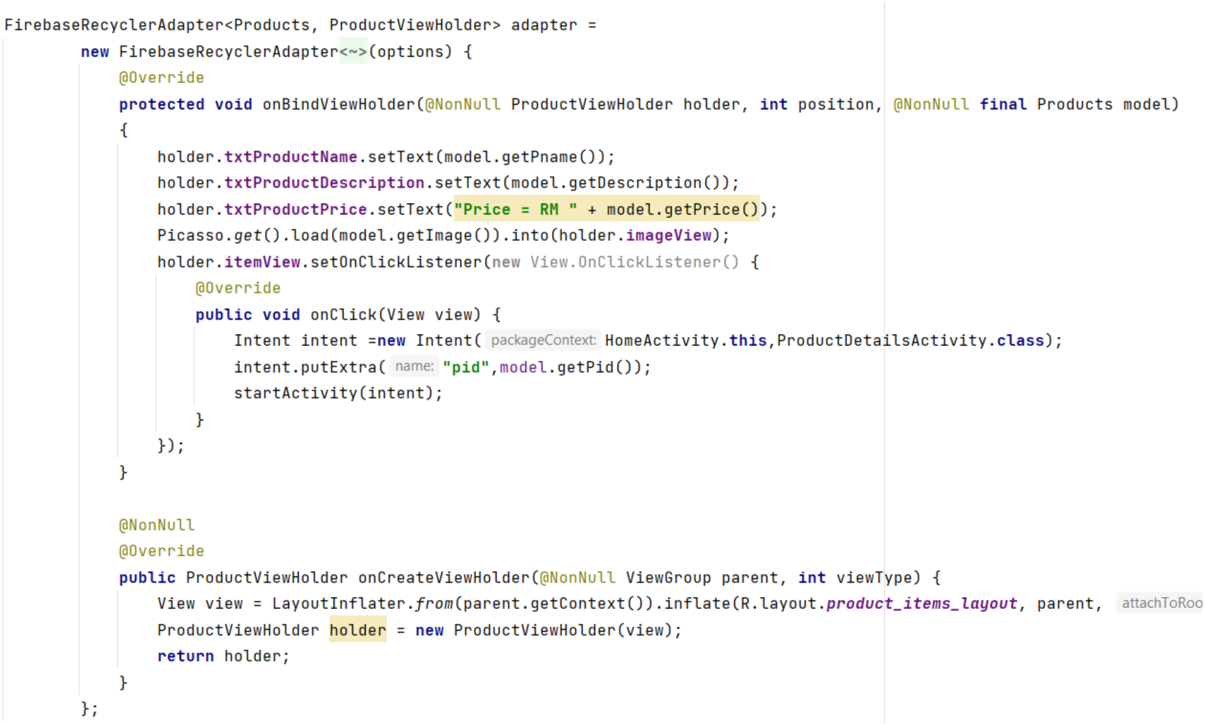
Figure 4.17 Admin New Order Activity (check new order from the user)



```
protected void onStart() {
    super.onStart();
    FirebaseRecyclerOptions<Cart> options=
            new FirebaseRecyclerOptions.Builder<Cart>()
                    .setQuery(cartListRef,Cart.class)
                    .build();
    FirebaseRecyclerAdapter<Cart, CartViewHolder> adapter = new FirebaseRecyclerAdapter<~>(options) {
        @Override
        protected void onBindViewHolder(@NonNull CartViewHolder holder, int position, @NonNull Cart model) {

            holder.txtProductQuantity.setText("Quantity = "+model.getQuantity());
            holder.txtProductPrice.setText("Price = RM "+model.getPrice());
            holder.txtProductName.setText(model.getPname());
            holder.txtProductUsize.setText("Size = "+model.getUsize());
        }

        @NonNull
        @Override
        public CartViewHolder onCreateViewHolder(@NonNull ViewGroup parent, int viewType) {
            View view = LayoutInflater.from(parent.getContext()).inflate(R.layout.cart_items_layout,parent, attachToRoot: false);
            CartViewHolder holder = new CartViewHolder(view);
            return holder;
        }
    };
    productsList.setAdapter(adapter);
    adapter.startListening();
}
```

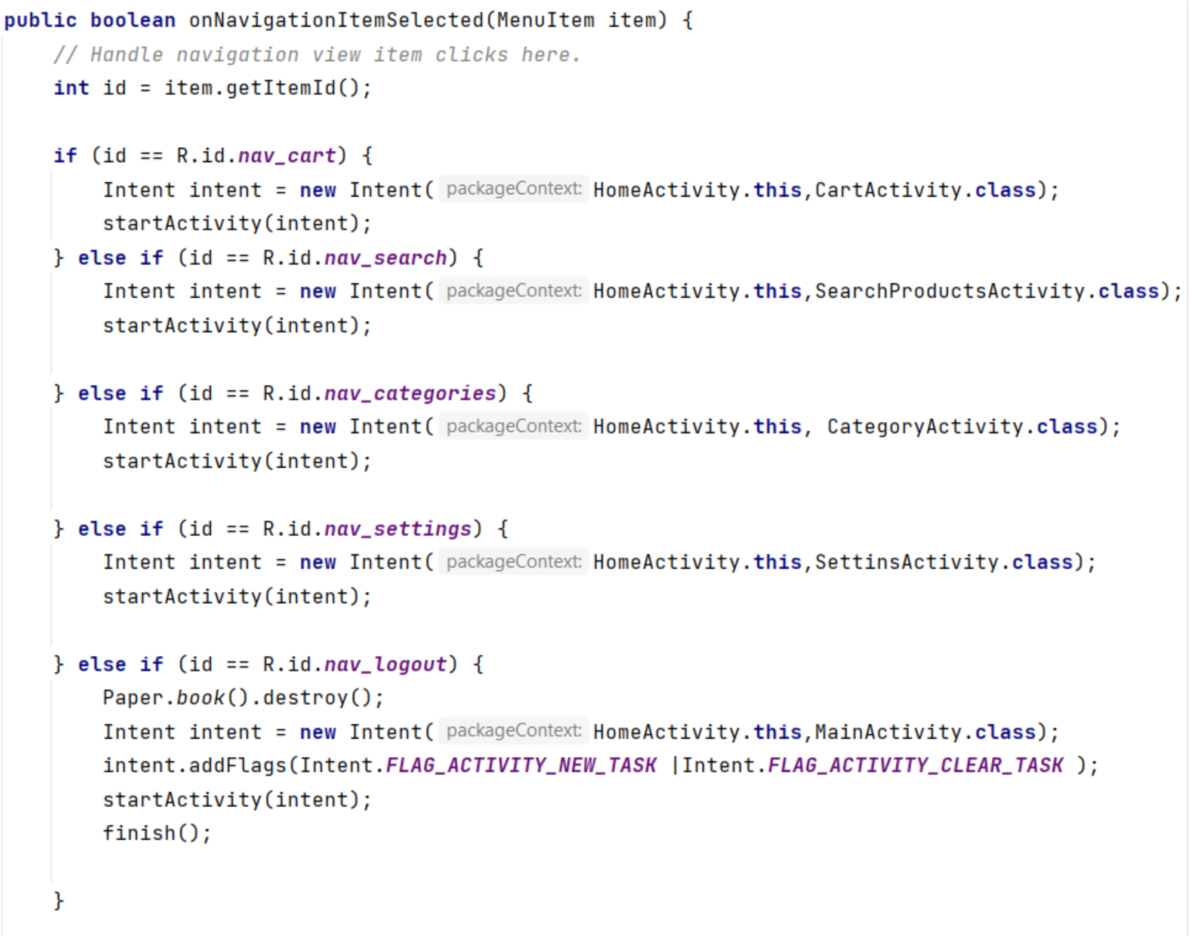
Figure 4.18 Admin User Products Activity (check user product detail)

User Page



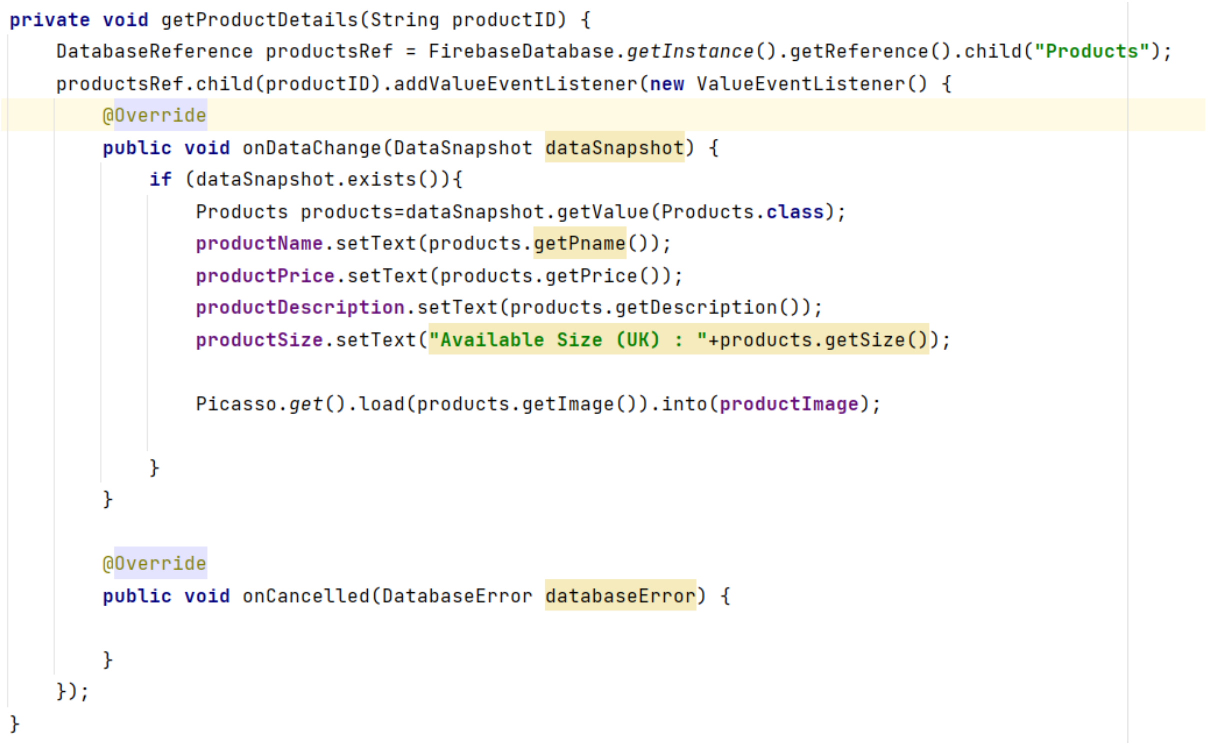
```
FirebaseRecyclerAdapter<Products, ProductViewHolder> adapter =
        new FirebaseRecyclerAdapter<~>(options) {
            @Override
            protected void onBindViewHolder(@NonNull ProductViewHolder holder, int position, @NonNull final Products model)
            {
                holder.txtProductName.setText(model.getPname());
                holder.txtProductDescription.setText(model.getDescription());
                holder.txtProductPrice.setText("Price = RM " + model.getPrice());
                Picasso.get().load(model.getImage()).into(holder.imageView);
                holder.itemView.setOnClickListener(new View.OnClickListener() {
                    @Override
                    public void onClick(View view) {
                        Intent intent =new Intent( packageContext: HomeActivity.this,ProductDetailsActivity.class);
                        intent.putExtra( name: "pid",model.getPid());
                        startActivity(intent);
                    }
                });
            }

            @NonNull
            @Override
            public ProductViewHolder onCreateViewHolder(@NonNull ViewGroup parent, int viewType) {
                View view = LayoutInflater.from(parent.getContext()).inflate(R.layout.product_items_layout, parent,  attachToRoo
                ProductViewHolder holder = new ProductViewHolder(view);
                return holder;
            }
        };
```

Figure 4.19 Home Activity (retrieve the product detail on the users home page)



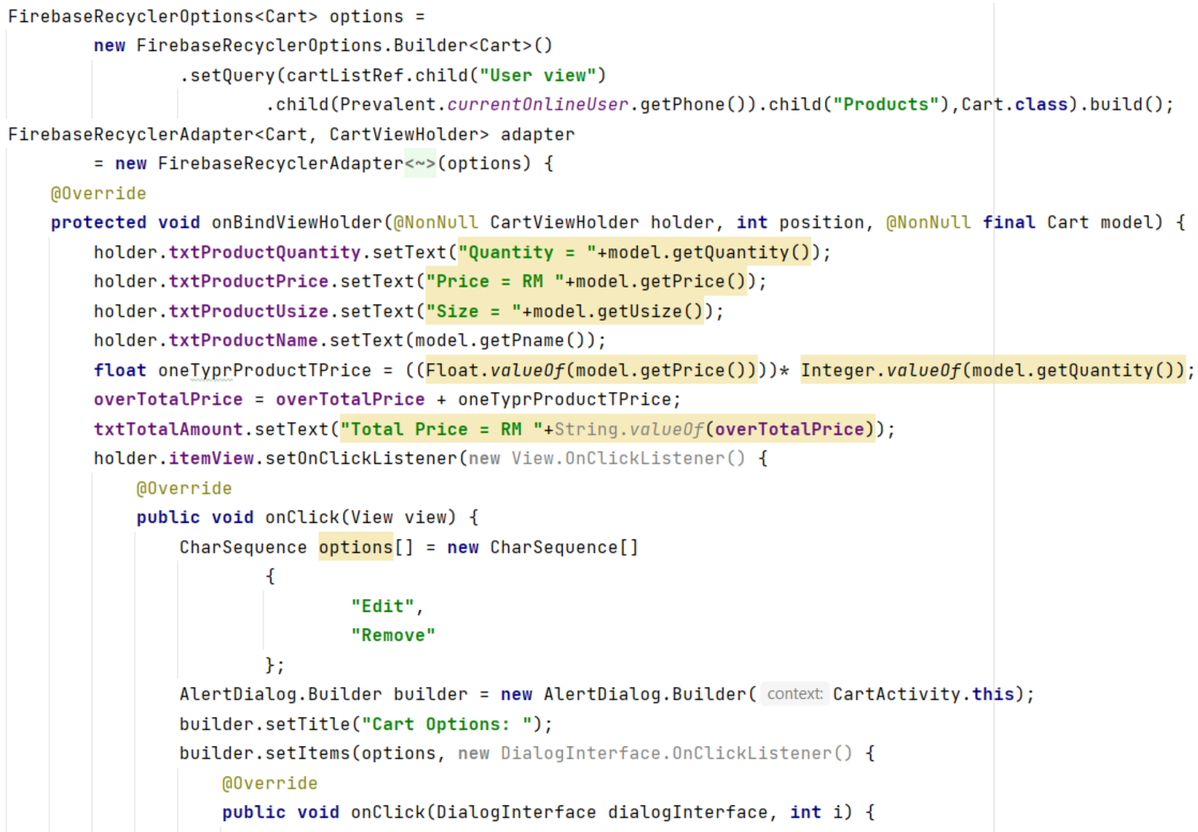
```
public boolean onNavigationItemSelected(MenuItem item) {
    // Handle navigation view item clicks here.
    int id = item.getItemId();

    if (id == R.id.nav_cart) {
        Intent intent = new Intent( packageContext: HomeActivity.this,CartActivity.class);
        startActivity(intent);
    } else if (id == R.id.nav_search) {
        Intent intent = new Intent( packageContext: HomeActivity.this,SearchProductsActivity.class);
        startActivity(intent);

    } else if (id == R.id.nav_categories) {
        Intent intent = new Intent( packageContext: HomeActivity.this, CategoryActivity.class);
        startActivity(intent);

    } else if (id == R.id.nav_settings) {
        Intent intent = new Intent( packageContext: HomeActivity.this,SettinsActivity.class);
        startActivity(intent);

    } else if (id == R.id.nav_logout) {
        Paper.book().destroy();
        Intent intent = new Intent( packageContext: HomeActivity.this,MainActivity.class);
        intent.addFlags(Intent.FLAG_ACTIVITY_NEW_TASK |Intent.FLAG_ACTIVITY_CLEAR_TASK );
        startActivity(intent);
        finish();

    }
```

Figure 4.20 Home Activity (left side menu)



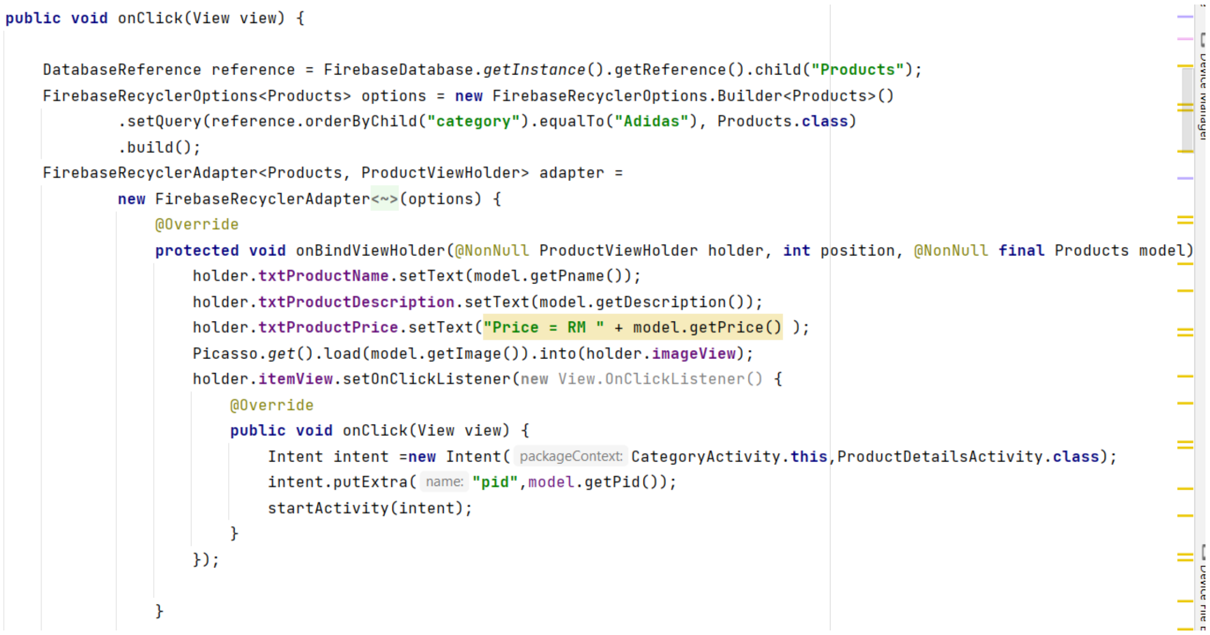
```
private void getProductDetails(String productID) {
    DatabaseReference productsRef = FirebaseDatabase.getInstance().getReference().child("Products");
    productsRef.child(productID).addValueEventListener(new ValueEventListener() {
        @Override
        public void onDataChange(DataSnapshot dataSnapshot) {
            if (dataSnapshot.exists()){
                Products products=dataSnapshot.getValue(Products.class);
                productName.setText(products.getPname());
                productPrice.setText(products.getPrice());
                productDescription.setText(products.getDescription());
                productSize.setText("Available Size (UK) : "+products.getSize());

                Picasso.get().load(products.getImage()).into(productImage);

            }
        }

        @Override
        public void onCancelled(DatabaseError databaseError) {

        }
    });
}
```

Figure 4.21 Product Detail Activity



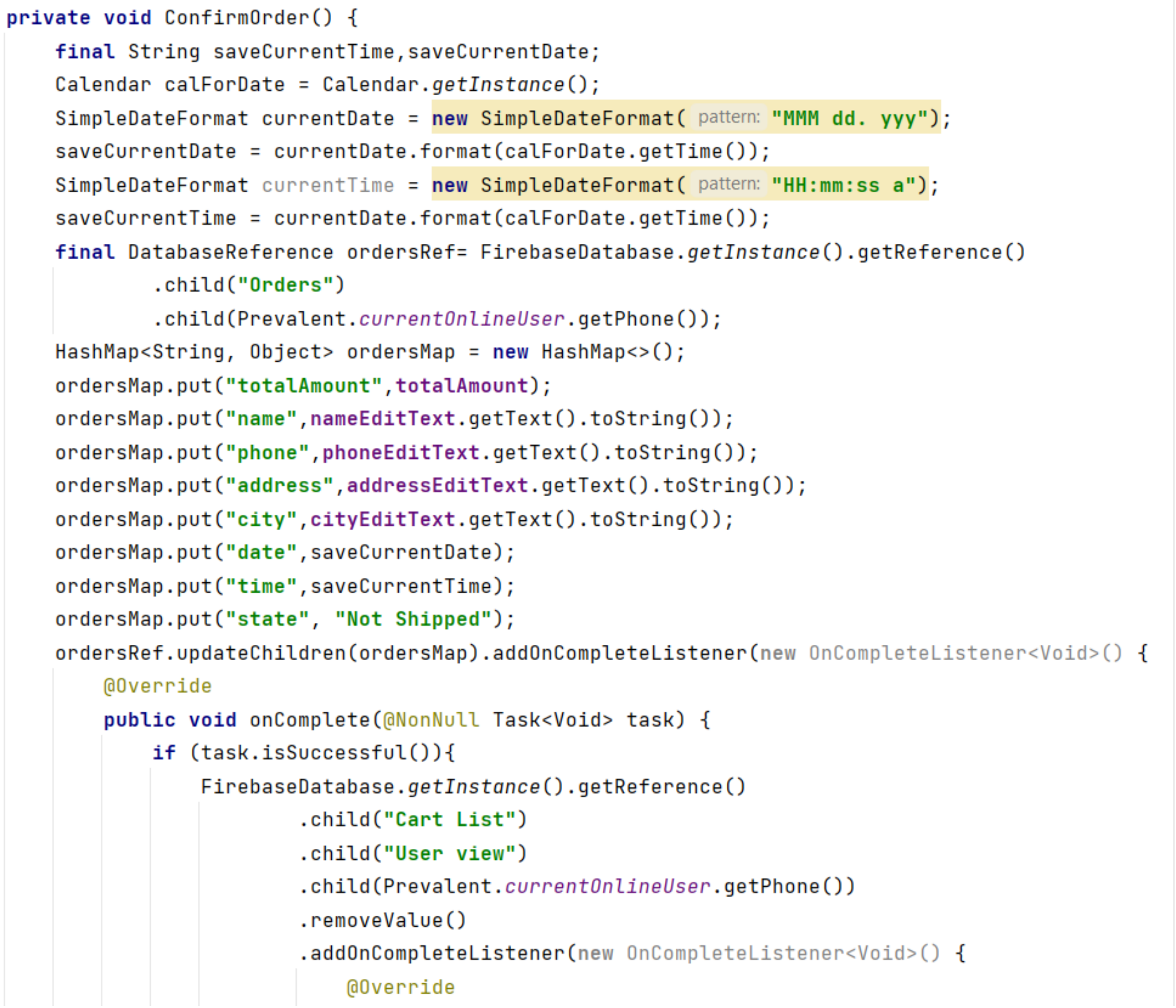
```
FirebaseRecyclerOptions<Cart> options =
        new FirebaseRecyclerOptions.Builder<Cart>()
                .setQuery(cartListRef.child("User view")
                        .child(Prevalent.currentOnlineUser.getPhone()).child("Products"),Cart.class).build();
FirebaseRecyclerAdapter<Cart, CartViewHolder> adapter
        = new FirebaseRecyclerAdapter<~>(options) {
    @Override
    protected void onBindViewHolder(@NonNull CartViewHolder holder, int position, @NonNull final Cart model) {
        holder.txtProductQuantity.setText("Quantity = "+model.getQuantity());
        holder.txtProductPrice.setText("Price = RM "+model.getPrice());
        holder.txtProductUsize.setText("Size = "+model.getUsize());
        holder.txtProductName.setText(model.getPname());
        float oneTyprProductTPrice = ((Float.valueOf(model.getPrice())))* Integer.valueOf(model.getQuantity());
        overTotalPrice = overTotalPrice + oneTyprProductTPrice;
        txtTotalAmount.setText("Total Price = RM "+String.valueOf(overTotalPrice));
        holder.itemView.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {
                CharSequence options[] = new CharSequence[]
                        {
                                "Edit",
                                "Remove"
                        };
                AlertDialog.Builder builder = new AlertDialog.Builder( context: CartActivity.this);
                builder.setTitle("Cart Options: ");
                builder.setItems(options, new DialogInterface.OnClickListener() {
                    @Override
                    public void onClick(DialogInterface dialogInterface, int i) {
```

Figure 4.22 Cart Activity



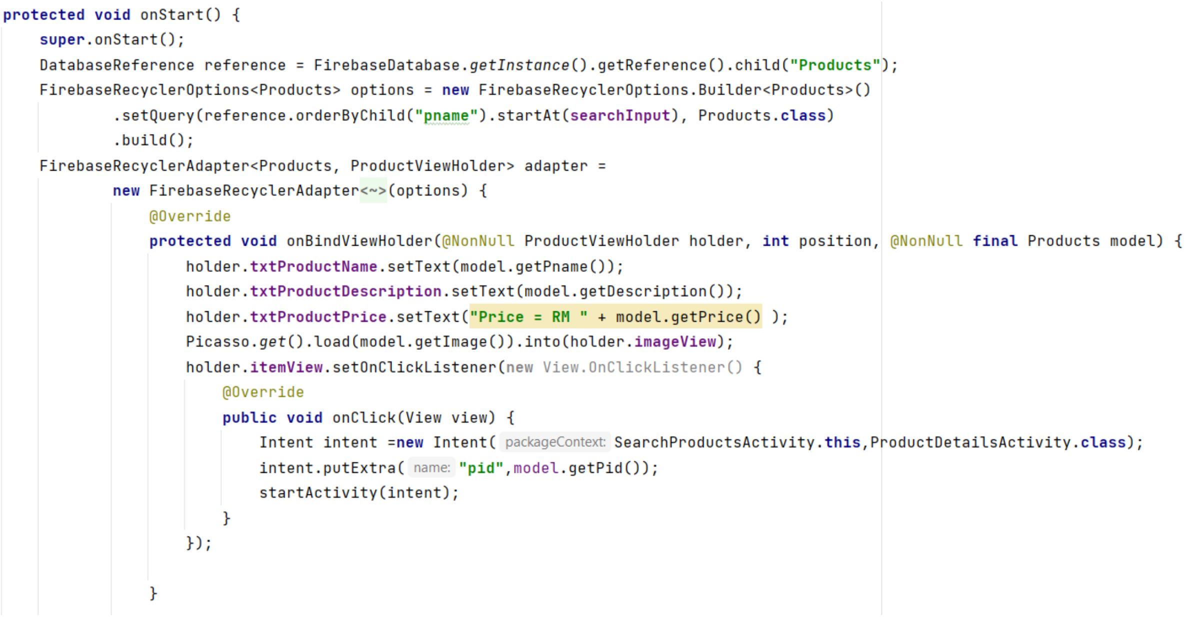
```
public void onClick(View view) {

    DatabaseReference reference = FirebaseDatabase.getInstance().getReference().child("Products");
    FirebaseRecyclerOptions<Products> options = new FirebaseRecyclerOptions.Builder<Products>()
            .setQuery(reference.orderByChild("category").equalTo("Adidas"), Products.class)
            .build();
    FirebaseRecyclerAdapter<Products, ProductViewHolder> adapter =
            new FirebaseRecyclerAdapter<~>(options) {
                @Override
                protected void onBindViewHolder(@NonNull ProductViewHolder holder, int position, @NonNull final Products model)
                    holder.txtProductName.setText(model.getPname());
                    holder.txtProductDescription.setText(model.getDescription());
                    holder.txtProductPrice.setText("Price = RM " + model.getPrice() );
                    Picasso.get().load(model.getImage()).into(holder.imageView);
                    holder.itemView.setOnClickListener(new View.OnClickListener() {
                        @Override
                        public void onClick(View view) {
                            Intent intent =new Intent( packageContext: CategoryActivity.this,ProductDetailsActivity.class);
                            intent.putExtra( name: "pid",model.getPid());
                            startActivity(intent);
                        }
                    });

                }
```

Figure 4.23 Category Activity (sort product by category)



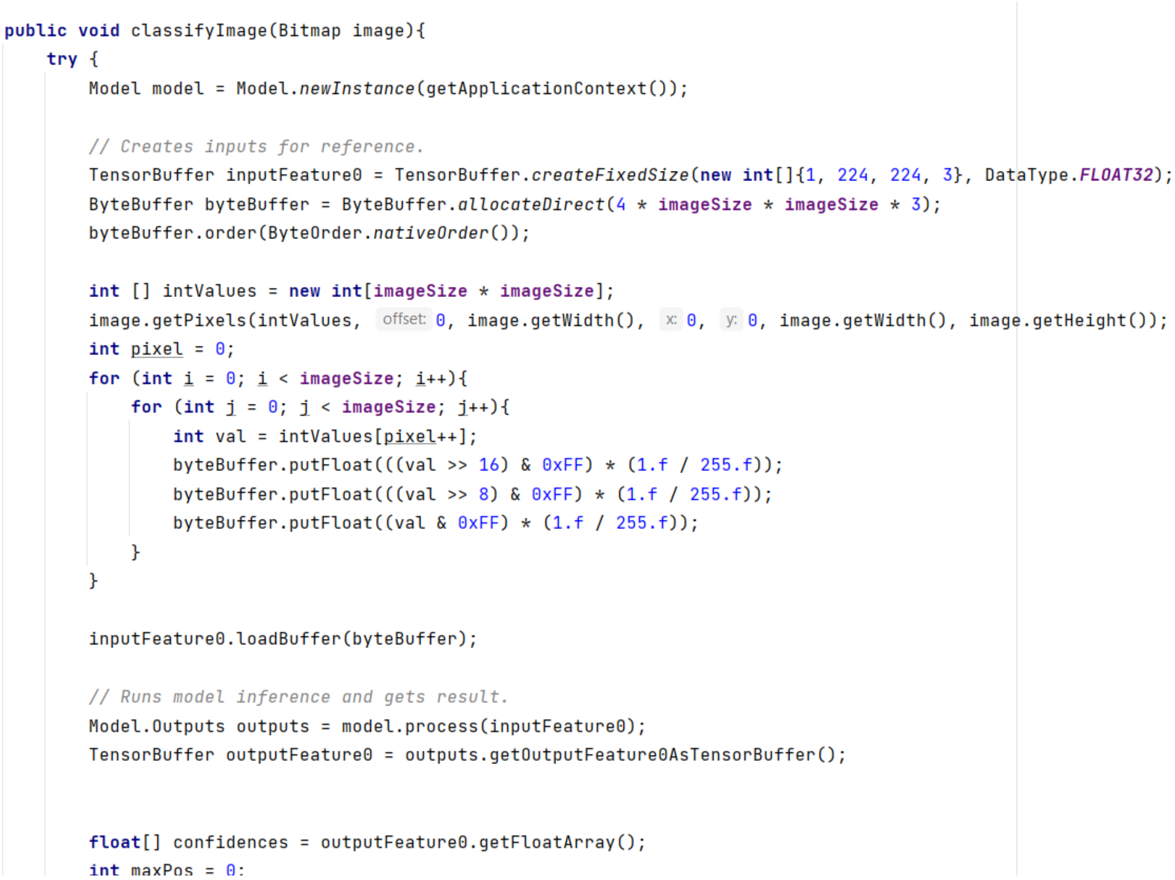
```
private void ConfirmOrder() {
    final String saveCurrentTime,saveCurrentDate;
    Calendar calForDate = Calendar.getInstance();
    SimpleDateFormat currentDate = new SimpleDateFormat( pattern: "MMM dd. yyy");
    saveCurrentDate = currentDate.format(calForDate.getTime());
    SimpleDateFormat currentTime = new SimpleDateFormat( pattern: "HH:mm:ss a");
    saveCurrentTime = currentDate.format(calForDate.getTime());
    final DatabaseReference ordersRef= FirebaseDatabase.getInstance().getReference()
            .child("Orders")
            .child(Prevalent.currentOnlineUser.getPhone());
    HashMap<String, Object> ordersMap = new HashMap<>();
    ordersMap.put("totalAmount",totalAmount);
    ordersMap.put("name",nameEditText.getText().toString());
    ordersMap.put("phone",phoneEditText.getText().toString());
    ordersMap.put("address",addressEditText.getText().toString());
    ordersMap.put("city",cityEditText.getText().toString());
    ordersMap.put("date",saveCurrentDate);
    ordersMap.put("time",saveCurrentTime);
    ordersMap.put("state", "Not Shipped");
    ordersRef.updateChildren(ordersMap).addOnCompleteListener(new OnCompleteListener<Void>() {
        @Override
        public void onComplete(@NonNull Task<Void> task) {
            if (task.isSuccessful()){
                FirebaseDatabase.getInstance().getReference()
                        .child("Cart List")
                        .child("User view")
                        .child(Prevalent.currentOnlineUser.getPhone())
                        .removeValue()
                        .addOnCompleteListener(new OnCompleteListener<Void>() {
                            @Override
```

Figure 4.24 Confirm Final Order Activity



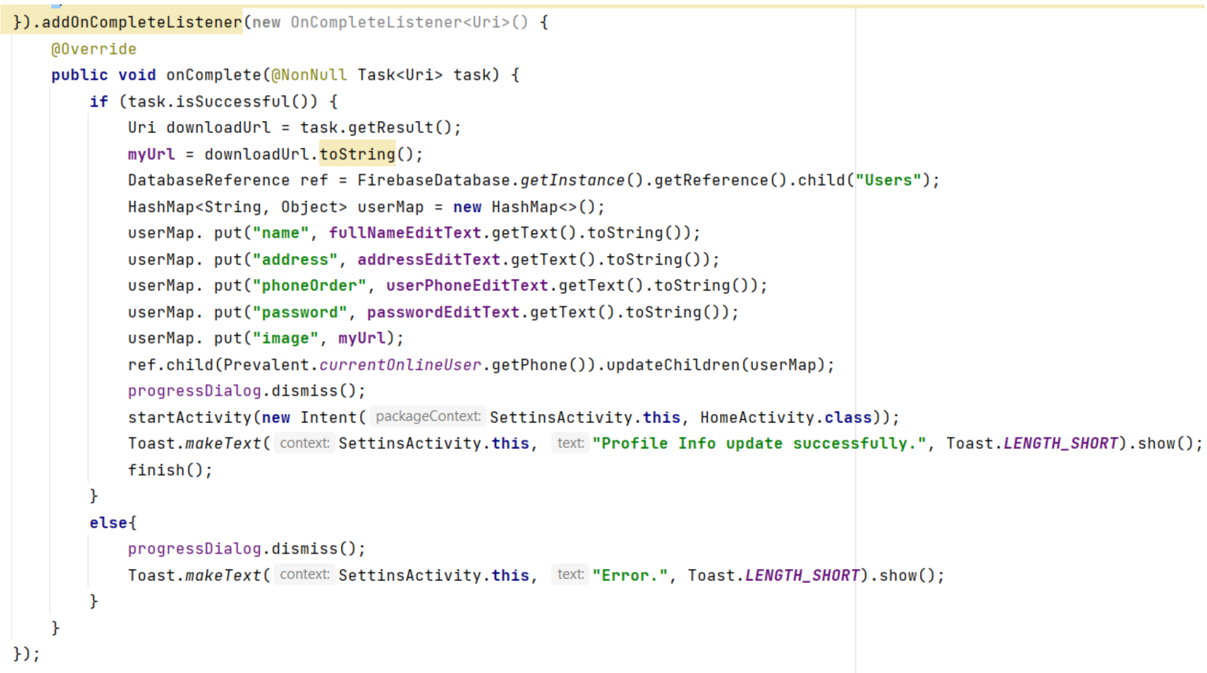
```
protected void onStart() {
    super.onStart();
    DatabaseReference reference = FirebaseDatabase.getInstance().getReference().child("Products");
    FirebaseRecyclerOptions<Products> options = new FirebaseRecyclerOptions.Builder<Products>()
            .setQuery(reference.orderByChild("pname").startAt(searchInput), Products.class)
            .build();
    FirebaseRecyclerAdapter<Products, ProductViewHolder> adapter =
            new FirebaseRecyclerAdapter<~>(options) {
                @Override
                protected void onBindViewHolder(@NonNull ProductViewHolder holder, int position, @NonNull final Products model) {
                    holder.txtProductName.setText(model.getPname());
                    holder.txtProductDescription.setText(model.getDescription());
                    holder.txtProductPrice.setText("Price = RM " + model.getPrice() );
                    Picasso.get().load(model.getImage()).into(holder.imageView);
                    holder.itemView.setOnClickListener(new View.OnClickListener() {
                        @Override
                        public void onClick(View view) {
                            Intent intent =new Intent( packageContext: SearchProductsActivity.this,ProductDetailsActivity.class);
                            intent.putExtra( name: "pid",model.getPid());
                            startActivity(intent);
                        }
                    });

                }
```

Figure 4.25 Search Product Activity



```
public void classifyImage(Bitmap image){
    try {
        Model model = Model.newInstance(getApplicationContext());

        // Creates inputs for reference.
        TensorBuffer inputFeature0 = TensorBuffer.createFixedSize(new int[]{1, 224, 224, 3}, DataType.FLOAT32);
        ByteBuffer byteBuffer = ByteBuffer.allocateDirect(4 * imageSize * imageSize * 3);
        byteBuffer.order(ByteOrder.nativeOrder());

        int [] intValues = new int[imageSize * imageSize];
        image.getPixels(intValues,  offset: 0, image.getWidth(),  x: 0,  y: 0, image.getWidth(), image.getHeight());
        int pixel = 0;
        for (int i = 0; i < imageSize; i++){
            for (int j = 0; j < imageSize; j++){
                int val = intValues[pixel++];
                byteBuffer.putFloat(((val >> 16) & 0xFF) * (1.f / 255.f));
                byteBuffer.putFloat(((val >> 8) & 0xFF) * (1.f / 255.f));
                byteBuffer.putFloat((val & 0xFF) * (1.f / 255.f));
            }
        }

        inputFeature0.loadBuffer(byteBuffer);

        // Runs model inference and gets result.
        Model.Outputs outputs = model.process(inputFeature0);
        TensorBuffer outputFeature0 = outputs.getOutputFeature0AsTensorBuffer();


        float[] confidences = outputFeature0.getFloatArray();
        int maxPos = 0;
```

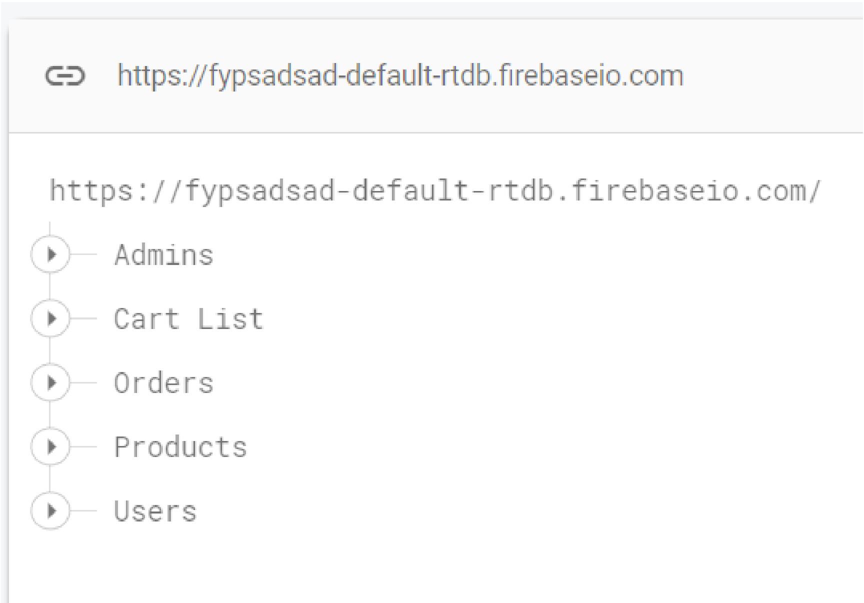
Figure 4.26 Visual Search Activity



```
}).addOnCompleteListener(new OnCompleteListener<Uri>() {
    @Override
    public void onComplete(@NonNull Task<Uri> task) {
        if (task.isSuccessful()) {
            Uri downloadUrl = task.getResult();
            myUrl = downloadUrl.toString();
            DatabaseReference ref = FirebaseDatabase.getInstance().getReference().child("Users");
            HashMap<String, Object> userMap = new HashMap<>();
            userMap. put("name", fullNameEditText.getText().toString());
            userMap. put("address", addressEditText.getText().toString());
            userMap. put("phoneOrder", userPhoneEditText.getText().toString());
            userMap. put("password", passwordEditText.getText().toString());
            userMap. put("image", myUrl);
            ref.child(Prevalent.currentOnlineUser.getPhone()).updateChildren(userMap);
            progressDialog.dismiss();
            startActivity(new Intent( packageContext: SettinsActivity.this, HomeActivity.class));
            Toast.makeText( context: SettinsActivity.this,  text: "Profile Info update successfully.", Toast.LENGTH_SHORT).show();
            finish();
        }
        else{
            progressDialog.dismiss();
            Toast.makeText( context: SettinsActivity.this,  text: "Error.", Toast.LENGTH_SHORT).show();
        }
    }
});
```

Figure 4.27 Settinng Activity (update user profile activity)

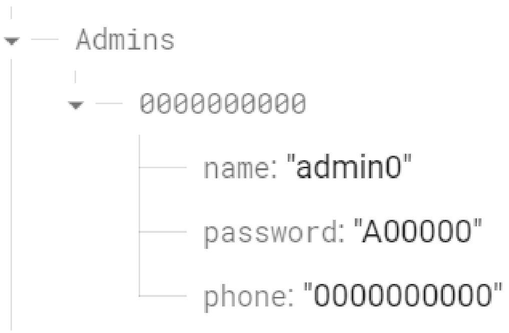
Firebase



https://fypsadsad-default-rtdb.firebaseio.com

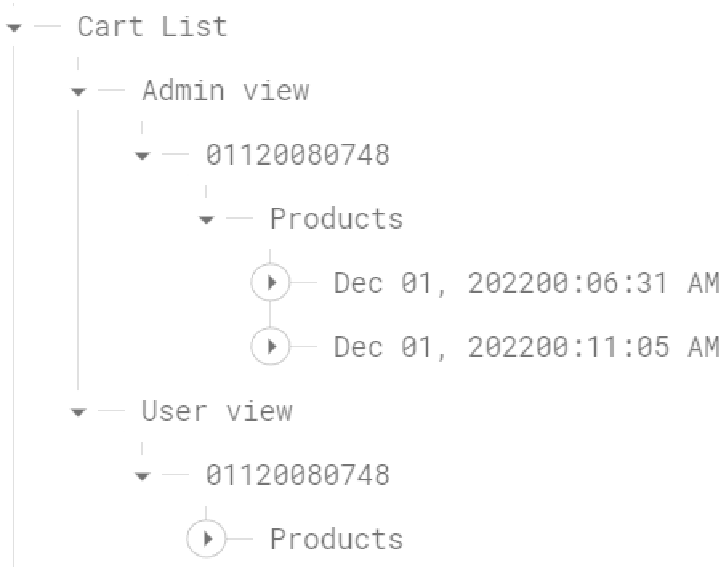
```
https://fypsadsad-default-rtdb.firebaseio.com/
├─ Admins
├─ Cart List
├─ Orders
├─ Products
└─ Users
```

Figure 4.28 Realtime Firebase



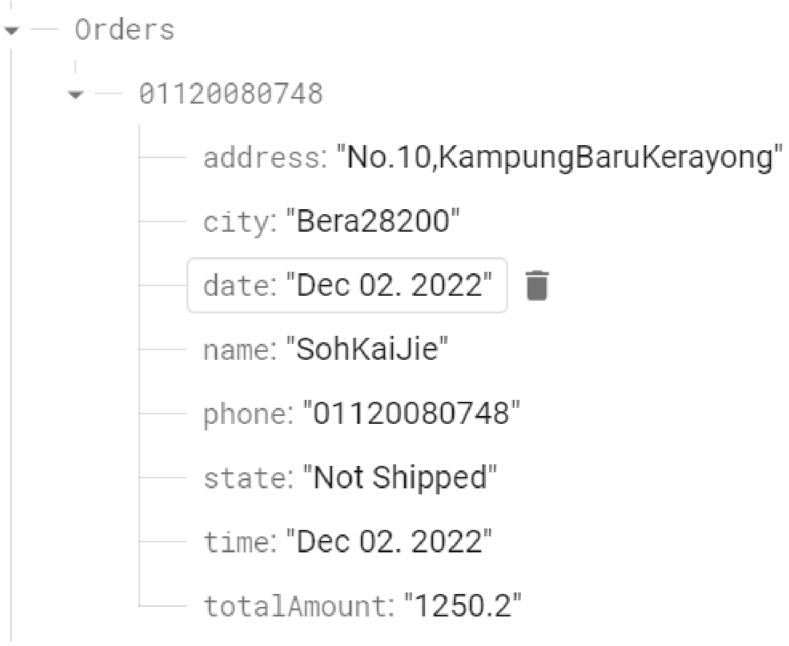
```
Admins
  0000000000
    name: "admin0"
    password: "A00000"
    phone: "0000000000"
```

Figure 4.29 Realtime (Admins)



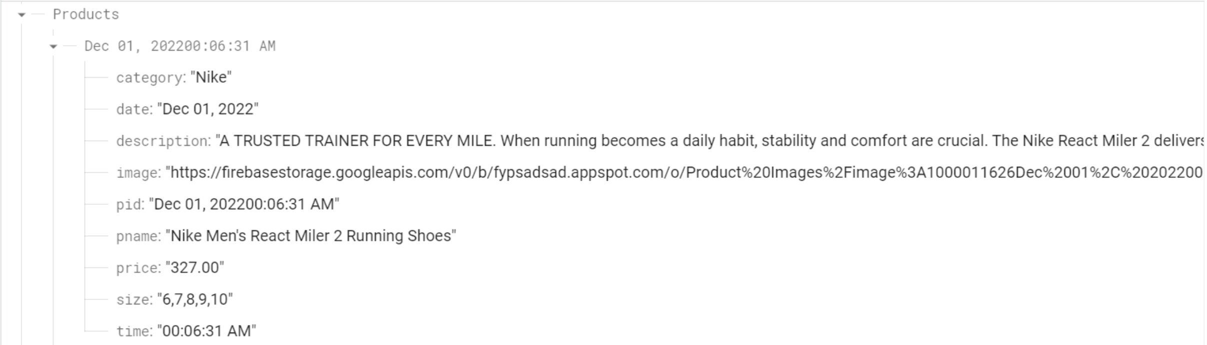
```
Cart List
  Admin view
    01120080748
      Products
        Dec 01, 202200:06:31 AM
        Dec 01, 202200:11:05 AM
  User view
    01120080748
      Products
```

Figure 4.30 Realtime (Cart List)



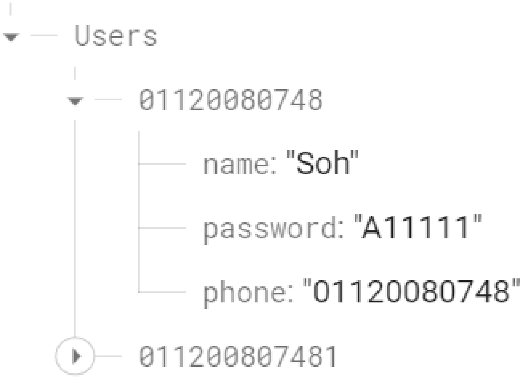
```
Orders
  01120080748
    address: "No.10,KampungBaruKerayong"
    city: "Bera28200"
    date: "Dec 02. 2022"
    name: "SohKaiJie"
    phone: "01120080748"
    state: "Not Shipped"
    time: "Dec 02. 2022"
    totalAmount: "1250.2"
```

Figure 4.31 Realtime (Orders)



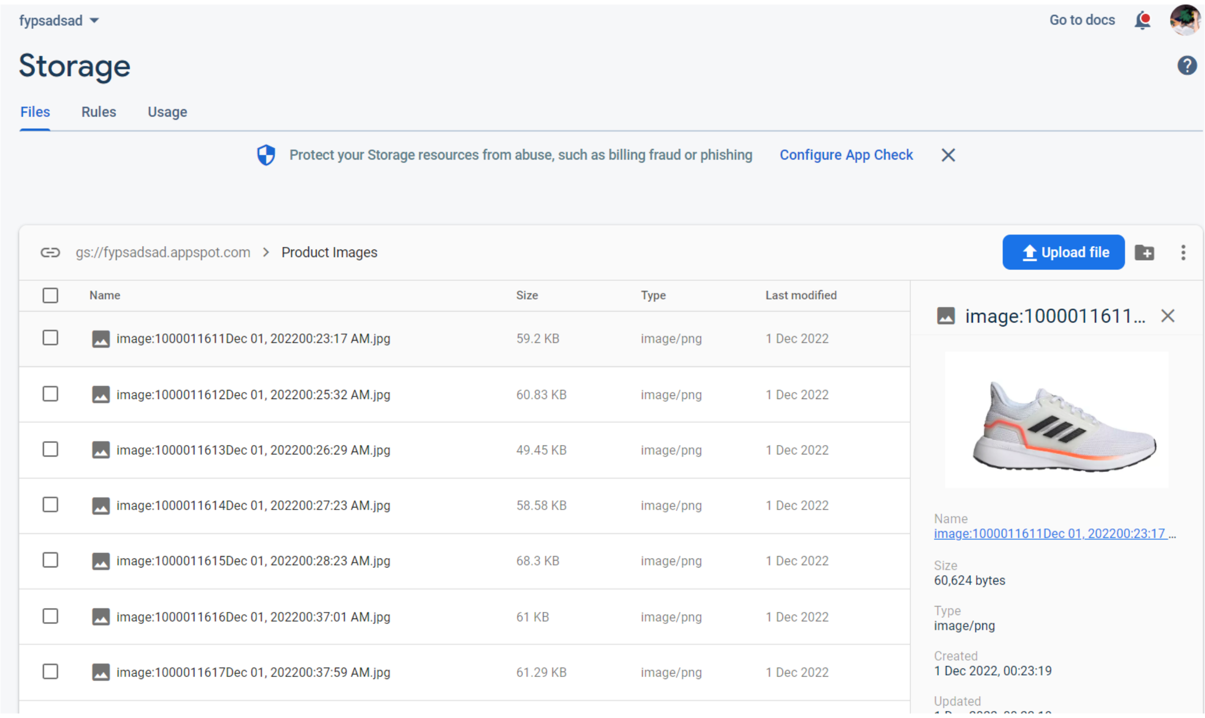
```
Products
  Dec 01, 202200:06:31 AM
    category: "Nike"
    date: "Dec 01, 2022"
    description: "A TRUSTED TRAINER FOR EVERY MILE. When running becomes a daily habit, stability and comfort are crucial. The Nike React Miler 2 delivers
    image: "https://firebasestorage.googleapis.com/v0/b/fypsadsad.appspot.com/o/Product%20Images%2Fimage%3A1000011626Dec%2001%2C%20202200
    pid: "Dec 01, 202200:06:31 AM"
    pname: "Nike Men's React Miler 2 Running Shoes"
    price: "327.00"
    size: "6,7,8,9,10"
    time: "00:06:31 AM"
```

Figure 4.32 Realtime (Products)



```
Users
  01120080748
    name: "Soh"
    password: "A11111"
    phone: "01120080748"
  011200807481
```

Figure 4.33 Realtime (Users)



fypsadsad
Go to docs
Storage
Files
Rules
Usage
Protect your Storage resources from abuse, such as billing fraud or phishing
Configure App Check
gs://fypsadsad.appspot.com > Product Images
Upload file

Name	Size	Type	Last modified
image:1000011611Dec 01, 202200:23:17 AM.jpg	59.2 KB	image/png	1 Dec 2022
image:1000011612Dec 01, 202200:25:32 AM.jpg	60.83 KB	image/png	1 Dec 2022
image:1000011613Dec 01, 202200:26:29 AM.jpg	49.45 KB	image/png	1 Dec 2022
image:1000011614Dec 01, 202200:27:23 AM.jpg	58.58 KB	image/png	1 Dec 2022
image:1000011615Dec 01, 202200:28:23 AM.jpg	68.3 KB	image/png	1 Dec 2022
image:1000011616Dec 01, 202200:37:01 AM.jpg	61 KB	image/png	1 Dec 2022
image:1000011617Dec 01, 202200:37:59 AM.jpg	61.29 KB	image/png	1 Dec 2022

image:1000011611...

Name
image:1000011611Dec 01, 202200:23:17 ...

Size
60,624 bytes

Type
image/png

Created
1 Dec 2022, 00:23:19

Updated

Figure 4.34 Firebase Storage (product image database)

4.3 System Output and Results

4.3.1 Application User Interface

A system or an application need the user interface to operate, which seems very important to it. This is because the user interface act as the interaction and communication between human and computer. A good user interface can make easily the interaction between the user and the computer that ensure the process runs smoothly. For this section, the user interface of the proposed mobile application will be shown below.

Admins

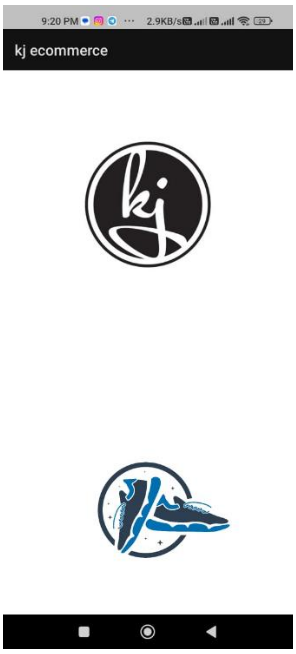


Figure 4.35 Splash Screen Activity

Figure 4.35 show the splash screen page of the application that comes with the logo and the shoe image that will take 2 seconds and automatically switch to the Login and Register page.

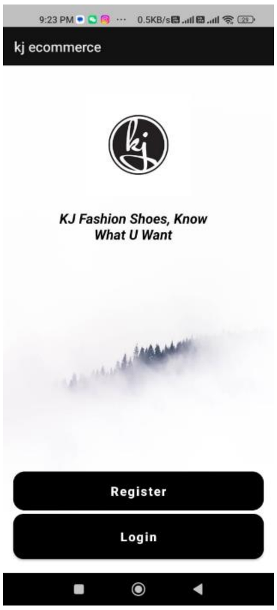


Figure 4.36 Login and Register Activity

Figure 4.36 shows the Login and Register page which able let the user choose and click whether to register an account or login using their account.

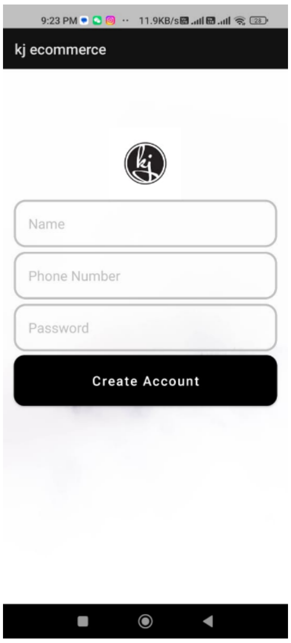


Figure 4.37 Register Activity

Figure 4.37 show the Register page which able let user register an account for the application by using their name, phone number, and password.

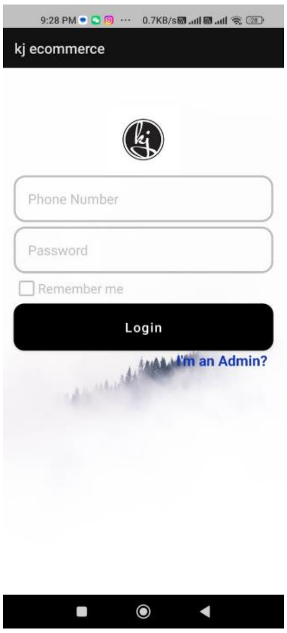


Figure 4.38 Login Activity (Users)

Figure 4.38 shows the Login page which able the user to log in to the application using the phone number and password. The admin can choose to click "I'm an Admin" to Switch to the admin login page which is also similar to the user login interface as shown in Figure 4.39. if the user click Remember me, after the user reenters the application, it will auto-login to the system.

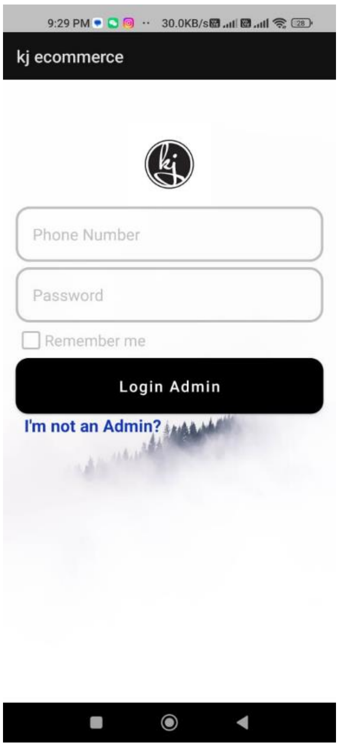


Figure 4.39 Login Activity (Admins)

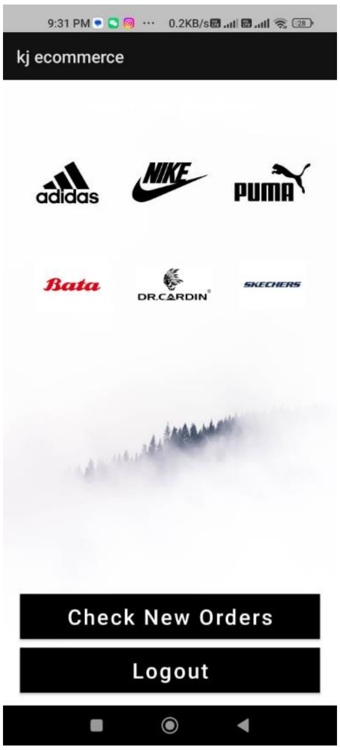


Figure 4.40 Admin Category Activity

Figure 4.40 shows the Admin home page which able the admin to add their product by clicking the brand of the product they want to add. Below is the check new order button which can switch to the check new order page and the Logout button which logout the admin page.

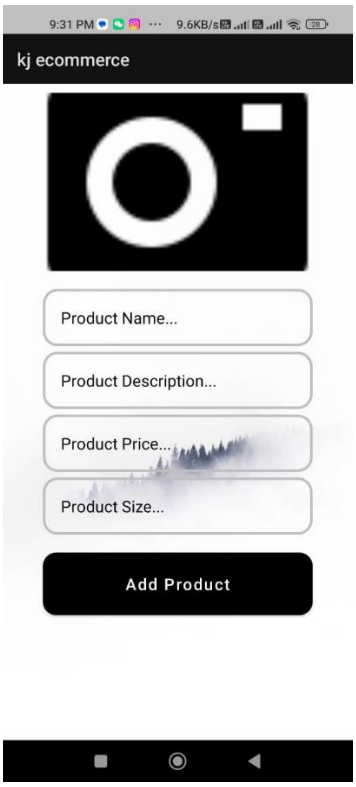
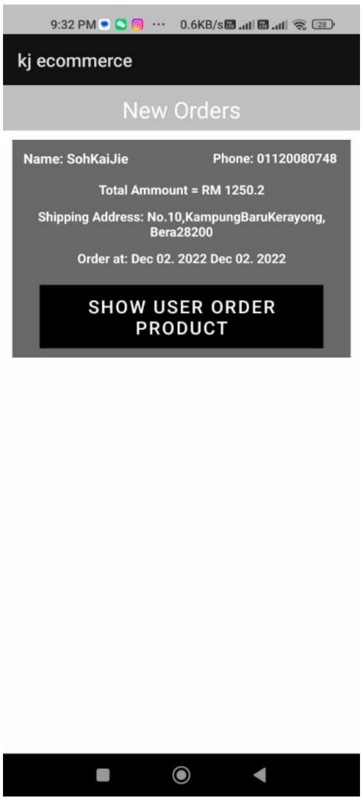


Figure 4.41 Admin Add New Product Activity

Figure 4.41 shows the add new product page after the user clicks the brand on the home page. The admin can upload the device image, add the product name, add the product description, and add the product price and size. Then, click add product button to save the product to Firebase.



Name: SohKaiJie Phone: 01120080748

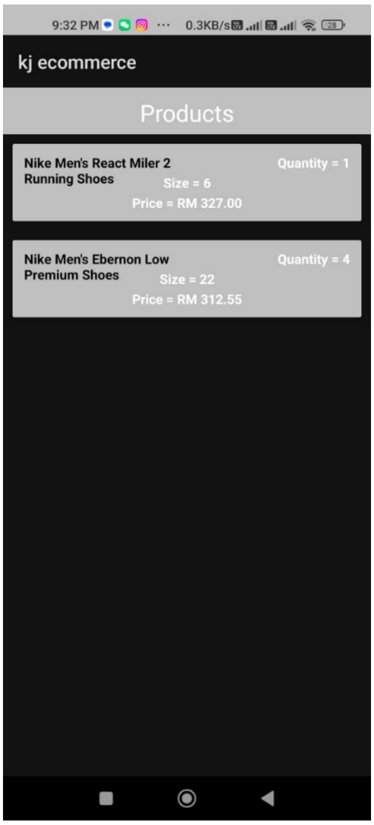
Total Ammount = RM 1250.2

Shipping Address: No.10,KampungBaruKerayong, Bera28200

Order at: Dec 02. 2022 Dec 02. 2022

Figure 4.42 Admin New Order Activity

Figure 4.42 shows the check order page which the admin can see the order created by users and choose whether to ship the product or not.



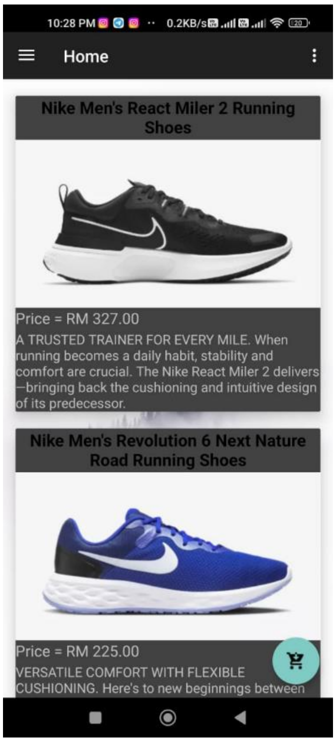
Nike Men's React Miler 2 Running Shoes Quantity = 1 Size = 6 Price = RM 327.00

Nike Men's Ebernon Low Premium Shoes Quantity = 4 Size = 22 Price = RM 312.55

Figure 4.43 Admin User Product Activity

Figure 4.43 shows the admin user product page which able the admin to check the product in more detail before shipping the order.

Users



Nike Men's React Miler 2 Running Shoes

Price = RM 327.00

A TRUSTED TRAINER FOR EVERY MILE. When running becomes a daily habit, stability and comfort are crucial. The Nike React Miler 2 delivers—bringing back the cushioning and intuitive design of its predecessor.

Nike Men's Revolution 6 Next Nature Road Running Shoes

Price = RM 225.00

VERSATILE COMFORT WITH FLEXIBLE CUSHIONING. Here's to new beginnings between

Figure 4.44 Home Activity

Figure 4.44 shows the home page of the users which includes name, image, price, and description of the products. The user can click the product to see the product's detail.

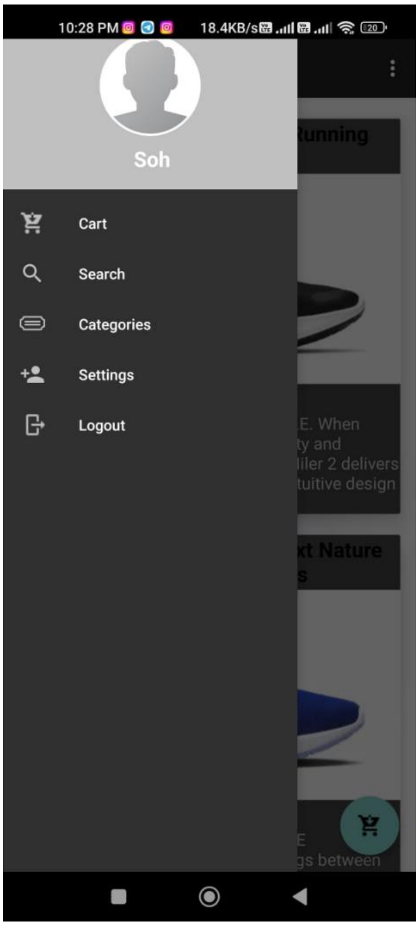
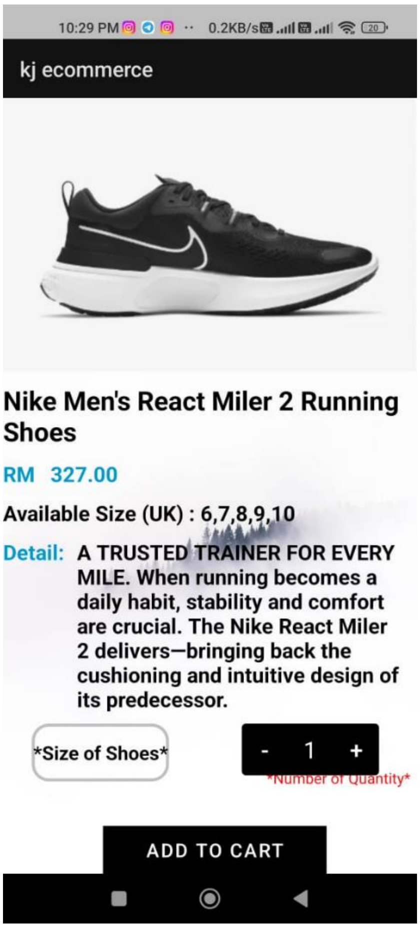


Figure 4.45 menu home page

Figure 4.45 shows the menu of the home page, the user can switch to different pages more quickly by clicking the list of menus their want.



Nike Men's React Miler 2 Running Shoes

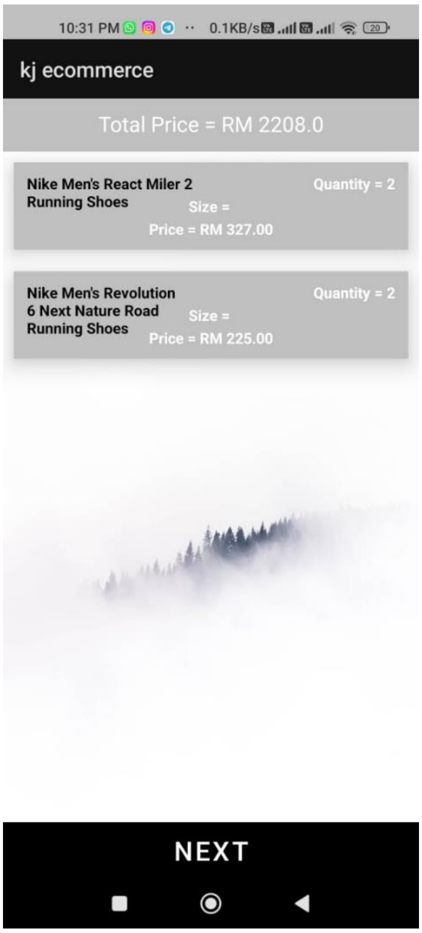
RM 327.00

Available Size (UK) : 6,7,8,9,10

Detail: A TRUSTED TRAINER FOR EVERY MILE. When running becomes a daily habit, stability and comfort are crucial. The Nike React Miler 2 delivers—bringing back the cushioning and intuitive design of its predecessor.

Figure 4.46 Product Detail Activity

After the user clicks the image from the home page, the application will display the product detail as shown in Figure 4.46 which is the product detail page. On this page, users can type what size of shoe product they want and also the quantity. After that, the user can go to the cart page by clicking ADD TO CART button.



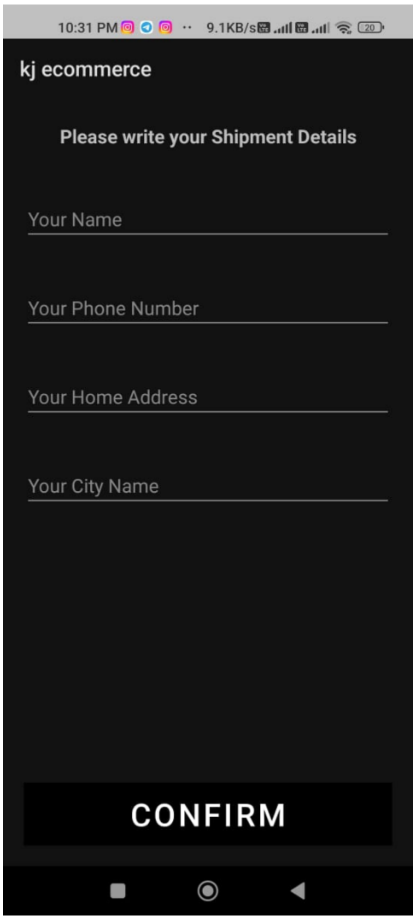
Total Price = RM 2208.0

Nike Men's React Miler 2 Running Shoes
Quantity = 2
Size =
Price = RM 327.00

Nike Men's Revolution 6 Next Nature Road Running Shoes
Quantity = 2
Size =
Price = RM 225.00

Figure 4.47 Cart Activity

Figure 4.47 shows the cart page which displays the orders list and the user can check or edit the product inside the cart list. After that, the user can click the Next button to proceed with the order confirmation page.

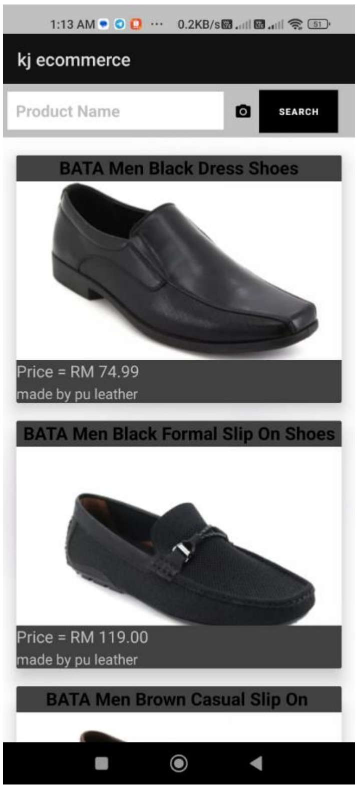


kj ecommerce

Please write your Shipment Details

Figure 4.48 Order Confirm Activity

Figure 4.48 shows the order confirmation page which let the user type their shipment detail like name, phone number, address, and city. After that, the user clicks the confirm button to send the order to the admin.



BATA Men Black Dress Shoes

Price = RM 74.99

made by pu leather

BATA Men Black Formal Slip On Shoes

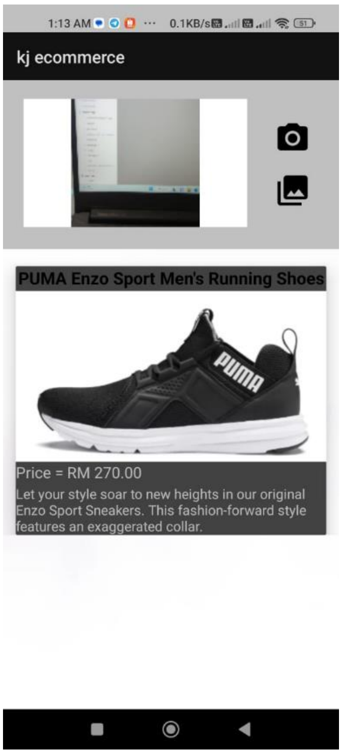
Price = RM 119.00

made by pu leather

BATA Men Brown Casual Slip On

Figure 4.49 Search Product Activity

Figure 4.49 shows the search page in which users can search for their preferred product by typing the product name. The user is able to click the camera icon to pass to Visual Search Activity to do visual search.



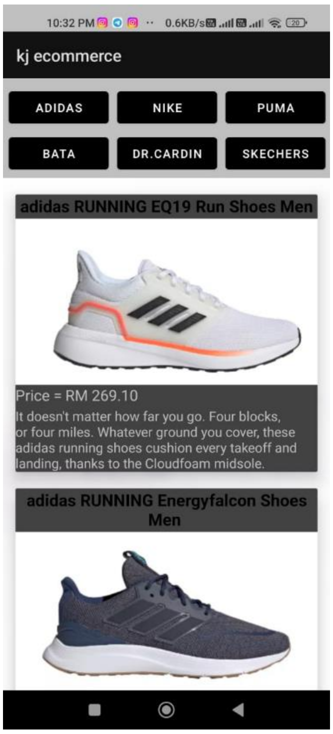
PUMA Enzo Sport Men's Running Shoes

Price = RM 270.00

Let your style soar to new heights in our original Enzo Sport Sneakers. This fashion-forward style features an exaggerated collar.

Figure 4.50 Visual Search Activity

Figure 4.50 shows the visual search page which the user can choose either real-time capture the image or upload the image from the gallery to predict and find the higher similarity product.



adidas RUNNING EQ19 Run Shoes Men

Price = RM 269.10

It doesn't matter how far you go. Four blocks, or four miles. Whatever ground you cover, these adidas running shoes cushion every takeoff and landing, thanks to the Cloudfoam midsole.

adidas RUNNING Energyfalcon Shoes Men

Figure 4.51 Category Activity

Figure 4.51 shows the category page which users can choose to display only the category product they choose.

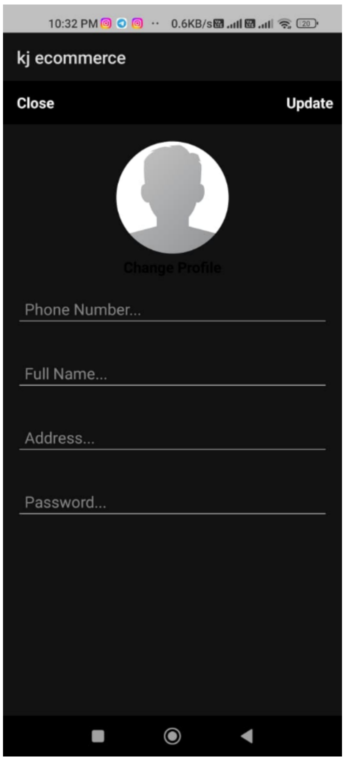


Figure 4.52 Settins Activity

Figure 4.52 shows the setting page in which users can change their phone number, name, address, and also password. The user also can upload the image from the gallery to set the profile picture.

4.4 Testing Report (UAT)

This section will represent and design the process of the KJ fashion shoes e-commerce mobile application User Acceptance Test (UAT). The approval of the system testing process indicates that the reviewers are competent and confident to participate in the test plan execution activity. Hence, the achieved result will be deemed fully tested and qualified for implementation. Appendix C shows the UAT for Admin Activity that conducts a test by Ms.Noraini, owner of Al-ikhsan Sports which is a Sportswear store located in No. G-07, Ground Floor, Jalan Tengku Arif Bendahara, 26600 Pekan. Meanwhile, Appendix D shows the UAT for User Activity that conducts a test by Mr.Azrul Nizam, staff of Al-ikhsan Sports. Each test case is designed and implemented based on the module or interface in the proposed application, and the function, buttons, text fields, display data, and other functions had been tested in more detail to ensure the application runs smoothly. Figure 4.43 shows Ms.Noraini doing the UAT test using the proposed application and Figure 4.44 shows me as the visitor, Mr.Azrul Nizam (Staff), and Ms.Nuraini(owner).

Figure 4.53 Ms.Noraini doing the UAT test

Figure 4.54 me as the visitor, Mr.Azrul Nizam (Staff), and Ms.Nuraini(owner)

CHAPTER 5

CONCLUSION

5.1 Introduction

The thesis report includes five chapters. Chapter 1 discusses the project ideas, problem statement, objective, and scope of the proposed application. Chapter 2 discusses the existing application of the same field which is fashion and machine learning. A comparison was also made between the proposal application with three existing applications. Chapter 3 discusses the methodology used for this project such as the preliminary diagram, general architecture, data design, prototype, and UAT. The flow chart and prototype will show the flow of the application that should be run. In this Chapter 5, the limitation and the future work of the application will be discussed to improve its function of the application.

5.2 Objective Revisited

There are three objectives for this project, as stated in Chapter 1. One of them is to identify the current limitation of the existing application KJ Fashion Shoes E-Commerce Mobile Based Application with the Implementation of Image Recognition System, to develop the visual search for the product shoes using a neural network, and evaluate the functionality of the e-commerce mobile-based application.

The first objective is achieved when the discussion about advantages and disadvantages is made for the existing application. The second objective is achieved when the image recognition system is implemented inside the existing application as the visual search. The last objective is also achieved when the functionality of the existing application is evaluated using UAT in Chapter 4.

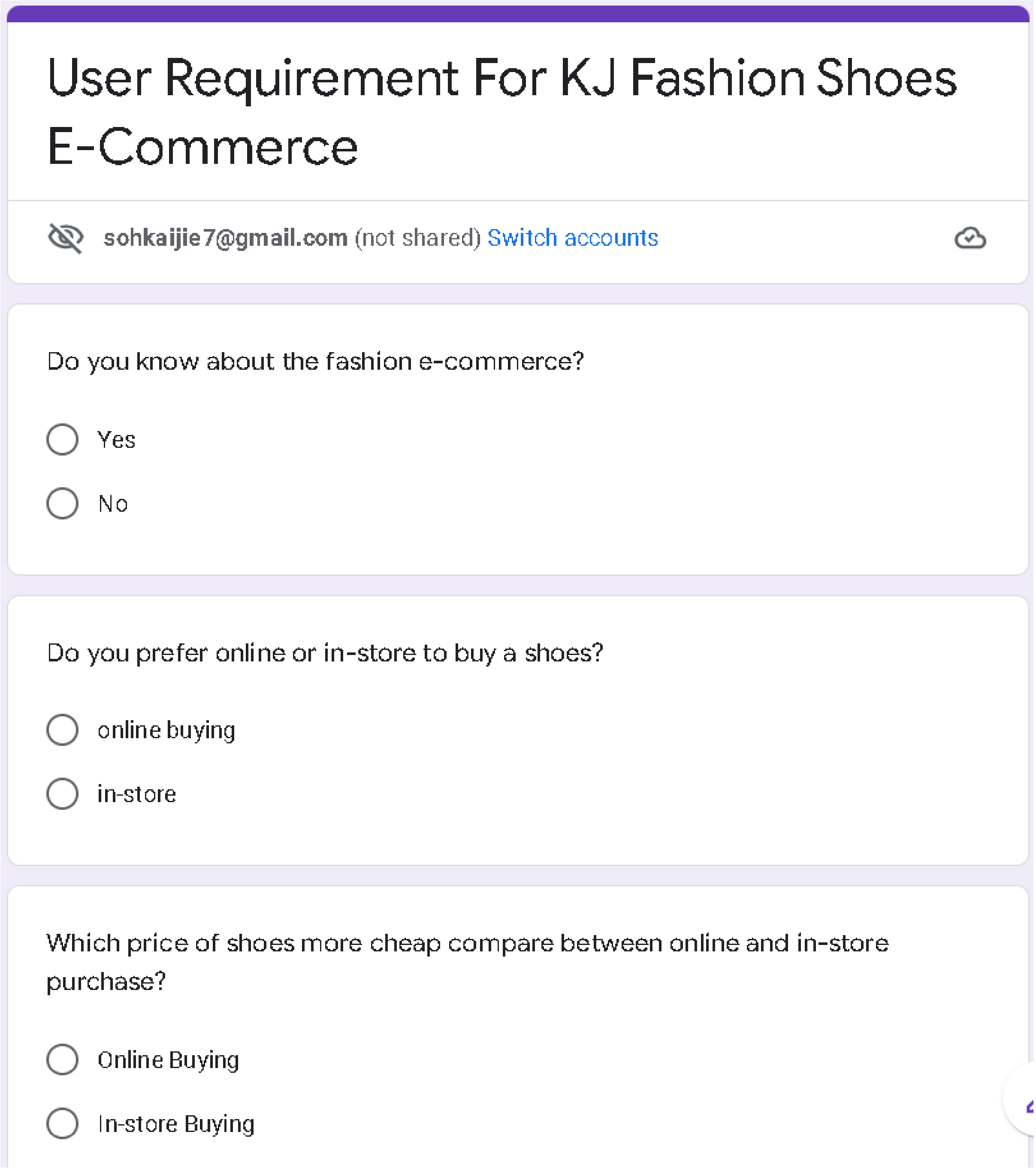
5.2.1 Limitations

The limitation of KJ Fashion Shoes E-Commerce Mobile Based Application with the Implementation of Image Recognition System is the application is only available for Android devices with at least Android 6.0 (Marshmallow) which is similar to Android API 23. Next, the product image of each shoe product is limited for every side every angle image is to be trained in the CNN which will lead to the accuracy of the visual search being limited for other input images.

5.2.2 Future Work

Future work will improve the current limitations stated above. The brand of the product shoes will be added as the requirement need and a recommendation system can be added to the application. As the shoe product brand increase, the admin can bring new products and sell them in this application to attract more customers to buy them and visit the application. The recommendation system is to recommend the product either based on the trending or the user purchase activity.

Appendix A



User Requirement For KJ Fashion Shoes E-Commerce

sohkaijie7@gmail.com (not shared) Switch accounts

Do you know about the fashion e-commerce?

○ Yes

○ No

Do you prefer online or in-store to buy a shoes?

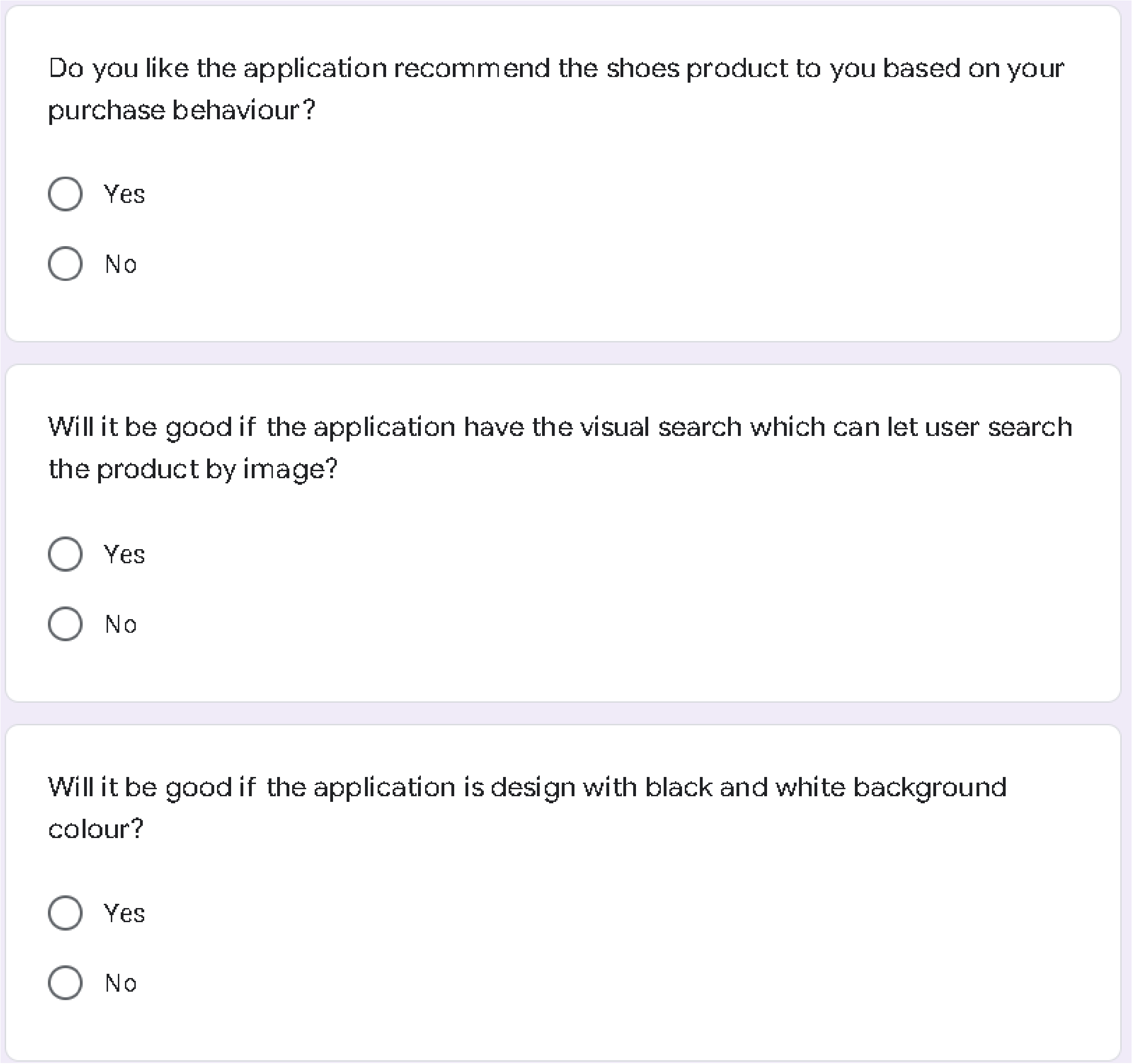
○ online buying

○ in-store

Which price of shoes more cheap compare between online and in-store purchase?

○ Online Buying

○ In-store Buying



Do you like the application recommend the shoes product to you based on your purchase behaviour?

○ Yes

○ No

Will it be good if the application have the visual search which can let user search the product by image?

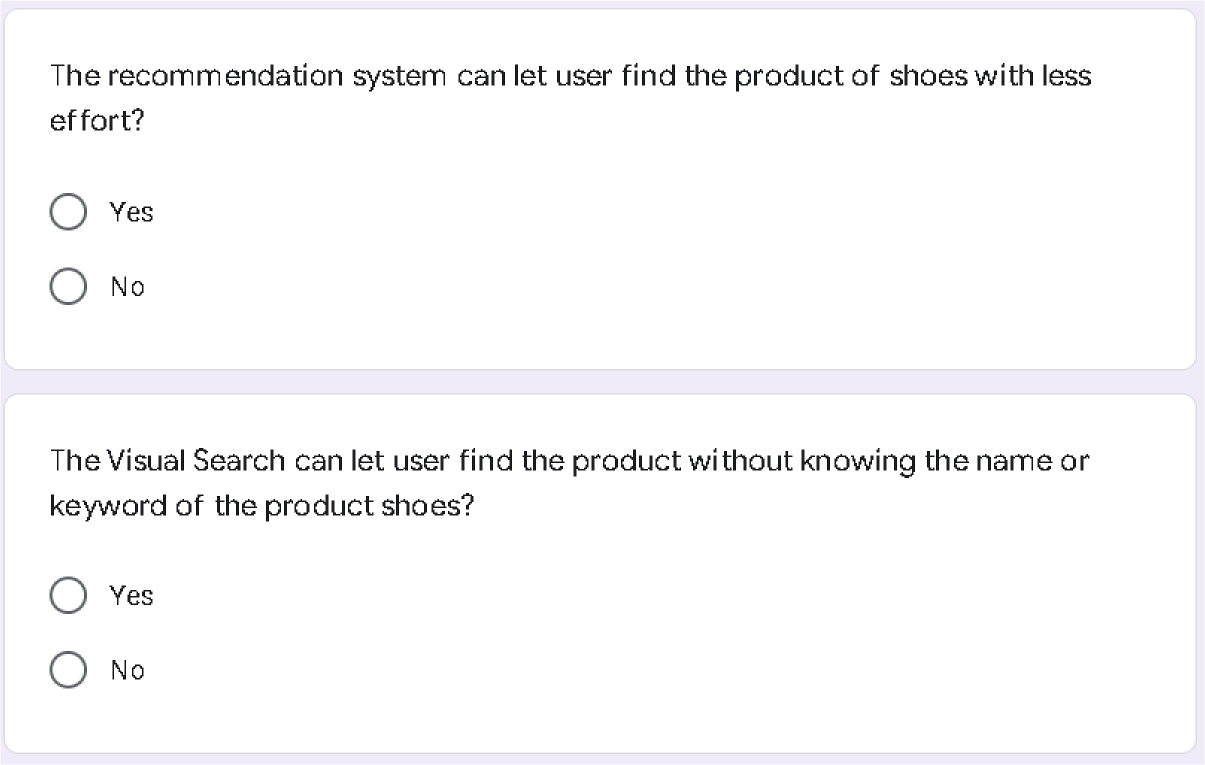
○ Yes

○ No

Will it be good if the application is design with black and white background colour?

○ Yes

○ No



The recommendation system can let user find the product of shoes with less effort?

○ Yes

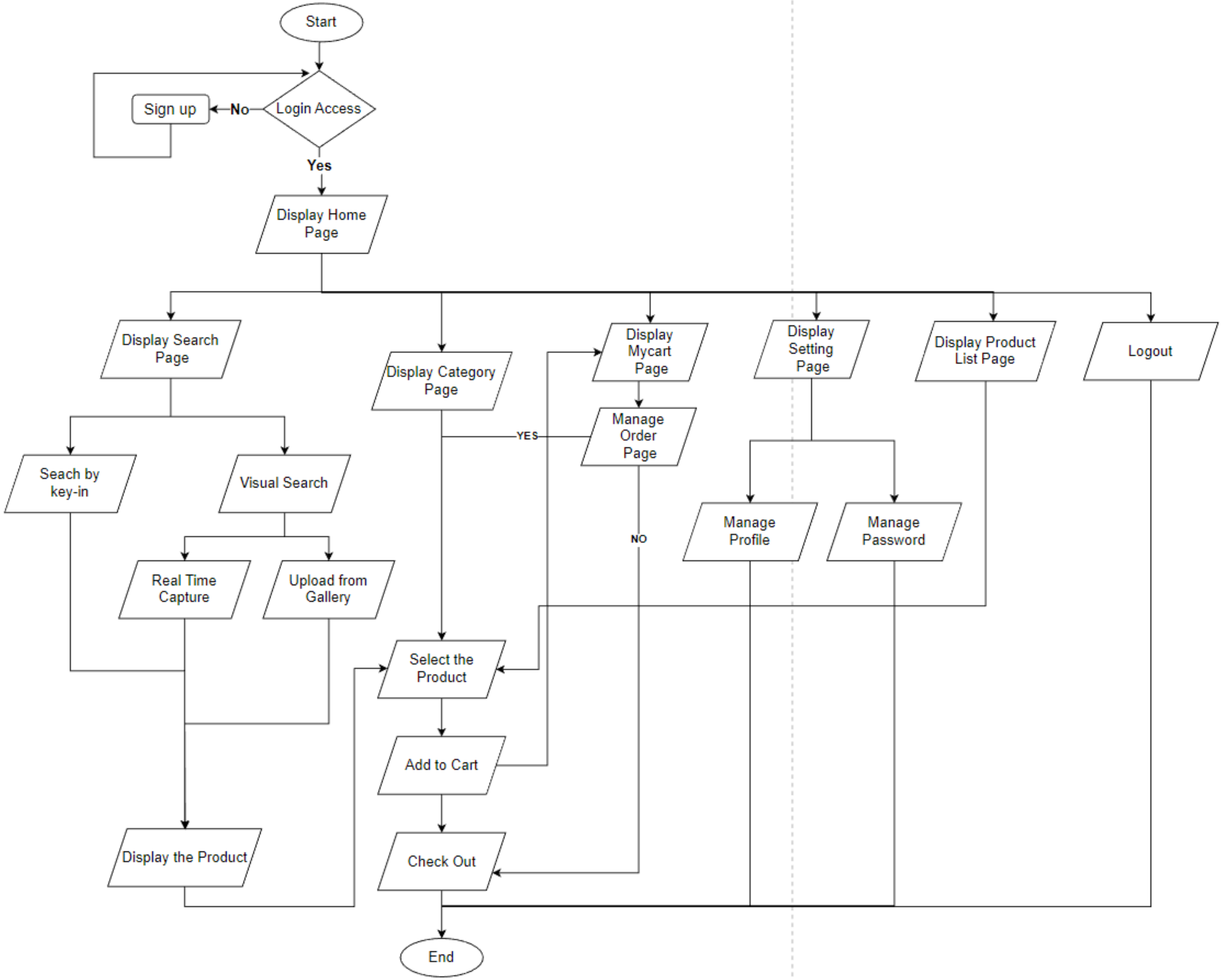
○ No

The Visual Search can let user find the product without knowing the name or keyword of the product shoes?

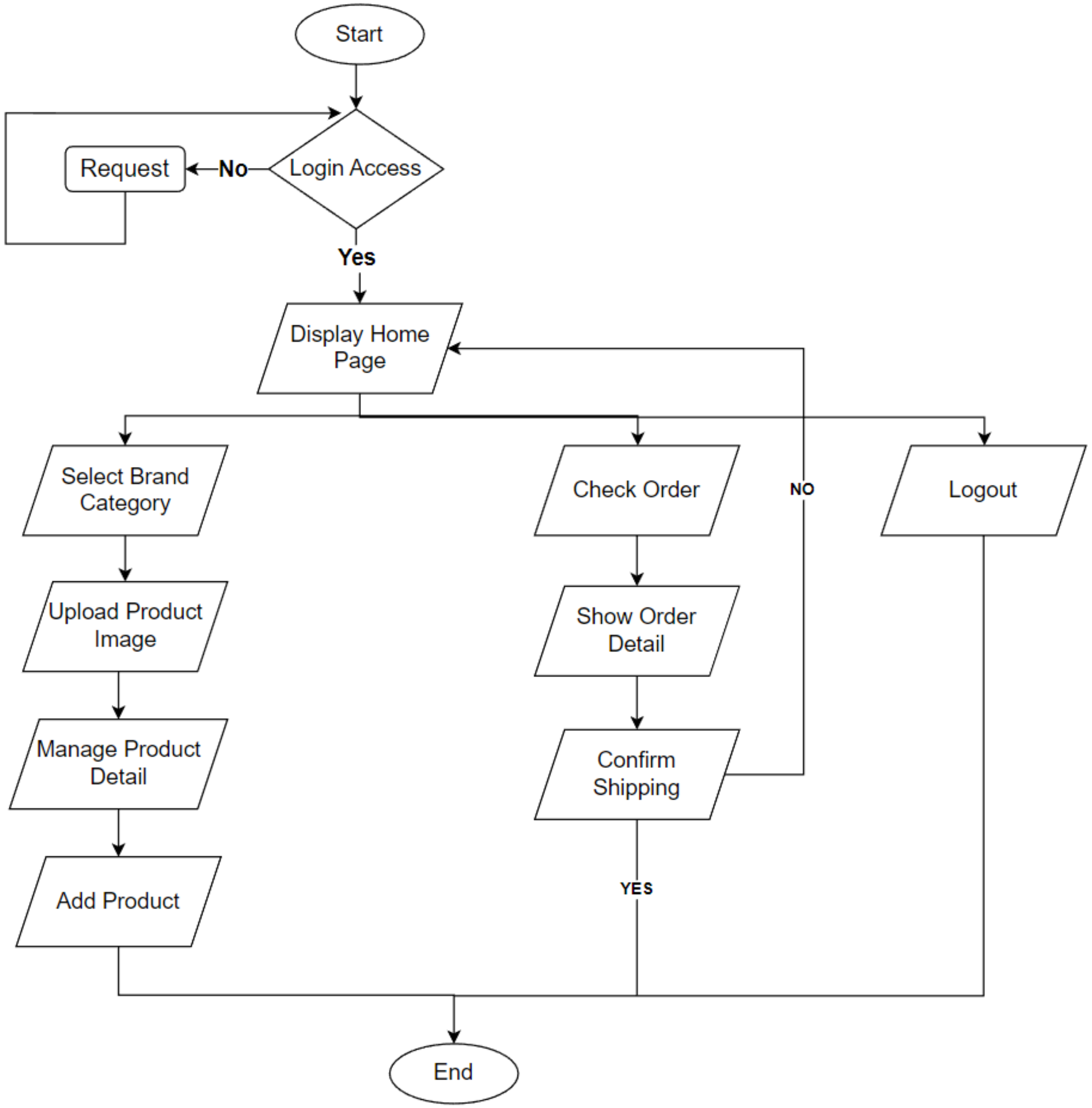
○ Yes

○ No

Appendix B



Flow Chart of User Activity for KJ Fashion Shoes E-Commerce Mobile-Based Application



Flowchart of Admin Activity for KJ Fashion Shoes E-Commerce Mobile-Based Application

Appendix C

UAT for Admin Test

Module	Splash Screen				
Objective	Display the KJ logo and shoes image				
Test ID	**Test Case**	**Input**	**Actual Result**	**Expected Result**	**Test Status**
TC01-01	The initial view is displayed the KJ logo and shoes image	No input	Transfer to the Login Register Page after 2 second	Transfer to the Login Register Page after 2 second	PASS
Module	Login Register				
Objective	Display the KJ logo and to let choose either to log in or register				
Test ID	**Test Case**	**Input**	**Actual Result**	**Expected Result**	**Test Status**
TC02-01	User click the Login button	Click the Login button	Transfer to the Login Page	Transfer to the Login Page	PASS
TC02-02	User click the Register button	Click the Register button	Transfer to the Register Page	Transfer to the Register Page	PASS

Module	Login				
Objective	To let admin login to the application				
Test ID	**Test Case**	**Input**	**Actual Result**	**Expected Result**	**Test Status**
TC13-01	Admin login with empty phone number and click Login Admin button	“” Click Login Admin button	Display error message	Display error message	PASS
TC13-02	Admin login with empty password and click Login Admin button	“” Click Login Admin button	Display error message	Display error message	PASS
TC13-03	Admin login with phone number no exceed 10 digits and click Login Admin button	“1234567” Click Login Admin button	Display error message	Display error message	PASS
TC13-04	Admin login with phone number exceed 10 digits, password no have one Uppercase and no exceed 6	“01120080748” “a11” Click Login Admin button	Display error message	Display error message	PASS

	characters and click Login Admin button				
TC13-05	Admin login with phone number exceed 10 digits, password have one Uppercase and exceed 6 characters and click Login Admin button	“01120080748” “A11111” Click Login Admin button	Successfully login to Admin home page	Successfully login to Admin home page	PASS
TC13-06	Admin click “Remember me” after login successful	Click remember me	Successfully login to Admin homepage without type the phone number and password after logout	Successfully login to Admin homepage without type the phone number and password after logout	PASS
TC13-07	Admin click “I’m not an Admin”	Click “I’m not an Admin”	The button will change to “Login” button	The button will change to “Login” button	PASS
TC13-08	Admin login with phone number exceed 10 digits, password have one Uppercase and exceed 6 characters and click Login Admin button	“01120080748” “A11111” Click Login Admin button	Display error message	Display error message	PASS

Module	Admin Home Page				
Objective	Display the Admin Home Page and functionable				
Test ID	**Test Case**	**Input**	**Actual Result**	**Expected Result**	**Test Status**
TC14-01	Admin click the brand category logo at the middle page	Click the brand category logo at the middle page	Redirect to add product page	Redirect to add product page	PASS
TC14-02	Admin click the check new orders button	Click the check new orders button	Redirect to check order page	Redirect to check order page	PASS
TC14-03	Admin click the logout button	Click the logout button	Redirect to Login Register page	Redirect to Login Register page	PASS

Module	Add product page				
Objective	To let the admin add new product				
Test ID	**Test Case**	**Input**	**Actual Result**	**Expected Result**	**Test Status**
TC15-01	Admin no upload the product image from phone gallery and click add product button	Click add product button	Display error message	Display error message	PASS
TC15-02	Admin upload the product image from phone gallery	upload the product image from phone gallery	Go to phone gallery and display the selected product image on top page	Go to phone gallery and display the selected product image on top page	PASS
TC15-03	Admin click add product button without type product description	“” Click add product button	Display error message	Display error message	PASS
TC15-04	Admin click add product button without type product price	“” Click add product button	Display error message	Display error message	PASS
TC15-05	Admin click add product button without type product available size	“” Click add product button	Display error message	Display error message	PASS
TC15-06	Admin click add product button without type product name	“” Click add product button	Display error message	Display error message	PASS
TC15-07	Admin click add product with fulfilled all text field	“nike kj shoes” “the best shoes even” “1000” “6,7,8,9,10” Click add product button	Display successfully toast message and redirect to Admin home page	Display successfully toast message and redirect to Admin home page	PASS

Module	Cart Page
Objective	Display the cart page and functionable

Test ID	Test Case	Input	Actual Result	Expected Result	Test Status
TC16-01	Admin click the order list	Click the order list	Pop out shipment option	Pop out shipment option	PASS
TC16-02	Admin click the SHOW USER ORDER PRODUCT button	click the SHOW USER ORDER PRODUCT button	Redirect to check product page	Redirect to check product page	PASS

Test by,

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Ms. Nuraini

Al-ikhsan Sports Owner

Appendix D

UAT for User Test

Module	Splash Screen				
Objective	Display the KJ logo and shoes image				
Test ID	**Test Case**	**Input**	**Actual Result**	**Expected Result**	**Test Status**
TC01-01	The initial view is displayed the KJ logo and shoes image	No input	Transfer to the Login Register Page after 2 second	Transfer to the Login Register Page after 2 second	PASS
Module	Login Register				
Objective	Display the KJ logo and to let choose either to log in or register				
Test ID	**Test Case**	**Input**	**Actual Result**	**Expected Result**	**Test Status**
TC02-01	User click the Login button	Click the Login button	Transfer to the Login Page	Transfer to the Login Page	PASS
TC02-02	User click the Register button	Click the Register button	Transfer to the Register Page	Transfer to the Register Page	PASS

Module	Login				
Objective	To let user login to the application				
Test ID	**Test Case**	**Input**	**Actual Result**	**Expected Result**	**Test Status**
TC03-01	User login with empty phone number and click Login button	“” Click Login button	Display error message	Display error message	PASS
TC03-02	User login with empty password and click Login button	“” Click Login button	Display error message	Display error message	PASS
TC03-03	User login with phone number no exceed 10 digits and click Login button	“1234567” Click Login button	Display error message	Display error message	PASS
TC03-04	User login with phone number exceed 10 digits, password no have one Uppercase and no exceed 6 characters and click Login	“01120080748” “a11” Click Login button	Display error message	Display error message	PASS

	button				
TC03-05	User login with phone number exceed 10 digits, password have one Uppercase and exceed 6 characters and click Login button	“01120080748” “A11111” Click Login button	Successfully login to User home page	Successfully login to User home page	PASS
TC03-06	User click “Remember me” after login successful	Click remember me	Successfully login to User homepage without type the phone number and password after logout	Successfully login to User homepage without type the phone number and password after logout	PASS
TC03-07	User click “I’m an Admin”	Click “I’m an Admin”	The button will change to “Login Admin” button	The button will change to “Login Admin” button	PASS
TC03-08	User login with phone number exceed 10 digits, password have one Uppercase and exceed 6 characters and click Login Admin button	“01120080748” “A11111” Click Login Admin button	Display error message	Display error message	PASS

Module	Register				
Objective	To let user register an account				
Test ID	**Test Case**	**Input**	**Actual Result**	**Expected Result**	**Test Status**
TC04-01	User create account with empty name	“” Click create account button	Display error message	Display error message	PASS
TC04-02	User create account with empty phone number	“” Click create account button	Display error message	Display error message	PASS
TC04-03	User create account with empty password	“” Click create account button	Display error message	Display error message	PASS
TC04-04	User create	“1234567”	Display error	Display error	PASS

	account with phone number no exceed 10 digits and click create account button	Click create account button	message	message	
TC04-05	User create account with phone number exceed 10 digits, password no have one Uppercase and no exceed 6 characters and click create account button	"01120080748" "a11" Click create account button	Display error message	Display error message	PASS
TC04-06	User create account with phone number exceed 10 digits, password have one Uppercase and exceed 6 characters and click create account button	"01120080748" "A11111" Click create account button	Redirect to Login page	Redirect to Login page	PASS

Module	User Home Page				
Objective	Display the User Home Page and functionable				
Test ID	**Test Case**	**Input**	**Actual Result**	**Expected Result**	**Test Status**
TC05-01	User click the menu icon at the top page	Click the menu icon	Display the menu list	Display the menu list	PASS
TC05-02	User click the icon in the menu list and redirect to the page	Click the cart icon	Redirect to cart page	Redirect to cart page	PASS
TC05-03	User click the icon in the menu list and redirect to the page	Click the search icon	Redirect to search page	Redirect to search page	PASS
TC05-04	User click the icon in the menu list and	Click the categories icon	Redirect to category page	Redirect to category page	PASS

	redirect to the page				
TC05-05	User click the icon in the menu list and redirect to the page	Click the Settings icon	Redirect to setting page	Redirect to setting page	PASS
TC05-06	User click the icon in the menu list and redirect to the page	Click the logout icon	Redirect to Login Register page	Redirect to Login Register page	PASS
TC05-07	User click the cart icon at the bottom page	Click the cart icon	Redirect to cart page	Redirect to cart page	PASS
TC05-08	User scroll the product list in the middle page	Scroll the page	Successfully scroll up and down	Successfully scroll up and down	PASS
TC05-09	User click the product in the product list	Click the product	Redirect to product detail page	Redirect to product detail page	PASS

Module	Product Detail Page				
Objective	Display the product detail page and functionable				
Test ID	**Test Case**	**Input**	**Actual Result**	**Expected Result**	**Test Status**
TC06-01	User type the size	“6”	Typeable	Typeable	PASS
TC06-02	User choose the quantity	Click the “+” and “-”	Clickable	Clickable	PASS
TC06-03	User click the ADD TO CART button	click the ADD TO CART button	Redirect to user home page and display toast message “Added to cart list”	Redirect to user home page and display toast message “Added to cart list”	PASS

Module	Cart Page				
Objective	Display the cart page and functionable				
Test ID	**Test Case**	**Input**	**Actual Result**	**Expected Result**	**Test Status**
TC07-01	User click the product in cart list that want to edit or remove	Click the cart list	Display pop out cart option edit and remove	Display pop out cart option edit and remove	PASS
TC07-02	User click edit on cart option	click edit on cart option	Redirect to specific product	Redirect to specific	PASS

			detail page that want to edit	product detail page that want to edit	
TC07-03	User click remove on cart option	click remove on cart option	Remove the order in cart list	Remove the order in cart list	PASS
TC07-04	User click NEXT button at the bottom page	Click the NEXT button	Redirect to confirm order page and toast the total amount	Redirect to confirm order page and toast the total amount	PASS

Module	Confirm order				
Objective	To let the user fill in the shipment detail				
Test ID	**Test Case**	**Input**	**Actual Result**	**Expected Result**	**Test Status**
TC08-01	User click CONFIRM button with empty name	“” Click CONFIRM button	Display error message	Display error message	PASS
TC08-02	User click CONFIRM button with empty phone number	“SohKaiJie” “” Click CONFIRM button	Display error message	Display error message	PASS
TC08-03	User click CONFIRM button with empty address	“SohKaiJie” “01120080748” “” Click CONFIRM button	Display error message	Display error message	PASS
TC08-04	User click CONFIRM button with empty city name	“SohKaiJie” “01120080748” “No.14, Kampung Ketapang Tengah” “” Click CONFIRM button	Display error message	Display error message	PASS
TC08-05	User click CONFIRM button with every text field	“SohKaiJie” “01120080748” “No.14, Kampung	Redirect to User home page and display toast	Redirect to User home page and display toast	PASS

	filled	Ketapang Tengah” “Pekan26600” Click CONFIRM button	message	message	

Module	Search				
Objective	To let the user find the product shoes with typing the name of the shoes				
Test ID	**Test Case**	**Input**	**Actual Result**	**Expected Result**	**Test Status**
TC09-01	User type the product name in the text field and click SEARCH button	“PATA-PATA Men Grey Sandals” Click SEARCH button	Display the product in the first of the product list	Display the product in the first of the product list	PASS
TC09-02	User type the product name in the text field and click SEARCH button	“PUMA Unisex Court Star Suede Shoes” Click SEARCH button	Display the product in the first of the product list	Display the product in the first of the product list	PASS
TC09-03	User type the product name in the text field and click SEARCH button	“adodas” Click SEARCH button	Display the empty product in the product list	Display the product in the product list	PASS
TC09-04	User type the product name in the text field and click SEARCH button	“adidas” Click SEARCH button	Display the product in the product list start with adidas	Display the product in the product list start with adidas	PASS
TC09-05	User can click the product in the product list	Click the product	Redirect to product detail page	Redirect to product detail page	PASS
TC09-06	User click the camera icon	Click the camera icon	Redirect to Visual Search page	Redirect to Visual Search page	PASS

Module	Visual search
Objective	To let the user find the product shoes with image

Test ID	Test Case	Input	Actual Result	Expected Result	Test Status
TC10-01	User click camera icon	Click camera icon	Redirect to phone camera and can functionable	Redirect to camera and can functionable	PASS
TC10-02	User click gallery icon	Click gallery icon	Redirect to phone gallery and can functionable	Redirect to phone gallery and can functionable	PASS
TC10-03	User visual search using the camera image	Phone camera capture image	Display the product list with higher similarity with image	Display the product list with higher similarity with image	PASS
TC10-04	User visual search using the gallery image	Select image from phone gallery	Display the product list with higher similarity with image	Display the product list with higher similarity with image	PASS
TC10-05	User can click the product in the product list	Click the product	Redirect to product detail page	Redirect to product detail page	PASS

Module	Category				
Objective	To let the user find the product based on category				
Test ID	**Test Case**	**Input**	**Actual Result**	**Expected Result**	**Test Status**
TC11-01	User click the category ADIDAS button	Click the category ADIDAS button	Display the “Adidas” brand product	Display the “Adidas” brand product	PASS
TC11-02	User click the category NIKE button	Click the category NIKE button	Display the “NIKE” brand product	Display the “NIKE” brand product	PASS
TC11-03	User click the category PUMA button	Click the category PUMA button	Display the “PUMA” brand product	Display the “PUMA” brand product	PASS
TC11-04	User click the category BATA button	Click the category BATA button	Display the “BATA” brand product	Display the “BATA” brand product	PASS
TC11-05	User click the category DR. CARDIN button	Click the category DR. CARDIN button	Display the “DR. CARDIN” brand product	Display the “DR. CARDIN” brand product	PASS
TC11-06	User click the category SKECHERS button	Click the category SKECHERS button	Display the “SKECHERS” brand product	Display the “SKECHERS” brand product	PASS

TC11-07	User click the product in the product list	Click the product	Redirect to product detail page	Redirect to product detail page	PASS

Module	Setting				
Objective	To let the user update the profile				
Test ID	**Test Case**	**Input**	**Actual Result**	**Expected Result**	**Test Status**
TC12-01	User update the image profile with upload image from gallery	Click change profile icon	Redirect to phone gallery and select the image to retrieve to setting page	Redirect to phone gallery and select the image to retrieve to setting page	PASS
TC12-02	User update the phone order, name, address, and password	“01120088748” “SohKaiJie” “No.15, Kamoung Ketapang Tengah” “A44444” Click update icon	Display successfully toast message	Display successfully toast message	PASS
TC12-03	User check back the updated information	Click back the setting page	Display the information like phone order, name, address and profile image	Display the information like phone order, name, address and profile image	PASS
TC12-04	User click cancel icon	Click cancel icon	Redirect to User home page	Redirect to User home page	PASS

Test by,

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Mr. Azrul Nizam

Al-ikhsan Sports Staff

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