VIETNAM NATIONAL UNIVERSITY HO CHI MINH CITY
INTERNATIONAL UNIVERSITY
COMPUTER SCIENCE AND ENGINEERING

PROJECT REPORT

AI Shopping System

TOPIC 16

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Contents

1 Introduction **3**
1.1 Overview . . . 3
1.2 Stakeholders . . . 3
1.3 Project scope . . . 3

2 System analysis **3**
2.1 Existing system: Problem of shopping directly at shop . . . 3
2.2 Proposed system . . . 4
2.3 System requirement . . . 4
2.3.1 Requirement analysis . . . 4
2.3.2 Non-functional requirements . . . 6
2.4 Resources requirement . . . 7
2.4.1 Hardware resouces . . . 7
2.4.2 Software resources . . . 7

3 Planning Ordanization **7**
3.1 Angile model . . . 7
3.2 Architectural Pattern – MCV Architecture . . . 8
3.2.1 Model- Database managed by phpMyAdmin . . . 8
3.2.2 Controller – Python . . . 8
3.2.3 View – HTML DOM . . . 8
3.3 Tools, techniques resources . . . 9
3.3.1 Flask . . . 9
3.3.2 CSS with SCSS . . . 9
3.3.3 Owl Carousel and DOM . . . 9
3.3.4 MySQL(PhpMyAdmin) . . . 9
3.3.5 Dialogflow . . . 9
3.4 Organization . . . 10
3.4.1 Risk Plan . . . 10
3.4.2 Atribute . . . 10
3.4.3 Timeline . . . 10

4 System design **13**
4.1 System modules . . . 13
4.1.1 Administrator . . . 14
4.1.2 Users . . . 15
4.2 Use case diagram . . . 16
4.3 ER Model . . . 19
4.4 Database diagram . . . 19
4.5 Dataflow . . . 21

5 Demo **22**
5.1 Layout . . . 22
5.1.1 Header . . . 22
5.2 Footer . . . 23
5.3 Main page . . . 24
5.4 More GUI related . . . 25
5.5 Register page . . . 25

5.6 Login page and forgot password 27
5.7 Shopping cart 29
5.8 Admin GUI 29
5.9 About chatbot 31

6 Conclusion **31**
6.1 Lessons 31
6.2 Development Potential 31
6.3 Expectation in Future 32

7 References **32**

1 Introduction

In the develop era, since our life is becoming busier and busier than its used to be, we don't have much time for our personal needs. Alongside the world economy is changing rapidly towards industrialization and modernization, most of the necessary items for the daily basis can be purchased through the e-commerce and online stores. Understanding this prevalent trend as well as client's demand, Choosing the AI Shopping System Project is an attempt to provide for customers a best application with the advantages of online shopping to customers, which is significantly improved user experience by offering personalized buying experiences. Through this project, we can study deeply about how the system interacts with customers and develop the business of a e-commercial company, which maximally apply the use of artificial intelligence so far.

1.1 Overview

Nowadays, Many fashion brands have been very successful in maintaining and expanding their online business thanks to the website is efficient and beneficial for businesses and shoppers. From customers perspective, they can easily compare the price, check quality with feedback, receive products at home or efficiently hunt attractive "sale off" programs. For companies , e-commercial brings remarkably a variety of benefits such as accessible more potential customers, saving staff costs, advertising, and easy payment with the Customer's bank account.Base on the significant benefits come from Online Shopping Platform, we decided to make a web-base application in the Women's fashion business. Since our main customers using this application are young people and women, user-friendly interaction and focusing on customers experience are our major priorities.

1.2 Stakeholders

Our project is a ecommerce web-based application with a wide range of products for customer choosing and base on the previous search and purchase history, the system not only comes up with a list of items best suited for user needs but also suggests other related items that the user may like. The system handles multiple users at a time and provides accurate results. Our goal is building a best convenient website for customers. With millennials, z generations and women are the potential clients we aim for.

1.3 Project scope

This system can be implemented to any shop in the locality. We are creating an online portal where their customers can enjoy easy shopping from anywhere. Meanwhile customers just need to surf the web in order to select items, complete orders, and receive their fashion items through home delivery companies.

2 System analysis

2.1 Existing system: Problem of shopping directly at shop

Traditionally, Clients have to visit the shop manually and choose the available products customer like and buying them by payment of the price of these items. This still exist a variety of limitation :

- User must go to shop to buy products
- It is a time consuming process
- Not in reach of distant user

- It is less user- friendly. Customer cannot refer to similar items' prices from other places to compare whether it's reasonable or not
- The quantity of products and designs as well as items' description is limited

2.2 Proposed system

In order to tackle all of problem of shopping traditional, this AI Shopping system allows clients select and order products online through a various items. System will manage the customers and product orders. It also recommends a home delivery system for the purchased products.

2.3 System requirement

2.3.1 Requirement analysis

A customer can register to purchase an item. The Customer will provide the bank account number and bank name (can have multiple account number). After registration, each Customer will have a unique customerID, username and password. Customer can purchase one or more items in different quantities. The items can of different classes based upon their prices. Based on the quantity, price of the item, and discount (if any) on the purchased items, the bill will be generated. A bank account is required to settle the bill. The items can be ordered from one or more suppliers

Functional requirements

Name	**Register/ Login / Forgot password**
Detail	- A new user will have to register in the system by providing essential details in order to add the products in the system into his cart. - Registration of client plays an indispensable role when client purchase items. It helps the Admin get customer's information that they can complete the customer's payment and delivering. - Forgot password tool helps user create new password.
Rationale	- Registration help the shop take customer information in order to not only serve for shipping customer's order but also provide the information of searching as well as buying products to discover best suitable items for customers in the next purchase and find prevalent products base on the orders at website.
Requirements	- After the user registered, logged in or reset password, all user information will be saved in database + Username and password will be provided after user registration is confirmed +System must be able to verify and validate information + Password should be hidden from others while typing it in the field
References	- Login and registration page

Name	**View Products**
Detail	- A variety of products exist in shop's database with its information such as rating, price, image... will be loaded on the website
Rationale	- It helps customers
Requirements	- Customer can see any items in the web page
References	- Main webpage, Products Details page, admin page

Name	**View Product's Details**
Detail	- When customer click to any item, he will wee details of that product and a list of related items. - He can add this item to his cart by click button "Add to cart"
Rationale	- Customer can choose any product to view more detailed information
- Requirements	This page must be displayed exactly information of the item, which is clicked by customer. - A product have to fulfill information such as: image, accurate price, description, rating... there exist function for customer choose item, increase or decrease the number of items that client need. - A list of products belongs to the chose items must be display
References	Product-detail page

Name	**Add to card / Purchasing items**
Detail	- The user can add the desired product into his cart by clicking add to cart option on the product. He also can view his cart by clicking on the cart button.All products added by cart can be viewed in the cart. User can remove an item from the cart by clicking icon remove. - After confirming the items in the cart the user can submit the cart by providing a delivery address. On successful submitting the cart will become empty.
Rationale	- It helps customers select all of his desired products and take time to thoroughly consider without worrying forgot any item his preffer befored by saved his data cart in the system web page. - Customers can own easily his preferred items by payment online without wasting time.
Requirements	- System must ensure that, only a registered customer can purchase items. - Payment system must be exactly accuracy all of information related.
References	- Payment page

Name	**Search engine**
Detail	- The search engine for items does not require the totally word.
Rationale	- When suff the web page, customers sometimes want to search exactly one or few items they need, and maybe they can type lackly in the filter box, search engine will help them to find out what they want better as faster.
Requirements	- When a clients enters the text into filter field, the system will perform the satement with LIKE operator on the database, filter the products contain characters client typed.
References	- Main webpage, admin page.

Name	**Add/ Upated products / Add category / View customers information**
Detail	- Administrator can: + add category +add/update products +View customers information +Manage total income/ customers/ products/orders
Rationale	- It helps administrator easily manage and interact with shop's database via front end GUI.
Requirements	- The system must identify the login of the admin Admin account should be secured so that only owner of the shop canaccess that account.
References	- Admin page.

Name	**Chatbot**
Detail	- Chatbots have been trained in useful skills to help customers have the best experience . Chatbots have been trained the following things: +Ask about gender +User can get the information of the shop (address) +User can know the hotline of the shop +Users can see what kind of products the store currently sells (which product is available) +User can know kind of the payment in the shop
Rationale	- It helps customers get more information about products and shop in order to improve client's experience better.
Requirements	- The system must train for bot all of detail important of shop and product.
References	- Chatbot.

2.3.2 Non-functional requirements

Requirement	Description
Efficiency	- Client can effectively access system as finding and purchasing products would be easy and convenient.
Dependable	- The system ought to precisely perform payment, product cost and quality, ...
Usable	- The system is intended for an easy to the most suitable product so that we can make user's experience more enjoyable, satisfied and personalized on the basis of their needs.
Reliable	- The system provides a reliable environment to both customers and administrator. All orders should be reaching at the admin without any errors.
Delivery	- The system shall be responded to the user in sufficient time with a weekly evaluation by the project guide.
Implementation	- Using html, css and js in front end with flask as backend and it will be used for database(developed by mysql) connectivity. - Responsive web designing is used for making the website compatible for any type of screen.
Performance Loading	-The system must be optimized to loading quickly.
Flexible	-The system must be user friendly, with easy to understand menu, instructions. - Minimal learning time for using.

2.4 Resources requirement

2.4.1 Hardware resouces

Since all types of computers with the necessary software installed can be used to implement the program, I will not mention much about it.
Each member in our group is required using personal computers in all the process from studying to implementing and testing software.

2.4.2 Software resources

Visual studio code: coding software
phpMyAdmin(sql): manage database
excel: collect data from real pages online
MS Windows 10 Home 64bit: Operate system
We can use any other compatible sotfware, just through some step setup for implemention our sofware

3 Planning Ordanization

3.1 Angile model

Agile is a flexible software development methodology, which proposes incremental and specific approach to software project management. It includes an integrated and interactive workflow that makes it possible

to get products into the hands of users as quickly as possible.

In software projects, especially projects, we will have much difficulty in obtaining full and precise product requirements for good planning from the start. There are too many problems affecting software development that we do not foresee. For example, problems can come from factors such as business, technology, people, launch time. Traditional software development process exposes more and more weaknesses and high rates of project failure during the tech boom.Realizing that problem, our team has chosen the Agile process of developing software to adapt to the new situation.

3.2 Architectural Pattern – MCV Architecture

3.2.1 Model- Database managed by phpMyAdmin

The Model is the component that stores data and related logic.In our project, we use a database, integrated managed by phpMyAdmin. phpMyAdmin, a free software tool written in PHP intended to handle the administration of MySQL over the Web. It supports a wide range of operations on MySQL and MariaDB. Frequently used operations (managing databases, tables, columns, relations, indexes, users, permissions, etc) can be performed via the user interface, while we still have the ability to directly execute any SQL statement. There are several open-source databases out there (such as My SQL server, Firebird...) but we decided to use PostgreSQL in our project because of several reasons:

- Firstly we are always looking to keep costs down, so phpMyAdmin, a free software is a viable way to do that.
- PhpMyAdmin is a web based app so we can easily access from any computer. It commonly installed on managed hosting environments.

3.2.2 Controller – Python

The Controller is the component responsible for the response processing of input data from the user such as mouse events, keyboards, interactions on controls. The controller is the bridge between the user and the application.
Python is a widely used general-purpose, high level programming language. It was designed with an emphasis on code readability, and its syntax allows programmers to express their concepts in fewer lines of code.Python helps developer work quickly and integrate systems more efficiently.

3.2.3 View – HTML DOM

The View is the component that performs the presentation from the Model data. The view includes what is shown on screens such as UI, controls, forms, widgets, ...
Hypertext Markup Language (HTML) in general term is the standard markup language for documents designed to be displayed in a web browser. HTML can be backed by tools technologies such as Cascading Style Sheets (CSS) and Scripting languages like JavaScript. In our project, we use the web layout template from the Internet to saving time. Moreover, the template has a well-tuned, user-friendly, and error-free interface, so that we can quickly redesign and integrate our implementation.
For building HTML which displays information of a user from a specific data source. The problem is, for each information to be displayed, we have to execute a new command and concatenate the string. The above work not only takes time but is also very difficult to maintain.
Helping this, we use Handlebars. Handlebars is a compelling JavaScript library that allows you to bind data to a template to display on a website. Moreover, when we need to edit the information, we need to edit in the template without controlling each line of JavaScript code anymore.

3.3 Tools, techniques resources

3.3.1 Flask

Flask is a popular Python framework for developing web applications. It comes with minimal built-in functionalities and requirements, making it simple to get started and flexible to use. The developer has the liberty to customize most aspects of the app, including database integration, accounts and authentication, and more between the user and the application.

3.3.2 CSS with SCSS

Cascading Style Sheets (CSS) is a style sheet language used for describing the presentation of a document written in a markup language such as HTML. [2] CSS is a foundation technology of the World Wide Web, along with HTML and JavaScript.
SCSS is a CSS preprocessor. Scss has a lear structure Besides, it has a lot of support libraries attached to help you write CSS code more simply.

3.3.3 Owl Carousel and DOM

Owl Carousel touch enabled jQuery plugin that lets you create a beautiful responsive carousel slider. It is a neat little carousel with all the perks you could possibly need.
Document Object Model(DOM) is constructed model as a tree of objetcs. It is a platform and language-neutral interface that allows programs and scripts to dynamically access and update the content, structure, and style of a document.

3.3.4 MySQL(PhpMyAdmin)

MySQL is the world's second most widely used open-source relationaldatabase management system (RDBMS). The SQL phrase stands forStructured Query Language. MySQL is the database management system, or a database server. phpMyAdmin is the web application written primarily in PHP. It's used for managing MySQL database. PhpMyAdmin intended to handle the administration of MySQL over the Web, support for most MySQL features:

- Browse and drop databases, tables, views, fields and indexes
- Create, copy, drop, rename and alter databases, tables, fields and indexes
- Maintenance server, databases and tables, with proposals on server configuration
- Execute, edit and bookmark any SQL-statement, even batch-queries
- Manage MySQL user accounts and privileges
- Manage stored procedures and triggers

3.3.5 Dialogflow

Dialogflow is a natural language understanding platform that makes it easy to design and integrate a conversational user interface into your mobile app, web application, device, bot, interactive voice response system, and so on. Using Dialogflow, you can provide new and engaging ways for users to interact with your product.
It can analyze multiple types of input from your customers, including text or audio inputs (like from a phone or voice recording). It can also respond to your customers in a couple of ways, either through text or with synthetic speech.

3.4 Organization

3.4.1 Risk Plan

Technical risk
The quite common source of the risks is to make one man finish someone else's job. The developers trying to make changes or fixes in the unknown code will make the relatively big number of mistakes. Also, to implement such of amazing feature requires high technical skills.
Affect : It affects the working time of the whole team and delays the schedule.
Management risks
The most significant management risks in software development is within the team structure. As for the first time, the new team members will work slower and make mistakes. If the settled team during the long term, it is difficulty to let the new member to join in, no matter how good programmer he is.

- Affect This can slow down the progress of the project, produce unreliable result from the uncooperative work.
- Solving: Address all the conflicts that are existing among the team members and have a plan for working together.

Schedule risks
Mostly, the risks are time-consuming because of many factors that lead to the wrong estimation like the key member has left, the budget for the software license is over, the misunderstandings with the customer and the overspending are inevitable consequences.

3.4.2 Atribute

Name	Reponsibility	Contribution
Nguyễn Thị Mai Hương	Leader, Project Manager, Developer, Tester.	30,1%
Hồ Thị Thu Hòa	Developer, Data Analyst.	23,3%
Thái Gia Lac	Developer, Designer.	23,3%
Bùi Đăng Khoa	Developer, Designer.	23,3%

3.4.3 Timeline

No	Backlog Items	Estimate (day(s))	Priority
1	As a Admin, I want to add and edit information about product	6	1
2	As a Admin, I want to product list management	4	1
3	As a customer, I want to view the list of products	4	1
4	As a customer, I want to view the details of products	4	1
5	As a customer, I want to browse categories & filter products	4	3
6	As a customer, I want to search, sort & page products	5	3
7	As a customer, I want to register & login my account	4	2
8	As a customer, I want to make an order	2	2
9	As a customer, I want to add comments, questions	5	4
10	As a customer, I want to review products	5	4
11	As a customer, I want to add comments, questions	5	4
12	As a Admin, I want to reply comments, questions of customers	3	4

Week 1 (08/03 – 14/03/09): Creating the basic outline of the Online Retail Web Application.

Tasks	Estimate (hours)	Member
Attend group meetings for planning & setting up	0.5	All members
Decide necessary web application information (field of retail, name of the brand, orientation, database source, outline tabs of the web, ...)	4	Thu Hòa
Find web application template	1	Gia Lạc.
Set & start a server and code for the primary outline tab	4	Mai Hương
Code web's layout	4	Đăng Khoa, Gia Lạc
Test the web application	2	Mai Hương
Attend group meetings for reviewing and planning	1.5	All members

Week 2 (15/03 - 21/03): Designing developing the database system.

Tasks	Estimate (hours)	Member
Analyze & list the types of information that need to be stored in the database & setting up	5	Thu Hòa, Đăng Khoa.
Design & define the tables and relationships	5	Mai Hương
Sync & demo database	5	Gia Lạc.
Set & start a server and code for the primary outline tab	4	Mai Hương
Attend group meetings for reviewing and planning	1	All members

Week 3(22/03- 28/03):Building "Register Login" functionality.

Tasks	Estimate (hours)	Member
Research, analyze the requirement, and define a concept of function	4	All members
Design interface for functions	5	Thu Hòa
Develop "Register & Login" functions	5	Đăng Khoa, Gia Lạc
Design and integrate data into the database	5	Mai Hương
Test function, database	2	Mai Hương
Attend group meetings for reviewing and planning	1	All members

Week 4(29/03 – 04/04) : Building "Admin" functionality .

Tasks Organization	Estimate (hours)	Member
Research, analyze the requirement, and define a concept of function	4	All members
Design interface for functions	5	Thu Hòa
Develop "Admin" functions	5	Đăng Khoa
Design and integrate data into the database	5	Gia Lạc
Test function, database	2	Mai Hương
Attend group meetings for reviewing and planning	1	All members

Week 5 + Week 6 (05/04 - 18/04): Midterm Examination.
Week 7+ Week 8:(19/04 – 29/04) : Building "Payment system" AND "Product" functionality.

Tasks Organization	Estimate (hours)	Member
Research, analyze the requirement, and define a concept of function	4	All members
Design interface for functions	5	Gia Lạc
Develop "Product" functions	5	Thu Hòa
Develop "Product" functions	5	Đăng Khoa
Design and integrate data into the database	5	Mai Hương
Test function, database	2	Mai Hương
Attend group meetings for reviewing and planning	1	All members

Week 9 +Week 10(04/05 – 15/05): Final testing application, completing all documents.

Tasks Organization	Estimate (hours)	Member
Detect errors and shortcomings of the system	4	Đăng Khoa
Improve system and optimize functions	4	Thu Hòa
Final test and demo all functions of the application	3	Mai Hương
Complete all the required documents	4	Gia Lạc
Complete the report	4	Thu Hòa, Mai Hương
Complete presentation slide	4	All members
Attend final group meetings for review	3	All members

Total working time (reality):

Member	Estimate working time (hours)
Nguyễn Thị Mai Hương	69
Hồ Thị Thu Hòa	57
Thái Gia Lạc	54
Bùi Đăng Khoa	53

4 System design

4.1 System modules

The system after careful analysis has been identified to be presented with the following modules and roles. The modules involved are:

- Administrator
- Users

4.1.1 Administrator

The administrator can be the owner of shop and he/ she has all the information about all the users and about all products. Just only administrator has access into admin page.

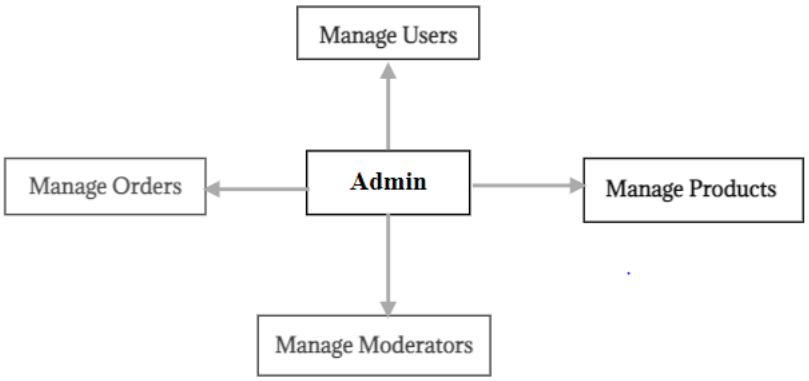

Figure 1: Admin module

Administrator modules is divided into different sub-modules :

- Manage products (add/ delete/ search products)

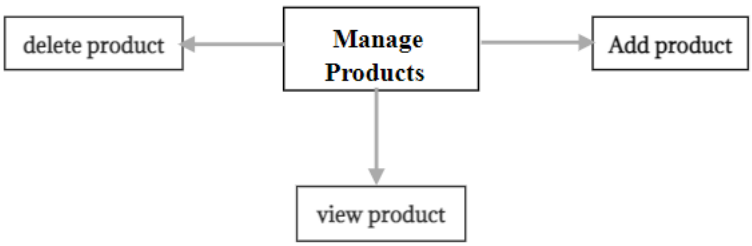

Figure 2: Manage products

- Manage Users(view/ add/ block Clients)

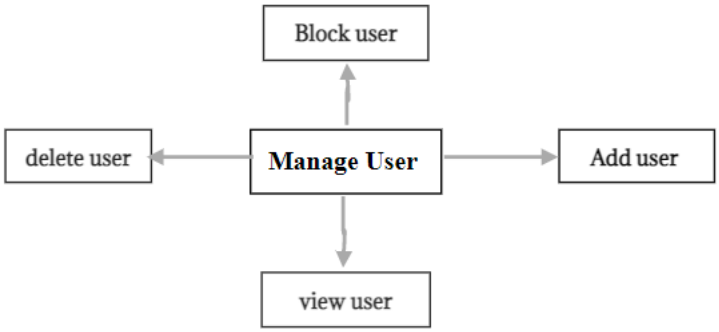

Figure 3: Manage Users

- Manage Purchase orders(view/ delete order)

Figure 4: Manage purchase orders

4.1.2 Users

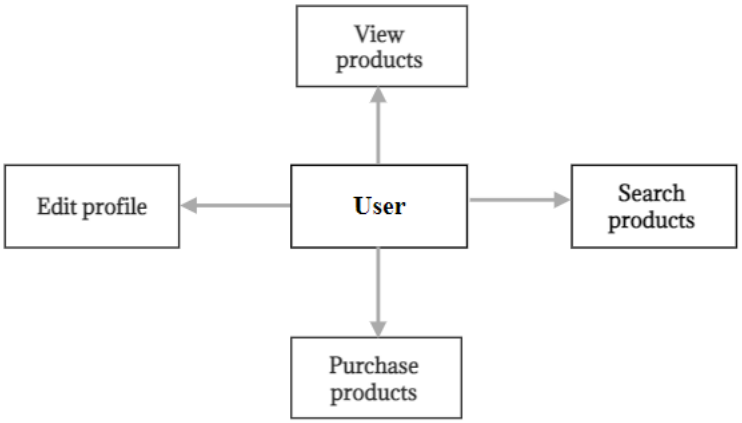

Figure 5: Users module

- Registration: A new user have to register on the system and get his online account on site in order to add product in the system into his cart .

- Login: User must login with his username and password to the system after registration.
- View product: User can see list of items based on their names or categories after successful login. Details of a particular product include name, short description, image, price and rating. System also shows related products likely to bought or searched by user.
- Search product: User can search for particular details. System takes user requirements and show products matching it.
- Add to cart: The user can add the desired product into his cart by clicking add to cart option on the product. He also can view his cart or remove some items from the cart.
- Submit cart: User can submit cart by providing a delivery address after confirming the items. When user submit successfully, the cart will be empty.
- Edit profile: the user can view and edit the profile.
- History: the user can see his pending orders.

4.2 Use case diagram

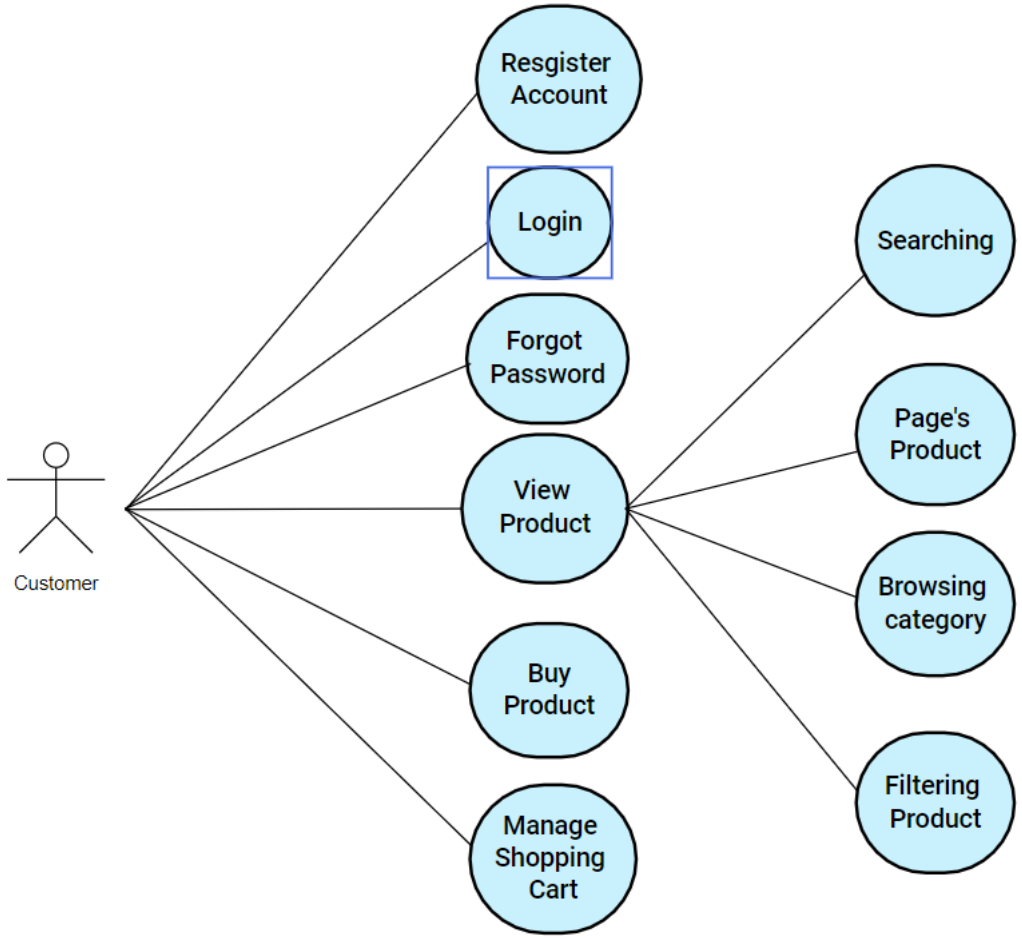

Figure 6: Use case diagram of customer

This diagram has 1 actor and 10 use cases including 4 extend use cases. The only actor is the customer. He can do many functions which are the use cases above. In the use case “View products”, the customer (actor) can do 4 functions which are the extended use cases. These are Sort Products, Page Products, Filter Products, Browse Categories. These use cases extend to the “View Products” use case.

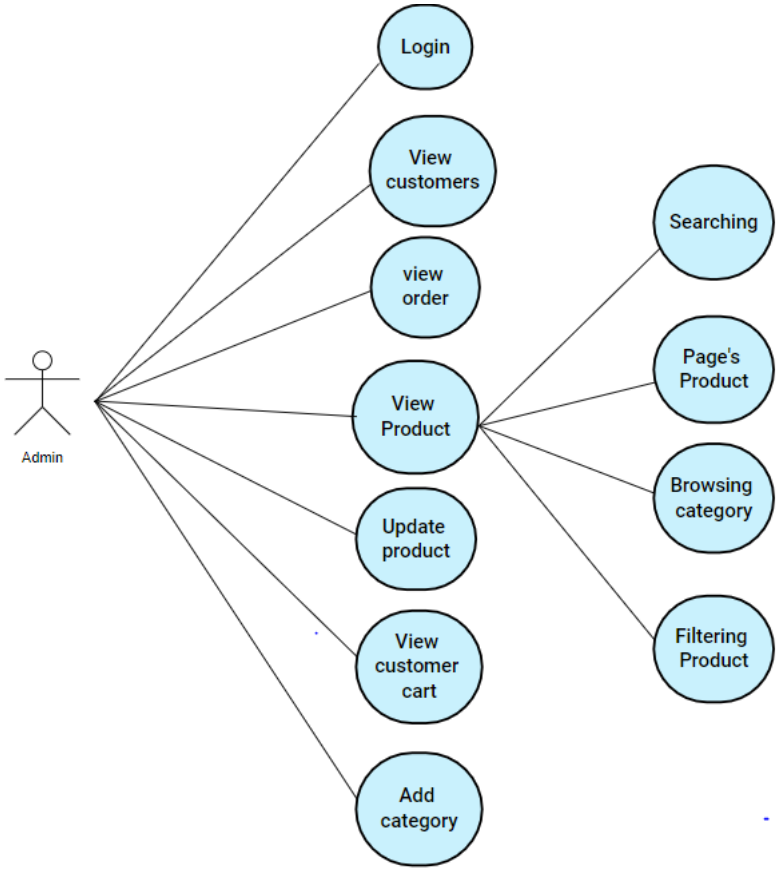

Figure 7: Use case diagram of admin

Admin can moderate all of customer and product information, the number of orders, income of shop, update or add product as well as category...

4.3 ER Model

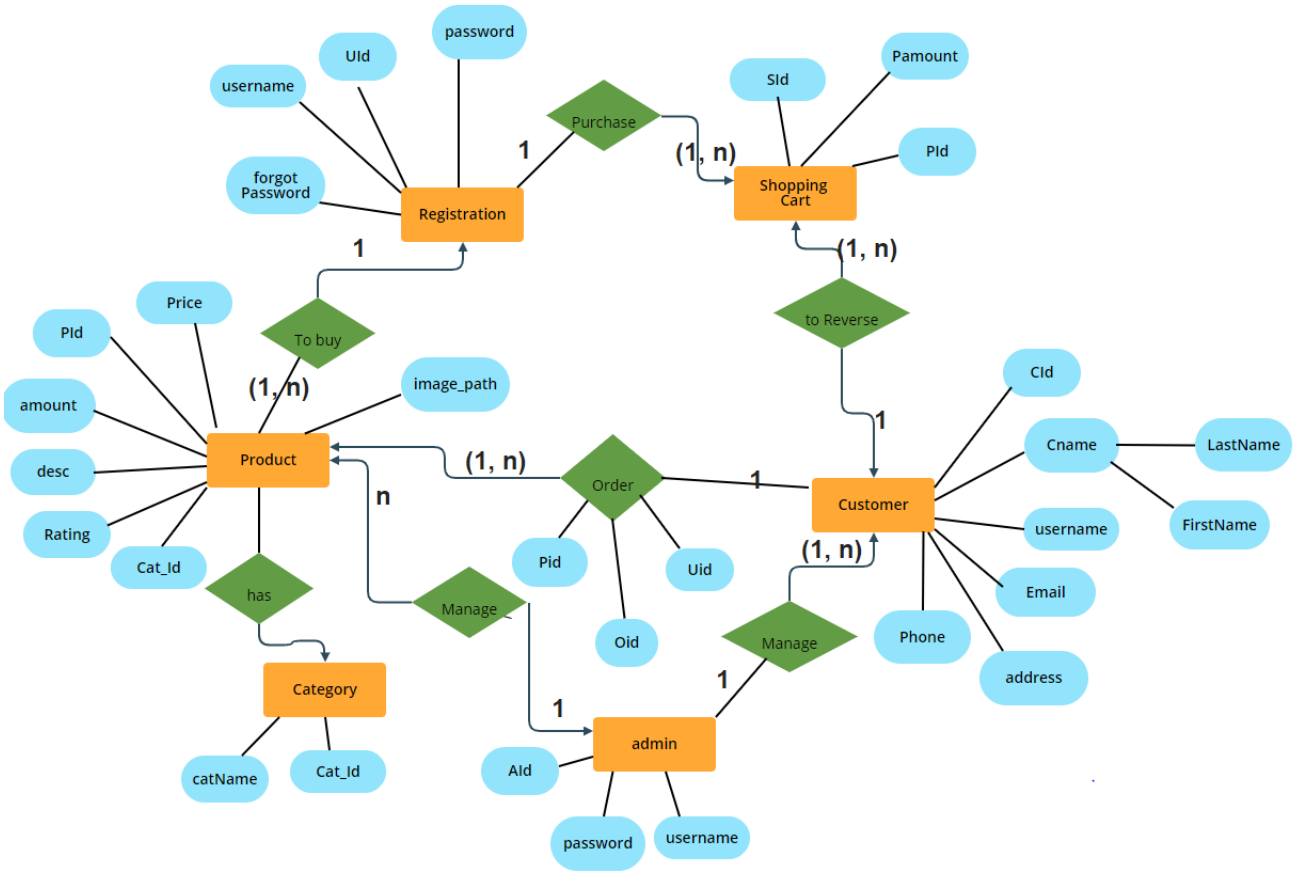

Figure 8: Use case diagram of admin

4.4 Database diagram

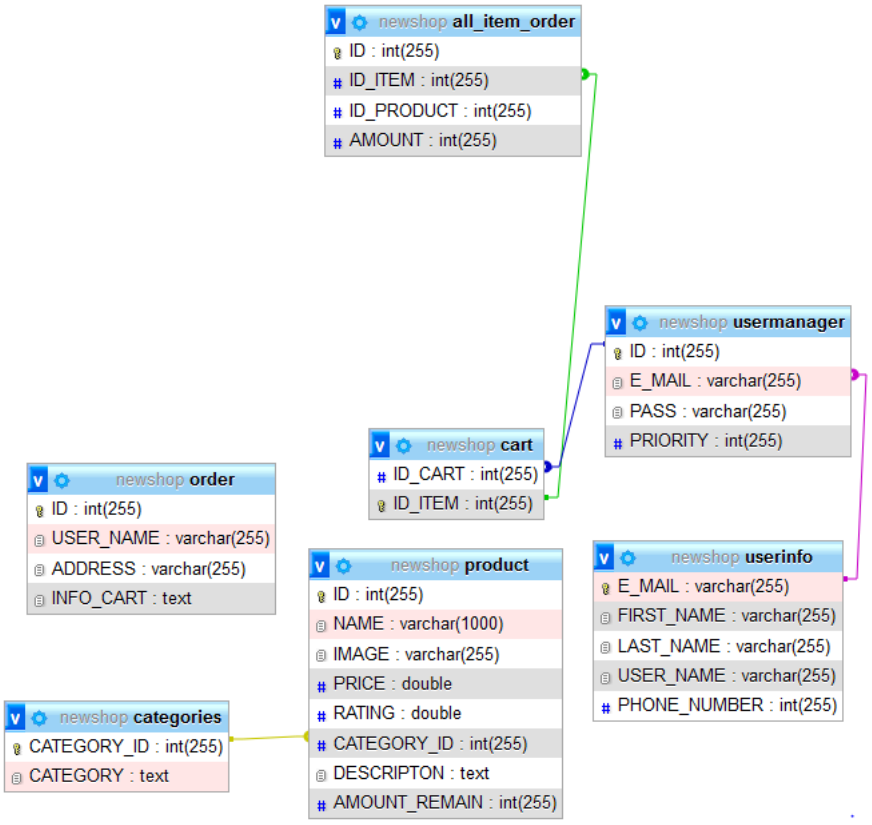

Figure 9: Database diagram of system

4.5 Dataflow

- Registration

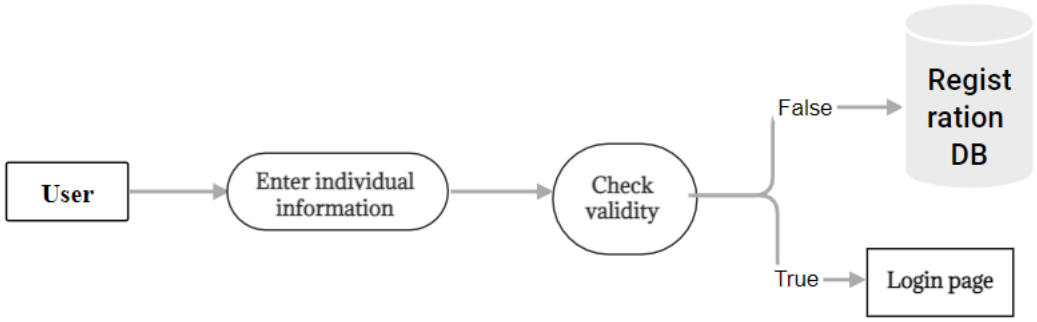

Figure 10: Registration DFD

- Registration

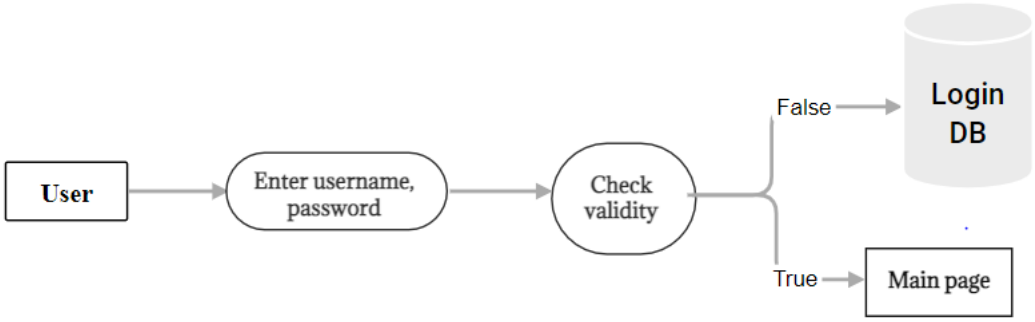

Figure 11: Login DFD

- Registration

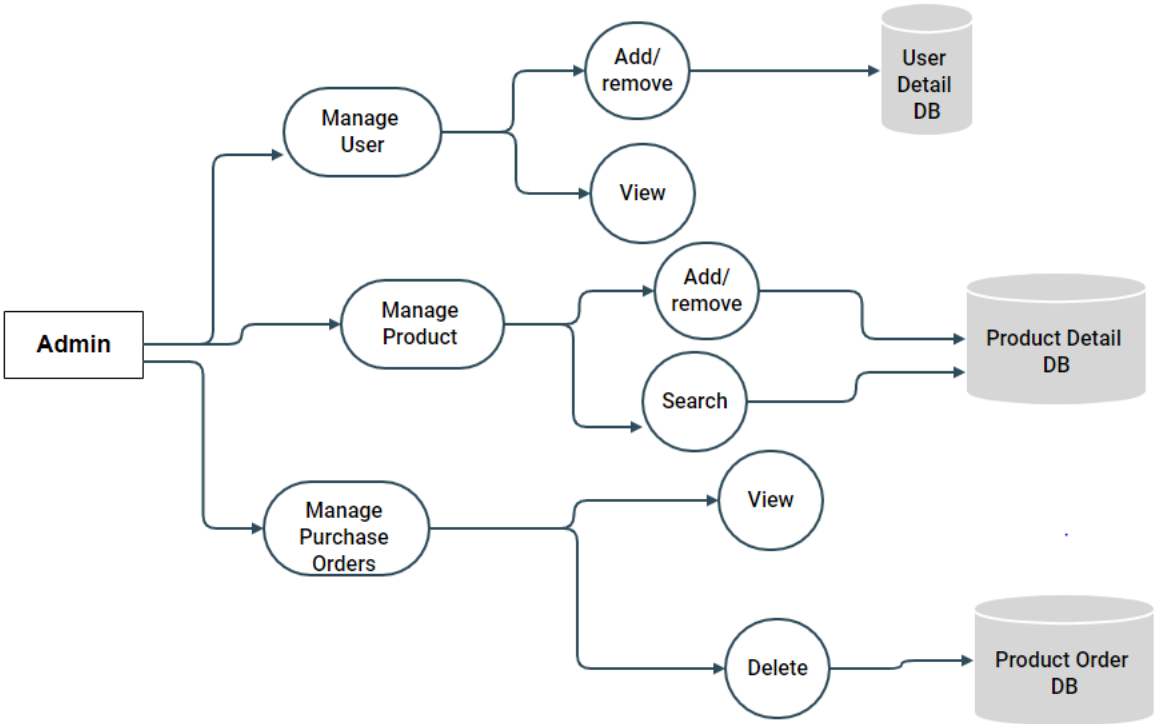

Figure 12: Administration DFD

5 Demo

5.1 Layout

5.1.1 Header

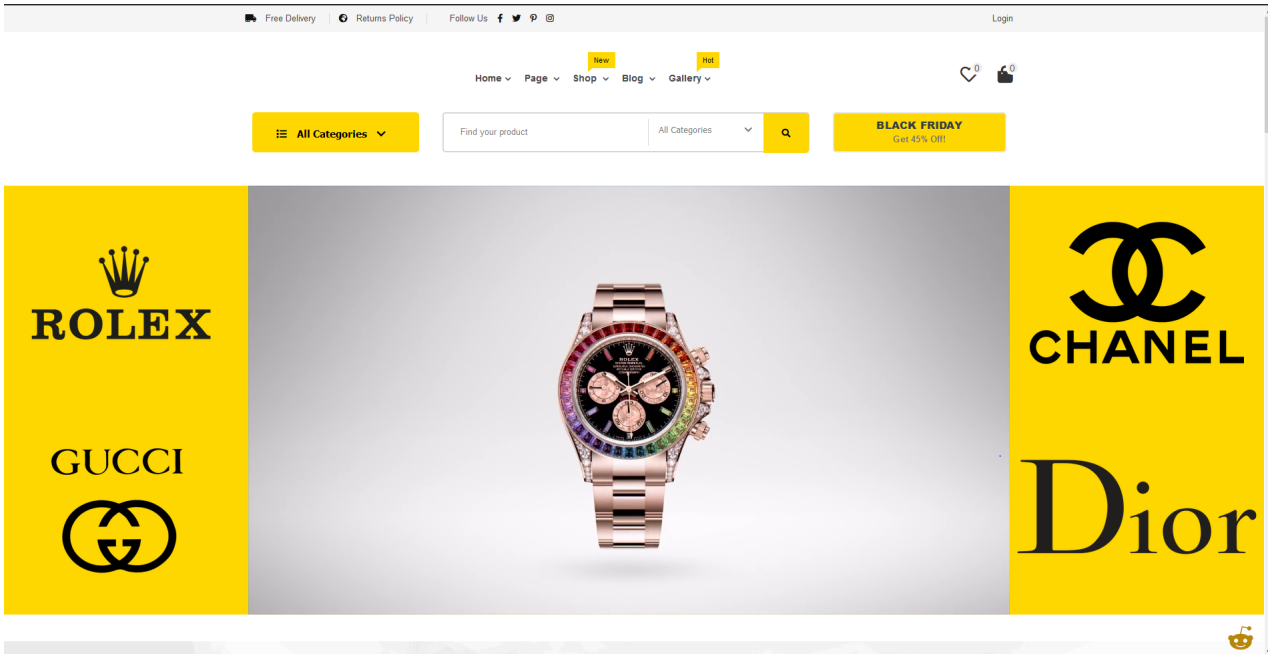

Figure 13: Header main page

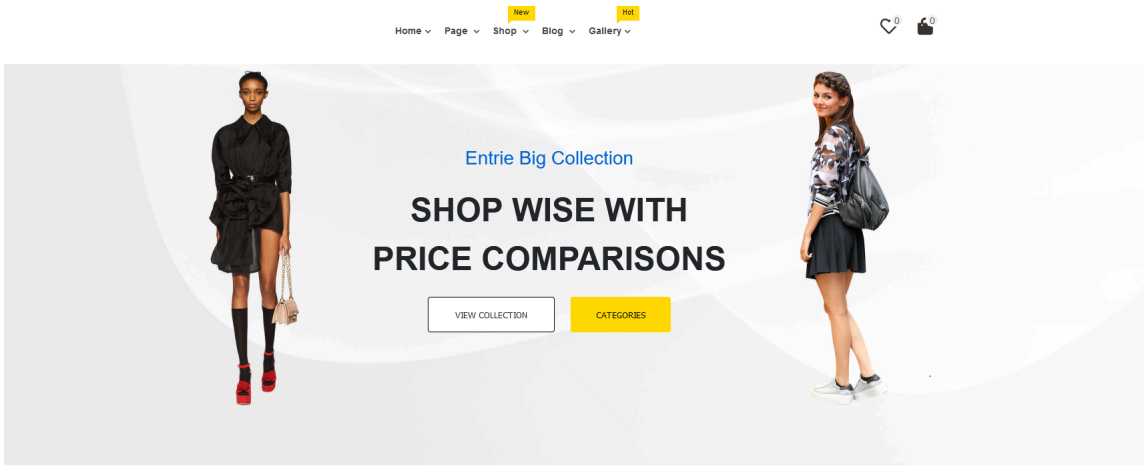

Figure 14: Main own carosel design

5.2 Footer

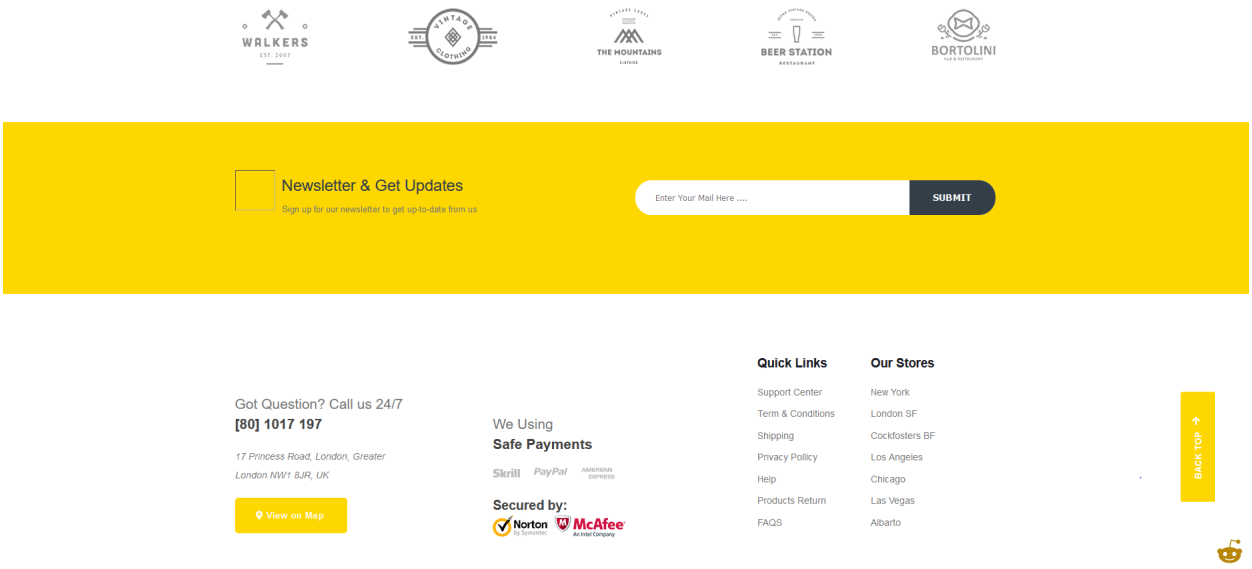

Figure 15: Footer M N

5.3 Main page

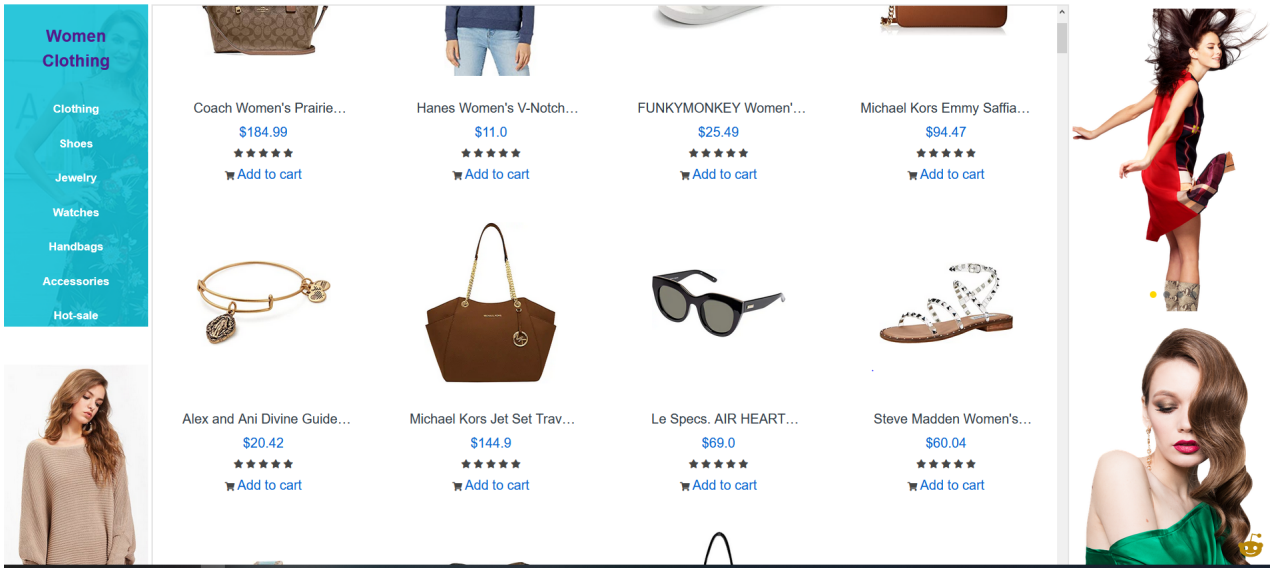

Figure 16: Trigger products area

Figure 17: Sponsor of MN

5.4 More GUI related

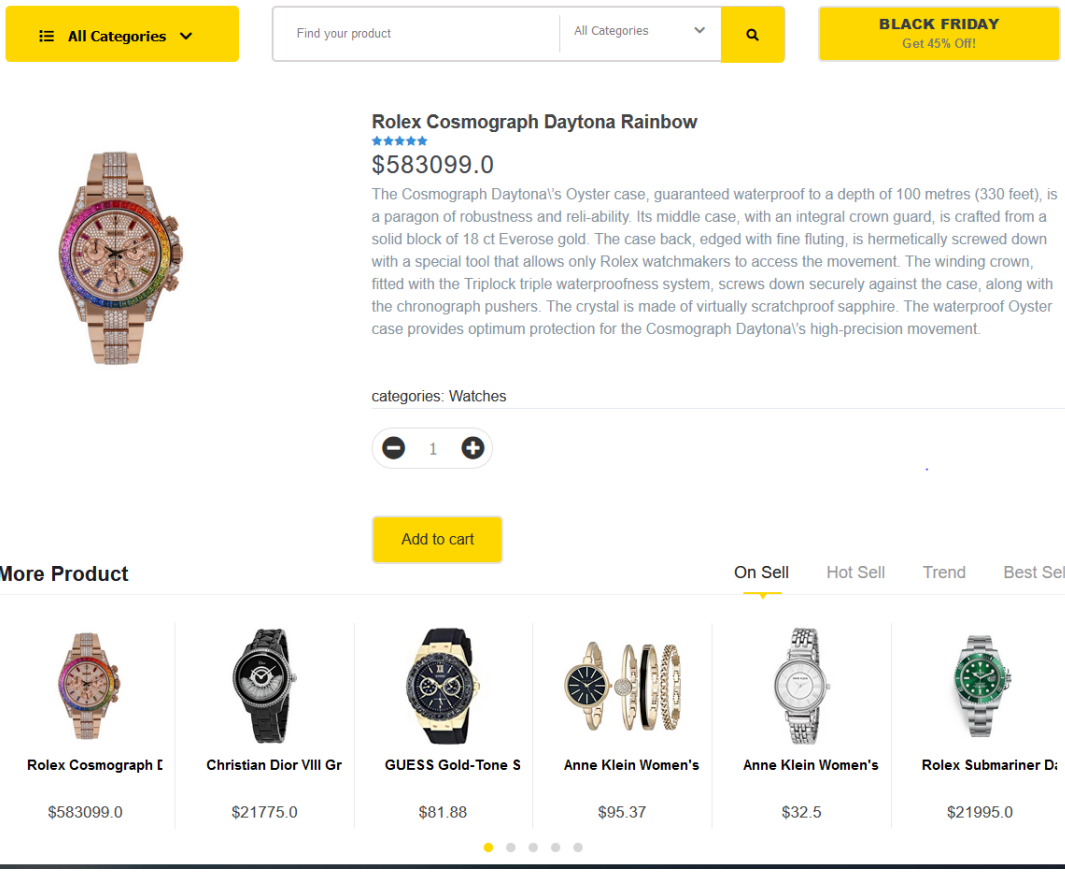

Figure 18: Product detail and related products

5.5 Register page

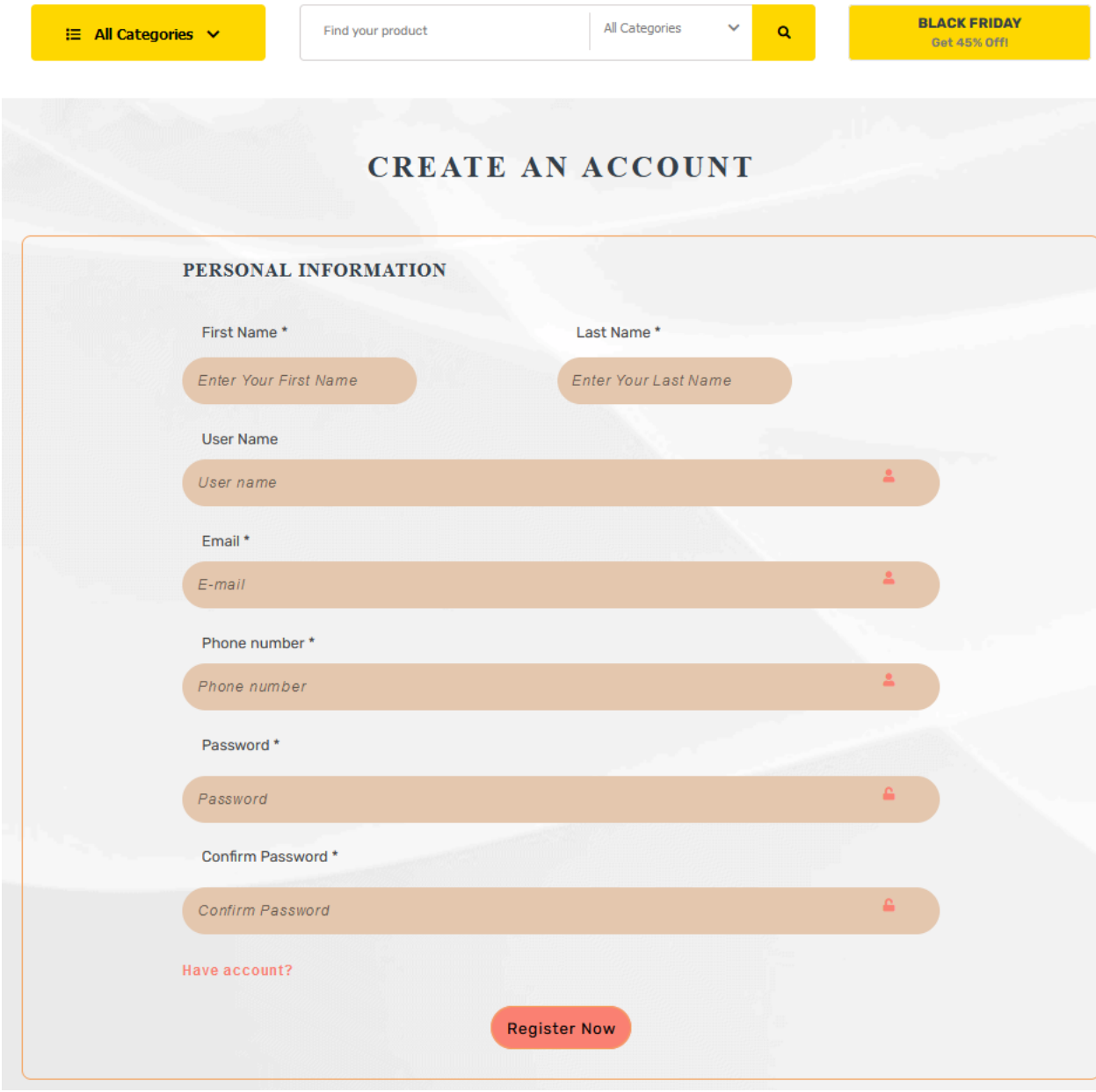

Figure 19: "Register account" layout

5.6 Login page and forgot password

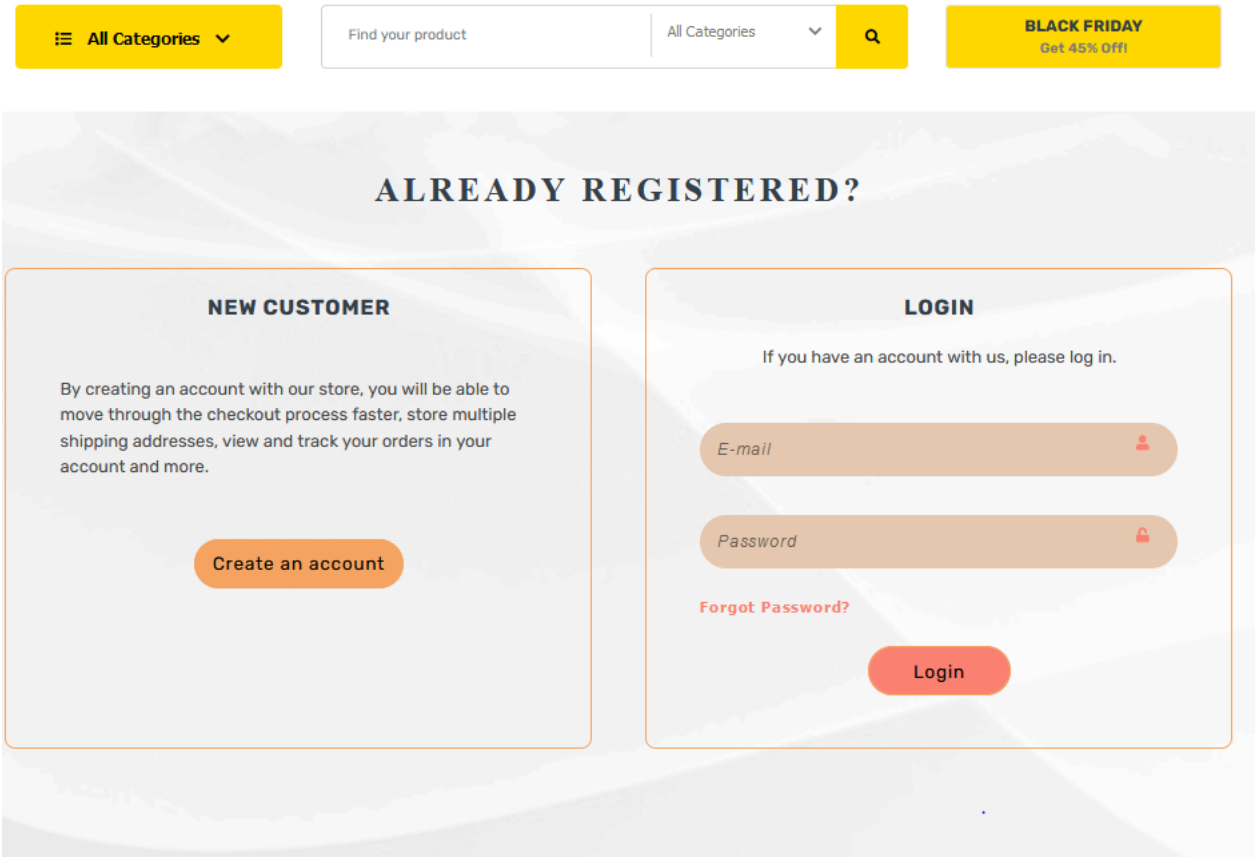

Figure 20: Login layout

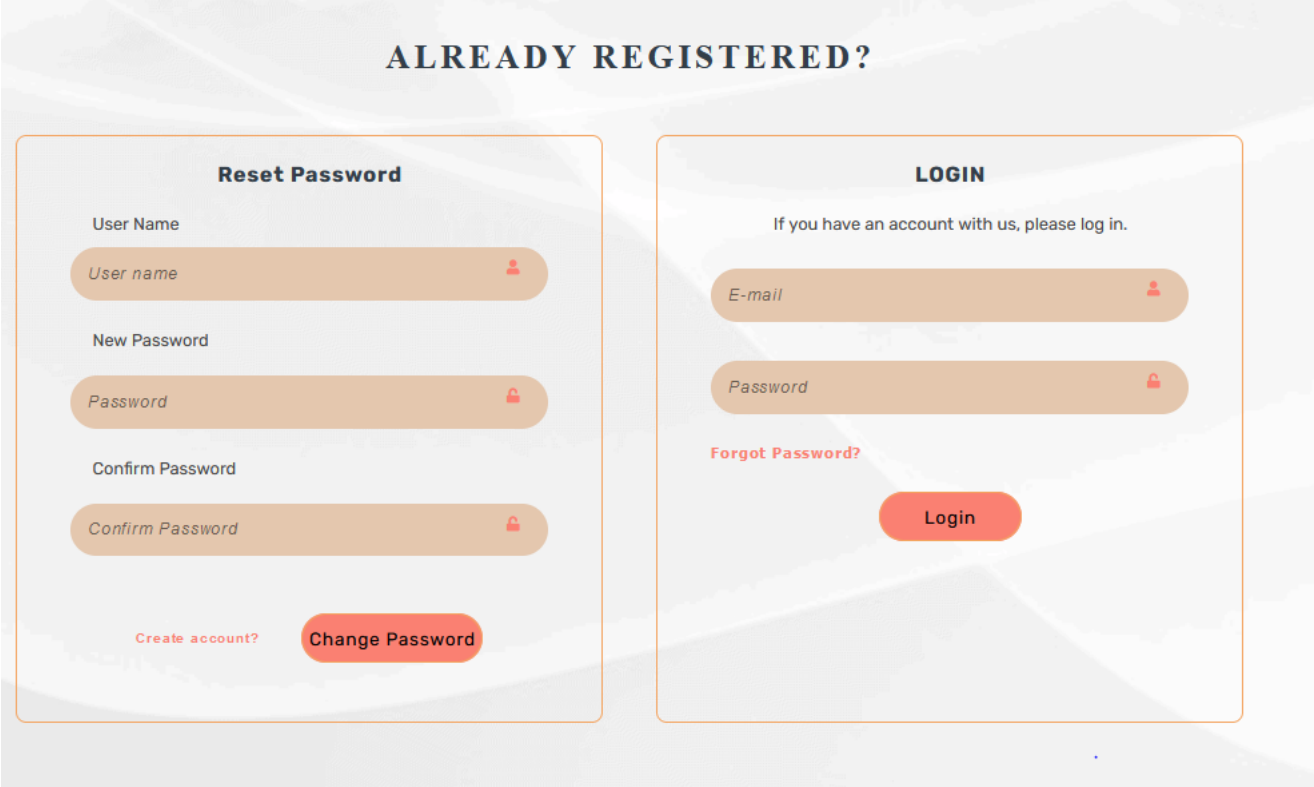

Figure 21: "Reset password" layout

5.7 Shopping cart

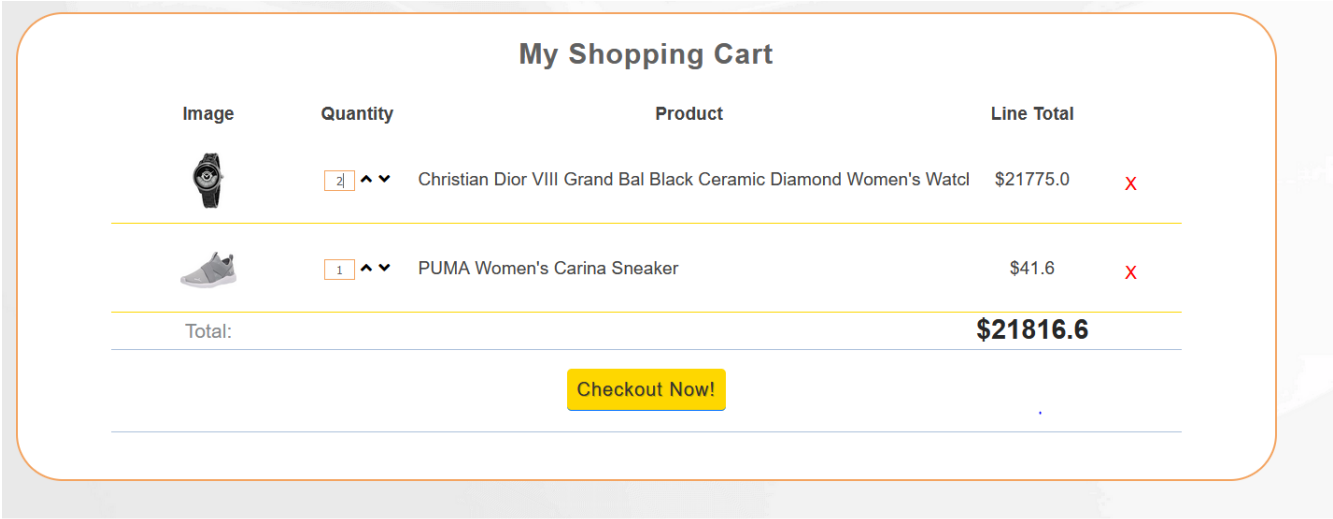

Figure 22: Customer's shopping cart layout

5.8 Admin GUI

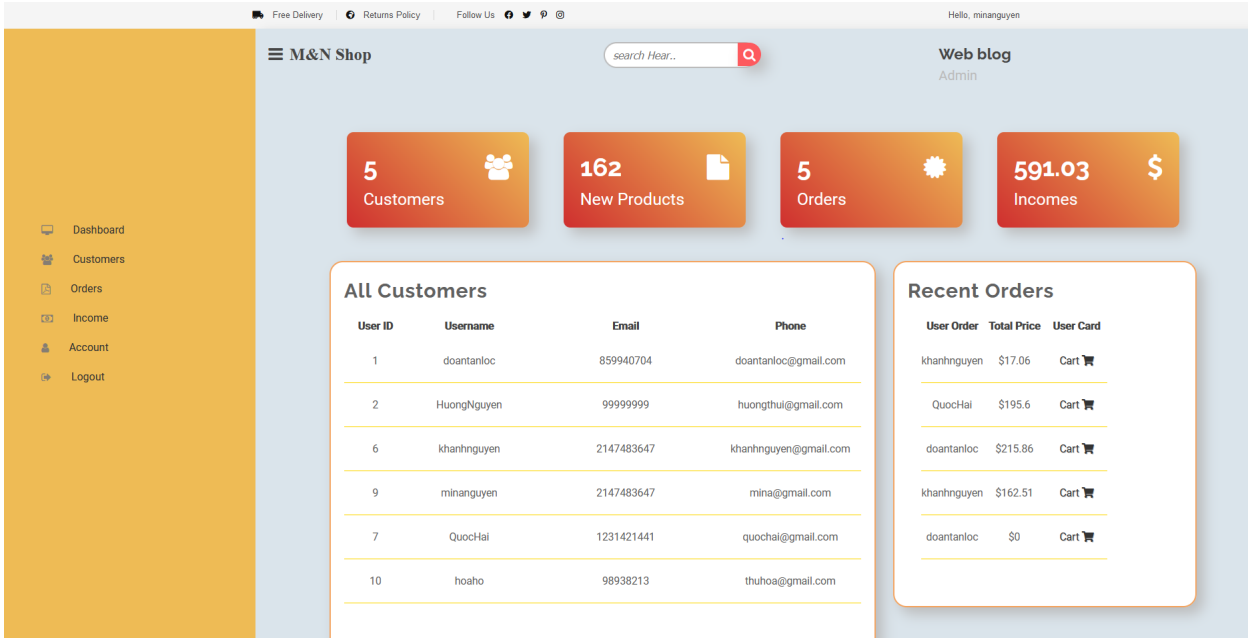

Figure 23: Main Admin layout

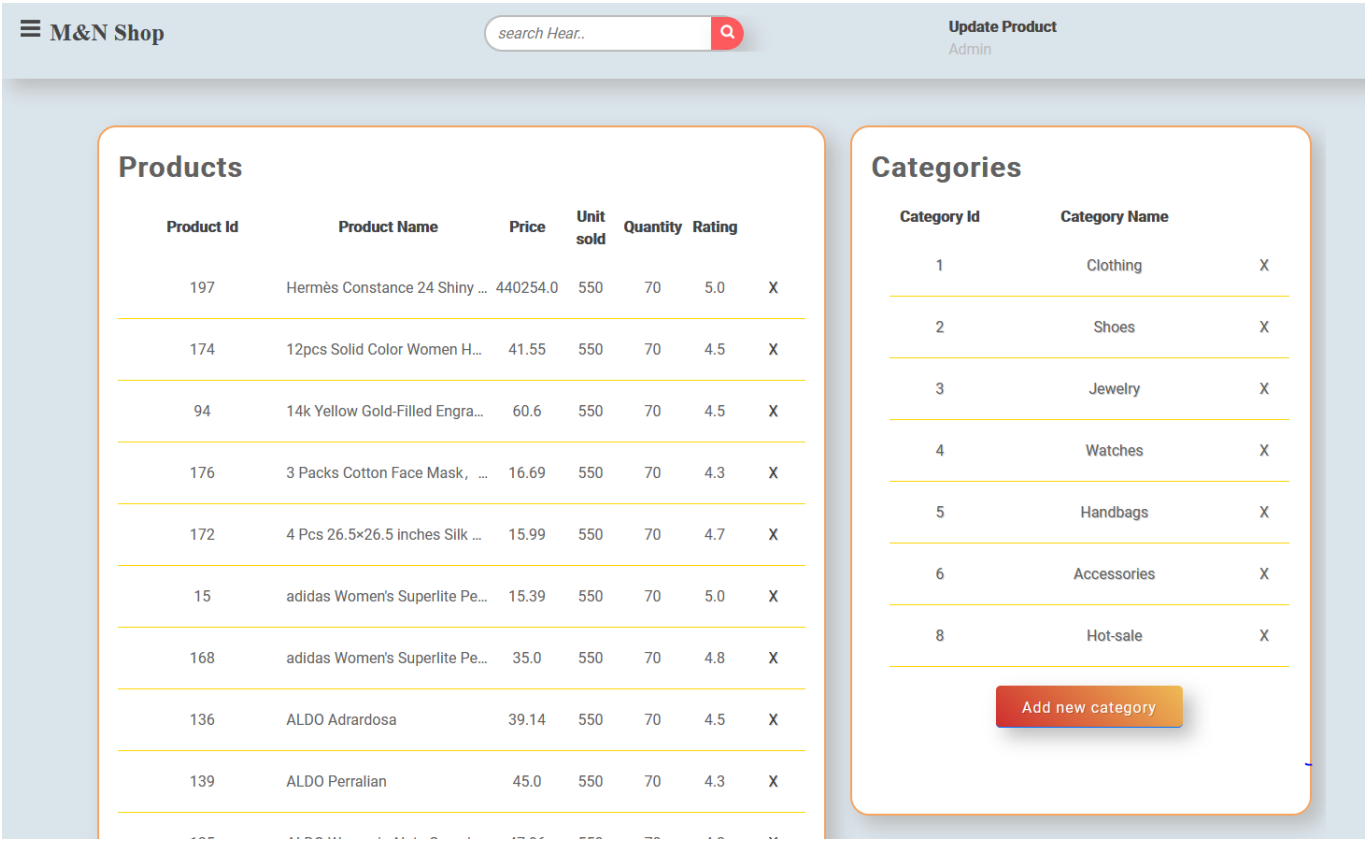

Figure 24: View/ Delete/ Add product and category

5.9 About chatbot

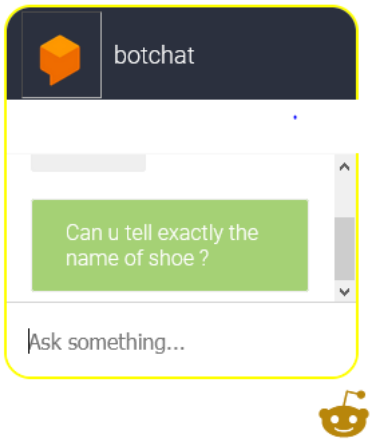

Figure 25: Chabot layout

6 Conclusion

AI Shopping System is a software developed and designed based on technologies that are easy to implement, upgrade, and reuse in other disciplines when integrating SQL and web applications. This is a commercial application, developed at the same time as the country's industrialization and modernization, suitable for strong and user-friendly deployment. The clients can develop this application for any further courses like Principle of Database Management, Web Application Development, Software Project Management... or even for applying into real shop.

6.1 Lessons

After completing this project, our team has completed and learned a lot of experiences that can apply in the future:

- Learned programming skills like Flask for developing a web-based application.
- Understanding mySQL database management tools, and associated programming technologies like Jquery, DOM, Dialogflow, SCSS for saving time and cost.
- Solved many problems and internal conflicts together in the process of working on this project, from which we have gained many experiences in working in a group and working with partners.
- Advanced in Software analysis design skills by improving our document with diagrams.

6.2 Development Potential

The clients can develop this application for any further courses like Principle of Database Management, Web Application Development, Software Project Management...

Principle of Database: for this course, students just need to logically change data with PostgreSQL or SQLServer and link to the existing backend of this project. It is possible to reuse diagrams and develop new and more mature features.
Web Application Development: Most of us have been learning, working, and experiencing like real web subjects using CSS, HTML.
Software Project Management: Based on the available knowledge and from the Software Engineering course we can develop more complete features for this subject.

6.3 Expectation in Future

Besides the completed project, we also have met many limits in process of developing this application. Therefore, there features we want to develop in the future:

- View Customer's list and order history: After a successful purchase, users can review the previous order history as well as the previous orders if they want to re-order the old item.
- Customer can give feedback for shop
- Change product information (as Admin): Admin can easily change basic information of products such as price, description, availability ...
- Add the moderator systemfor the application
- Send order information automatically to the shipper when a user creates a new order: The system will automatically send a notice to the shipper responsible in the delivery area when customers place an order without going through Admin to save time.
- Confirm receipt and no refund (as Customer): After receiving the goods and paying, customers who feel satisfied with the product and service can confirm receipt of the goods to receive a warranty policy from the store. Also, if there is a problem with the goods, customers can report the error and return within the time allowed.
- Warranty Policy: When the customer buys goods within the warranty period but the goods have problems, can keep, and note the problem encountered to the warranty support staff..

7 References

1 Agile Methodology: What is Agile Software Development Model? (guru99.com)

2 About flask framework Welcome to Flask — Flask Documentation (2.0.x) (palletsprojects.com)

3 Owl Carousel Home | Owl Carousel | 2.3.4 (owlcarousel2.github.io)