PineApple

Version 1.0.0

High-Level Design Document

GroupB2

1155173962	DONG Yi
1155173753	SU Yihang
1155173943	YANG Han
1155173774	LUAN Changwen
1155173835	LIANG Leyan

Department of Computer Science and Engineering
The Chinese University of Hong Kong

February 3, 2023

Contents

1. INTRODUCTION

1.1 Project Overview

PineApple is the official online shopping platform of the renowned retail company with the same name. PineApple comes with a clean and clear UI, using which customers can not only have a smooth experience of searching, selecting, checking the cart, and buying using different payment methods, but also monitor the real-time status of their orders, whether it's waiting for payment, shipping, or completed. PineApple's service does not end at customers receiving the products bought. After using the product, customers can go on PineApple to give the product a rating and a reviewing comment to evaluate the product and share their experience with it. To promote sales, PineApple has a comprehensive recommendation system, which combines system-level recommendations based on the products' popularity and personalized recommendations based on the user's browsing and purchase history. Moreover, for the sake of dependability, PineApple has a robust account management system and comes with an administrative user who will ensure the normal operation of PineApple. Overall, PineApple is a reliable and user-friendly solution for experiencing the thrill of shopping without leaving home and leveraging the internet to ease life.

1.2 System Features

1.2.1 Basic Requirements

In general, we are going to implement an online shopping mall system, where users can search for products, add them to shopping carts and make purchases, while administrators can manage the account and add or delete the products.

Specifically, the system should contain the following basic features:

(1) A user-friendly UI. Similar to existing online shopping malls, the UI is required to be clean and clear, so that users can understand how to use it without referring to any documentation. On the basics, we will implement the following pages: homepage, shopping cart and search page. In the homepage, there should be a search bar in the middle, where users can input and search desired products. The icon for the shopping cart should also be placed. Other areas can be filled with automatically recommended products. In the shopping cart page, the product that users have added should be listed. There should be icons for selecting, deleting and purchasing the products. In the search page, all the relevant products should be displayed according to the searching and recommender algorithms. There should also be a search bar for the users to search for another product conveniently. Also, the shopping cart page and search page should have the link back to the homepage.

(2) Account management. The users should be able to register for an account and then login with it. Information in the shopping cart and personalized shopping preference should correspond to the account.

(3) Administration User. There should be an administrator at the server end, who is able to view the information of all the users/products, and add or delete users/products. The administrator should do these operations in another interface different to normal users.

(4) Product searching details. A product should contain several information: product ID, name, price, category, descriptions, image, stock, number of sales, etc. Users can search a product with the product ID or name, and the recommender system should rank the products with relevance. Users can also filter the products by price, category, etc.

(5) Shopping cart details. Users can choose the purchase number and add the products to the shopping cart, as long as there are enough products in the stock. The shopping cart page should display all the added products, and users can select certain products and choose to remove or purchase them. Before purchase, the system should check again whether there are enough products in the stock. After the purchase is successful, the stock number of the product will decrease accordingly.

1.2.2 Advanced Functionality

Our website further provides the following advanced features for better user experience.

(1) System recommendation. Recommend to all users, recommend currently popular products or promote affordable products or newly launched products to promote product sales.

(2) Personalized recommendations. For different users, more accurate recommendations are given based on their historical search, browsing records and page dwell time. The system can achieve precision by referring to the users' purchase history and reviews and ratings given to the products bought.

(3) Order management. The system will record the order time, number, and classification of customer orders. Users can view the order status such as paid, pending shipment, shipped, completed, etc. in this module. At the same time, the system will update the database in real-time to avoid problems caused by overbooking.

(4) Product review and rating. The website will adopt the five-point scoring strategy currently used by the mainstream. The five-point scale model is very close to the standard for users to judge the quality of things. In addition to the basic three points of 1 point for poor, 3 points for average, and 5 points for excellent, three basic evaluation options are available. In addition, there are two fuzzy evaluation options: 2 points as poor and 4 points as good. A comment window is also set up below the rating window. Users can evaluate the product based on their actual use experience and attach pictures.

(5) Payment system. The mall supports multiple payment methods. After the user places an order, a payment page will pop up, the user can choose a preferred payment method from WeChat, Alipay, Payme, and credit cards. After payment, the system will automatically refresh and enter the order tracking page.

2. SYSTEM ARCHITECTURE

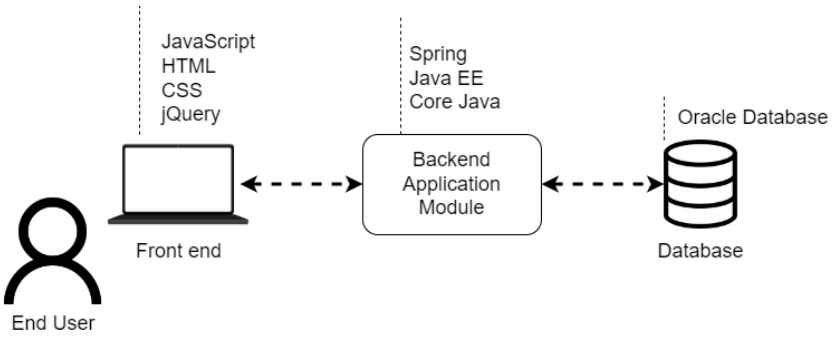
2.1 Technologies

The technologies that our project will apply include: JavaScript, HTML, CSS, jQuery, Java, Hibernate, Oracle Database and Git.

For the front-end aspect, we will utilize HTML and CSS to define the static layout of webpages and utilize JavaScript and jQuery to add interactivity and dynamic features. At the same time, we will use Vue as a framework to simplify the development process.

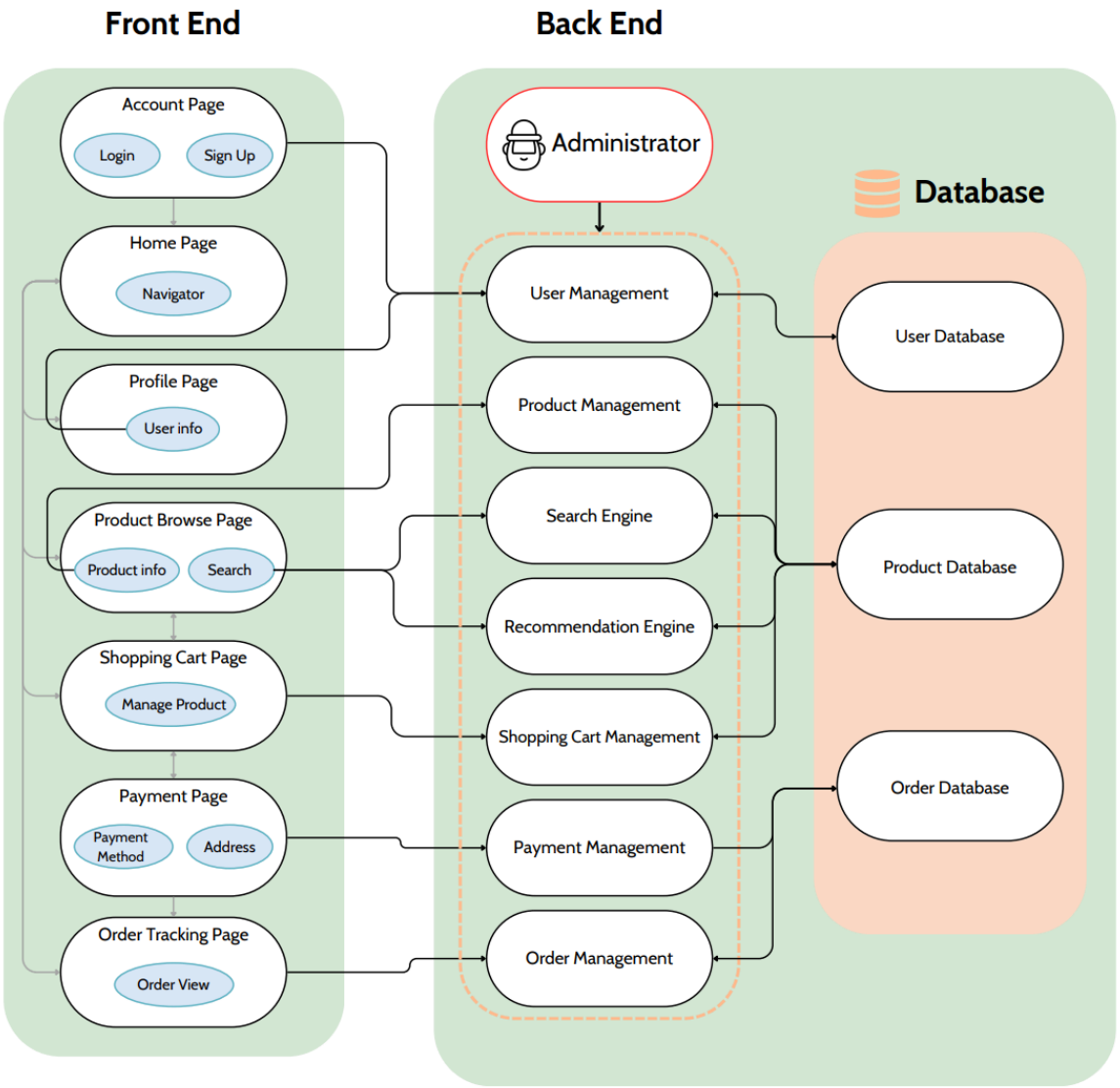
For the backend aspect, our project mainly uses Java as the main language and adopts Spring MVC as the main framework to manage objects and implement dependency injection. We will also use Hibernate to implement database interaction.

For the deployment aspect, we will adopt Git to help configure and manage servers, this will maintain security and stability of the website.



Technology

2.2 Architecture Diagram



2.3 System Components

The client-side (Front end) and server-side (Back end) consist of different components that can interact with each other. In the front end, there are seven pages, as shown in rectangular, including a start interface Account Page, a navigation interface Home Page, and five functional interfaces. Functions and operations corresponding to each page will be displayed in the ellipse. There are many modules in the back end that execute commands and give feedback based on the user's actions in the front end. The administrators of the PineApple can manipulate the codes and data in the back end directly from the administrator module.

On the Account Page, the starting interface of our online shopping mall, users can choose to sign up, log in or retrieve their password. On the back end, the User Management module will help collect and register new user information and verify the user's account password pairs.

On the Home Page, which is the navigation page, the users can choose to go to other pages to use the website features they need.

On the Profile Page, users can view and change their preference settings, such as payment account, shipping address, etc., or use the private chat feature to communicate with the seller. The User Management module in the back end will store and update these data, while the chat engine will implement the chat box functionality.

On the Product Browse Page, users can browse the products automatically recommended by the system or search for the products they want to buy, view detailed product information and add them to the shopping cart. The Product Management module in the back end is responsible for collecting and displaying the product information, and the Search Engine will search for qualified products based on the keyword and give the users the highly rated results they need by using the Recommendation Engine.

On the Shopping Cart Page, users can manage their selected product and choose the desired products to pay through the back-end Shopping Cart Management.

On the Payment Page, users will choose the payment method and corresponding account and provide a delivery address. The Payment Management module will verify the account and password and then give feedback on the success or failure of the payment.

On the Order Tracking Page, users can check the order status of their purchases for delivery times. The Order Management will help update the courier's delivery in real-time.

For the Database module, all the data will be divided into three categories: user, product, and order data, and placed in the PineApple database.