



# **Pet Care Management System—Front-End Design**

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**Abstract:** With the rapid development of Internet technology, we have entered the “Internet +” era, and all walks of life began to move closer to the Internet. Many industries began to develop their own web pages to show everyone their products and corporate philosophy so that new and old customers can know their latest products in the first place. Considering that more and more people in the family are starting to keep pets and they are treating pets as part of the family, they are increasingly concerned about the life and health of pets, so our group has developed a set of pet care appointments and pet products to purchase. A pet care management system. This system can help pet owners to take care of their pet baby more conveniently.

This project is a back-end management project based on the B/S model. The project adopts the MVC design pattern. The front end uses the Bootstrap framework, the database uses the MySQL database, and SVN is used as the project management tool. After the project is completed, an environment is set up on the cloud server, and a war package is installed on the server. At the same time, the initial application of the project on the Android terminal is completed. This article introduces the MySQL database, ajax, json, and MVC patterns used in the front-end development process.

**Keywords:** MySQL; ajax; json; MVC

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## **1. Introduction**

### **1.1 Software background**

With the development of Chinese society, the importance of pets in people’s lives is getting higher and higher, for many people, pets have become a family member of the family; for another part of the people, pets are more like a kind of spiritual sustenance, which together show that pets have become an indispensable part of our lives. The fast pace of modern life also makes more and more people have no time to go to pet stores to buy various pet supplies, and even sometimes go to pet agencies to cut pet hair and need to wait in line, which is very inconvenient for people who are tight on work hours. Therefore, it is particularly important and urgent to establish a pet care management system so that all of the above problems can be solved. People can browse the pet supplies online at home, and after purchase, they can deliver to the door; at the same time, they can also make an appointment online in advance to give pet care, and go when the time comes, eliminating the trouble of queuing and the waste of time.

This system has the shopping function of the e-commerce system, and it is also possible to make online reservations. Users can not only easily purchase the daily necessities of the pet, but also make an appointment with a pet doctor to care for the pet. The development of the Internet is constantly improving our quality of life, but also making our lives more and more convenient.

The design of the pet care management system conforms to the development trend of the Internet, and at the same time, it is really convenient for pets to become a part of our lives, so that we can better take care of and love them.

### **1.2 Software implements functionality**

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The main purpose of the pet care management system is to facilitate pet owners to buy pet daily necessities without leaving home and make an appointment with a pet doctor. This pet care management system mainly includes the registration module, login module, background management interface, shopping interface, public information page, shopping page and appointment interface settings.

The registration interface can be divided into user registration and administrator registration. In the user registration interface, users need to enter their own information such as name and enter their own user password to submit. After the successful submission, our data will save the user information and establish the corresponding form, and the next time the user logs in to the pet management system, it is only necessary to query the user's account information directly from the database and match it. If the account information is successfully matched, the user can enter the pet management system system. The administrator registration interface is basically similar to the user registration interface, different from the user registration interface, the administrator has already included a part of the information in the database when registering, and the management needs to fill in its own administrator number.

The login interface is also divided into user login and administrator login. The user enters his registered account and password in the login interface, and when he clicks to log in, he will extract the user information entered by the user at the time of registration from the database, and if it is successfully compared, the user will enter the interface of his pet care management system. After successful login, the user will enter the user selection interface of our pet management system, the user can select the pet type and pet care method, and then select options such as care time. The administrator login interface is basically similar to the user login interface, the difference is that the management jumps to the management interface after successful login, and the administrator can choose user management and pet management.

The background management interface is mainly for merchants to carry out commodity statistics, add commodities, classify statistics, add categories, view orders and order details, facilitate administrators to manage various types of commodities, and change the price and quantity of commodities according to demand.

Public information includes some dynamic information about pets and a brief introduction to our management system. Publishing some dynamic and static information about pets can help users take better care of their pets, and can understand some of the current pet information and developments.

The shopping interface includes food, toys and daily necessities needed by pets, and users can add different quantities of goods to the shopping cart according to their own needs to save and buy cheaply during the event.

The appointment screen includes the time of the appointment, name, and the content of the appointment. Where dates use Date Pickers to provide users with date and time input boxes, which can save time for typing date input, the processing efficiency of data is also improved

### **1.3 The current state of the relevant software**

At present, most of the websites about pets at home and abroad are limited to the purchase of pet food and daily necessities, the function is too single, and more and more people keep pets, such websites have been unable to meet the needs of people to take care of pets in a comprehensive and convenient way. The pet care management system management system solves the problem of single function very well, adds the appointment function, and brings more intimate services to users.

### **1.4 The meaning of the software implementation**

The design of the pet care management system, for the user, can save time, according to their own time to arrange nursing activities; for the manager, it is convenient to increase or decrease the number of goods, and at the same time can be arranged in advance according to the time of the user's appointment, reducing unnecessary waste of manpower and material resources. This is a kind of progress in the development of software, which provides a lot of convenience for people's lives.

## **2. Related technologies**

### **2.1 Introduction to MySQL databases**

The system database mainly uses the relational database MySQL database, which has been incorporated by Oracle. This is a database system that is very popular in the open source world and the Web community, and has become the standard for free database software. Its public-facing and easy-to-understand solution is sought after by database administrators and database users. In MySQL, the database is stored in different tables, which not only increases speed, but also increases flexibility. MySQL's technical support and product quality perfection is not as good as commercial products, its small size, speed and support for many systems focus on its low cost, so it has become the first choice for the development of many small and medium-sized websites. MySQL database is open source, its interface supports many language operations, such as: C#, C++, Java, etc., high cross-platform. The core program of the MySQL database adopts multi-threaded programming, which can support a database with tens of thousands of records, only need to modify the corresponding application, and the operation is convenient<sup>[1]</sup>. MySQL is highly diverse, and the user interface is also very diverse, including web browsers and programming language interfaces.

### **2.1.1 Indexing function**

Indexes are a special kind of file (indexes are part of a table space on an InnoDB data table) that contain reference pointers that can reference a data table index record. Of course, indexes are not a panacea, and although indexes can be used to speed up data retrieval operations, there is also a phenomenon that slows down data modification operations. Each time a data record is modified, it must be refreshed and takes up a significant portion of the space on the hard disk. Therefore, we build list indexing to facilitate querying data and tables. We use char and varchar type data to define indexes. The index thus defined is not only small in size but also extremely fast to retrieve.

## **2.2 Introduction to AJAX**

### **2.2.1 About ajax**

Ajax full name is Asynchronous JavaScript and XML, this technology can quickly create dynamic web pages, that is, asynchronous JavaScript and XML through a small amount of data exchange in the background, Ajax can refresh a part of the web page, rather than reloading the entire web page; compared to the traditional web page, we want to update the content of the web page need to update the content of the entire web page, rather than the part of the web page that needs to be updated. Ajax supports many browsers as running platforms, such as Mozilla, Firefox, Internet, Explorer, Konqueror, Safari, and Opera, where Opera does not support XSL format objects or XSLT.

### **2.2.2 Synchronous and asynchronous**

Asynchronous transmission is a relatively flexible form of transmission, it does not require the sender and receiver to reach a transmission state in advance, you can send data at any time, real-time is strong. In the data organization mode is similar to the form of packet transmission, generally according to the network protocol can be self-sized packet size, the data encapsulated into frames for transmission. When transmitting asynchronously, the data is often based on bytes or double bytes, and the method similar to the Ethernet frame predeterminator is used to increase the start and end bits and stop bits to unify the clock cadence. The principle is that the special placeholder data is used to remind the receiver that a frame has arrived, and it is necessary to prepare for the subsequent data processing at the end of the start bit, so that both the sender and receiver can enter synchronization. Obviously, although asynchronous data is flexible, it will be relatively expensive at the end and end.

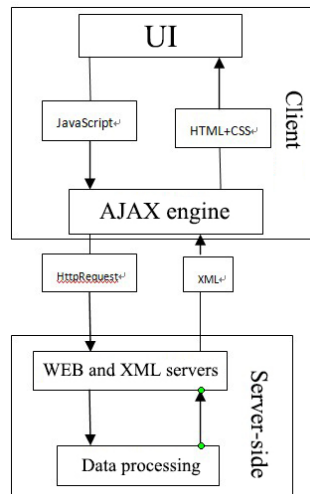
Synchronous transmission is a real-time working mode, which requires a unified pace of both the sender and receiver, and the clock frequency is also subject. So sync frames also have end-to-end placeholders to unify the frequency. The data portion of a synchronous frame is not as small as asynchronous, and tends to be much larger, so the overall network data volume overhead is relatively small. However, the negotiation before the initiation of the synchronous transfer needs to consume more efficiency, and is not as flexible as the asynchronous transfer, so as much data should be transferred as possible under a negotiated synchronous transfer. Other synchronization requests also need to wait more time.

All in all, asynchronous transfers are suitable for applications with frequent data nexus requests for a small number of data. Synchronous transmission is more suitable for networks with large data volumes and real-time connection re-

quests that are relatively infrequent.

### 2.2.3 Ajax principle

- Step 1: JavaScript sends asynchronous requests;
  - Step 2: The server queries the database and returns the data;
  - Step 3: The server returns to Response;
  - Step 4: The client manipulates the DOM in JavaScript based on the returned Response.
- The specific relationship is shown in **Figure 2-1**.



**Figure 2-1.** Ajax schematic.

### 2.2.4 Ajax cons

- 1. There are security issues that will expose the methods of the server side, and hackers can use this to attack;
- 2. The normal behavior of the browser back button may be broken;
- 3. Since Ajax does not reload when it is refreshed, the page has not changed significantly, and it is not very clear whether the data is updated or the original<sup>[2]</sup>.

### 2.2.5 Ajax advantage

- 1. The interaction between the Web page and the server does not affect the page, does not need to be reloaded as a whole, and the seamless operation is very good to improve the user's experience;
- 2. Rational use of broadband resources, rational organization and utilization of redundant resources and idle time periods, effectively improve efficiency, save bandwidth and time and space costs;
- 3. Ajax doesn't require too many embedded extensions, but requires support for JavaScript (JS), which is basically a generic script supported by various browsers. This does not affect its applicability. The JS script is responsible for basic interaction and control, and the data is processed by the logic module and database related module of the server through XML.

## 2.3 Json introduction

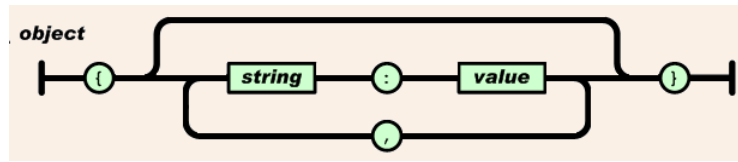
### 2.3.1 About Json

Json, whose full name is "JavaScript Object Notation", was proposed by Douglas Crockford in 2001 and is an XML-like data format language with a simple and straightforward formal syntax. Not only is it easy for people to read and write, but it's also convenient for machines to parse and generate, which is easier than extending the markup format.

### 2.3.2 Json form

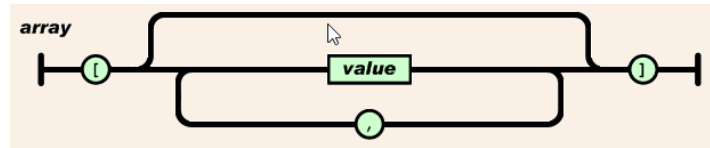
In json format, each pair of basic paragraphs enclosed by the "{}" symbol is called a set or object. It can be empty or contain data similar to key-value pairs. Keys and values are a group, separated by a colon of ":". If there are multiple

groups in the object, separate them with a comma “,”. As shown in **Figure 2-2**:



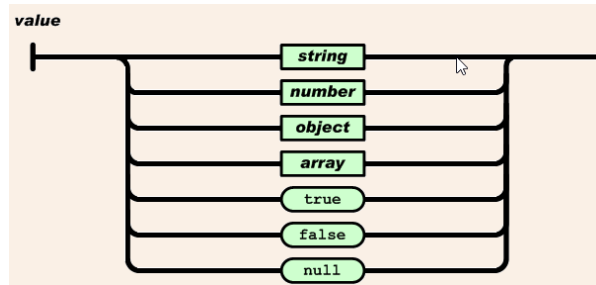
**Figure 2-2.** Collection diagram

Another basic paragraph is an array, which expresses the same meaning as arrays commonly found in programming languages. Array paragraphs are bounded by “[ ]”. Where the individual element values within it are separated by commas. As shown in **Figure 2-3**:



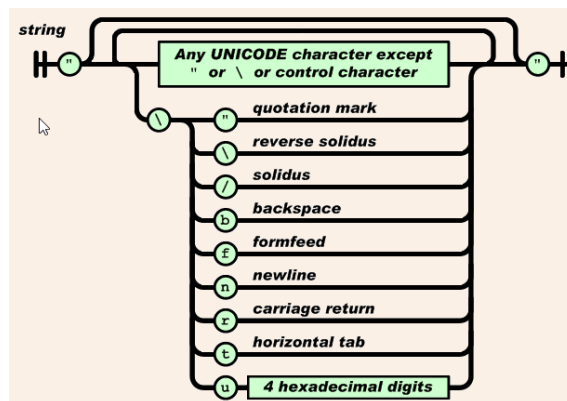
**Figure 2-3.** Array diagram

The type of value can be any of the ones shown in Figures 2-4. It includes basic types such as string, number, logical true/false, etc., and can also be complex types in the object described above or arrays, and can also be empty. As shown in **Figure 2-4**:



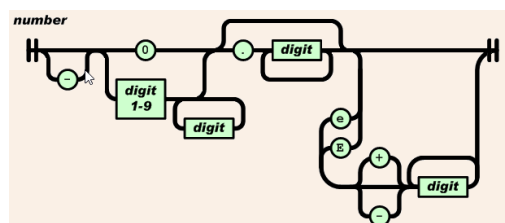
**Figure 2-4.** Value type graph

In programming languages, strings are sequences of characters, and here there are no characters but strings. Support for Unicode character sets. Theoretically, there is no limit to the length of the sequence. By convention, “/” is also known as the transition character, which matches the escape symbol. As shown in **Figure 2-5**:



**Figure 2-5.** String diagram

On numeric representation, json supports integer, floating-point numbers, and scientific notation of counts. As shown in **Figure 2-6**:



**Figure 2-6.** Numerical plot

## 2.4 Introduction to MVC

### 2.4.1 About MVC

MVC is the abbreviation for Model View Controller, model is the model, view is the view, and controller is the controller. It organizes code through interfaces that show methods that are decoupled from business logic and data. MVC is used to separate the business model from the user interface.

### 2.4.2 Advantages of MVC

1. The use of MVC in the program makes the three parts of the model, view and controller independent of each other, and any one of the three changes will not affect the other two, so the coupling is reduced<sup>[3]</sup>;
2. In MVC mode, multiple views can share a model, separate data and business rules, and improve the reusability of code;
3. Separating the view layer and the business logic layer makes it easier to maintain and modify the WEB.

### 2.4.3 MVC cons

1. The internal principle of MVC is very complex, it needs to be carefully considered and then applied, and it is a little difficult to fully understand MVC;
2. The view and model of MVC must be completely separated, otherwise it will add a lot of difficulties to the programmer debugging program, so it needs to be thoroughly tested to use the three components of MVC.

## 3. System design

### 3.1 System Requirements Analysis

This system is mainly developed so that people who like to keep pets can easily make pet care appointments and buy pet food without going out. Because the types of users are different, the modular development of the MVC mode is very convenient for adding or decreasing the functions of the system in the future. The front end of the system uses the Java+HTML+css+js method for page design, and when the page needs to be modified, it is modified in the Java project

The first time the user of the system logs in, the user needs to complete the registration, the user can query the required items in the search box, you can also make an appointment for pet care, add goods into the shopping cart. The administrator of the system is the administrator of the entire system, who can add or delete goods and provide online reservation services. The page of the system should be clean and generous, the content should be rich and specific, and the safety factor should be high to prevent customer information leakage. The database is the key to adding or subtracting information in the whole system, so the connection rate of each table should be high, and the naming must be standardized.

### 3.2 System framework composition design

The pet care management system is a background management project developed based on the B/S mode, which is designed in the MVC mode to establish contact with users through models, views, and controllers to convey data information. First, the user input command is passed to the model through the controller, and then the business logic judgment is made, the access to the data is determined, and different views are selected according to the business logic, and the result is presented to the user. The specific relationships of users, controllers, views, models, and databases in the system are shown in **Figure 3-1**.

### 3.3 Module Design

#### 3.3.1 Login Module

Users log in to the pet care management system for the first time to register, can support QQ, WeChat, Weibo and Alipay login, users need to set a password. The next time you log in, you will query the user registry according to your

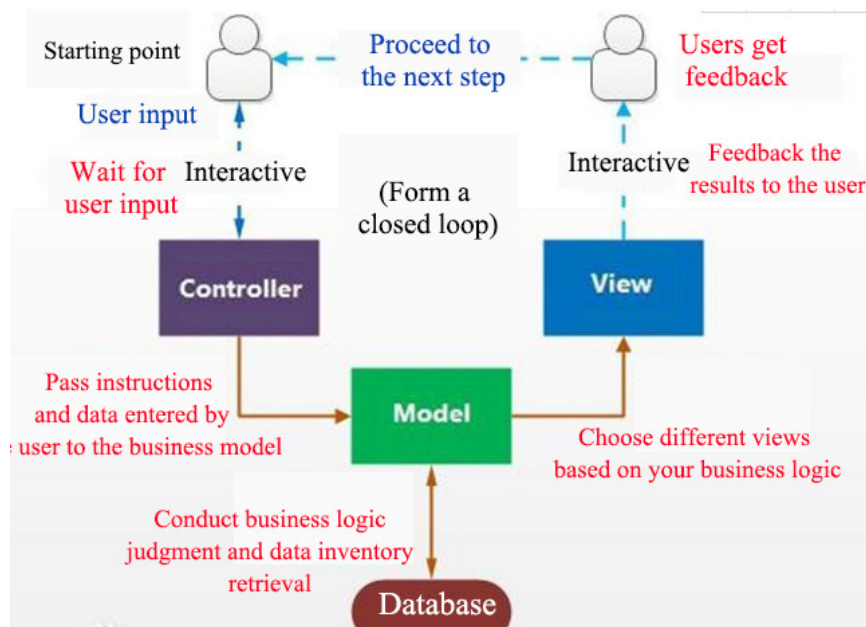


Figure 3-1 Diagram

account number and password to see if the user exists, if it exists, you can log in directly; if it does not exist, you need to register. In addition, when the user forgets the password also has the forgotten password retrieval function. Users who have successfully logged in can purchase goods or make an appointment with a pet doctor.

### 3.3.2 Verifying modules

Each user login system needs to retrieve and analyze its login data, verify the existence of the user can log in to the system, and if the verification fails, you need to re-enter the personal information until the verification is successful.

### 3.3.3 Processing Information Module

Login module, registration module, shopping cart module, etc. are associated with the created database, each operation needs to retrieve data to judge, if successfully pass the judgment can be carried out the next step of the activity, if not through the judgment will prompt the operation to fail or the page does not respond.

### 3.3.4 Background information management module

Since the pet care management system not only has a pet care appointment function, but also the sale of pet-related products, a background information management module has been set up, which includes commodity statistics, adding products, categorizing statistics, adding categories, viewing orders and order details. The establishment of these modules can facilitate the management of information and improve the efficiency of work for back-office workers.

### 3.3.5 Product Addition Interface

Regarding the sale of goods in the pet care management system, a product addition interface has been set up, which is mainly used for merchants to add product information, including product name, price, quantity, listing, removal, product pictures and descriptions of products. It can allow merchants to update the product information in a timely manner to facilitate the user's purchase.

## 4. Code implementation

### 4.1 Login Registration Module Section Code

Mainly including the user's registration, forgot password and password login, part of the code is shown in **Figure 4-1**.

Define the items in the list of `<li>` and registrations that define the login and registration, `<a href="">` password in the login `</a><a>` tag's href attribute determines the destination of the connection.

```

<li class="login_title_1">
  <a href="#">Password login </a>
</li>
<li>
  <input name="username" class="login_user" type="text" placeholder=" The user name " />
  <input name="password" class="login_password" type="password" placeholder="password" />
  <input class="login_btn" type="submit" value="login" />
</li>
<li class="login_select">
  <a class="weibo" href="#"> Weibo login </a>
  <a class="zhifubao" href="#"> Alipay login </a><br />
</li>
<li class="renmember_user">
  <input type="checkbox" value="remer_user" id="remer_user" />
  <label for="remer_user"> Remember the user name </label>
</li>
<li class="login_bottom">
  <a href="#">Forgot password </a>
  <a href="#"> Sign up for free </a>
</li>

```

Figure 4-1 Login registration code diagram

## 4.2 Background information management module part code

The background information management module mainly includes commodity statistics, adding commodities, categorizing statistics, adding categories, viewing orders and order details, and its implementation code part is shown in Figure 4-2:

```

<span class="nav-label">Background information management</span>
<span class="fa arrow"></span>
a>
l class="nav nav-second-level">
<li>
<a class="J-menuItem" href="{pageContext.request.contextPath}/product/findPageBeanList.action">Commodity statistics</a>
</li>
<li>
<a class="J-menuItem" href="{pageContext.request.contextPath}/product/getAddPage.action">Add products</a>
</li>
<li>
<a class="J-menuItem" href="{pageContext.request.contextPath}/category/findPageBeanList.action">Categorical statistics</a>
</li>
<li>
<a class="J-menuItem" href="{pageContext.request.contextPath}/category/getAddPage.action">Add a taxonomy</a>
</li>
<li>
<a class="J-menuItem" href="{pageContext.request.contextPath}/oroderBack/findPageBeanList.action">View orders</a>
</li>
<li>
<a class="J-menuItem" href="{pageContext.request.contextPath}/oroderBack/findOrderItem.action">Order details</a>
</li>

```

Figure 4-2. Code diagram related to background management

Gets the root directory of the current types of information that needs to be managed, and obtains it by using the statement `{pageContext.request.contextPath}`.

## 4.3 Add module part code to the product

The product addition module mainly includes product name, price, quantity, listing, removal, product picture and product description, some of which are shown in Figure 4-3 and Figure 4-4.

```

<div class="input-group input-group-sm">
  <span class="input-group-addon" id="sizing-addon3"> classify </span>
  <select class="form-control" id="ParentCategory" onchange="selectCategory(th
    <option value=""> Please select </option>
  </select>
  <select class="form-control" id="Category" name="category_id">
    <option value=""> Please select </option>
  </select>
</div>

<div class="form-group">
  <label>Product name </label>
  <input type="text" id="name" name="name" class="form-control" placeholder="Product name">
  <span id="nameInfo" > </span>
</div>

<div class="form-group">
  <label>subheading </label>
  <input type="text" name="subtitle" class="form-control" placeholder=" subheading ">
</div>

<div class="form-group">
  <label >price </label>
  <input type="text" name="price" class="form-control" placeholder=" Please enter a price">
</div>

<div class="form-group">
  <label >quantity </label>
  <input type="text" name="stock" class="form-control" placeholder="Please enter the quantity">
</div>
<div class="form-group">

```

Figure 4-3. Product-related content code diagram



```

<div class="form-group">
  <label >state</label>
  <select name="status" class="form-control">
    <option value="">state</option>
    <option value="1">shelves</option>
    <option value="2">take it down</option>
  </select>
</div>
</div>
<div class="form-group">
  <label>creation time</label>
  <input type="text" name="createTime" class="form-control" placeholder="creation time">
</div>
<div class="form-group">
  <label>update time</label>
  <input type="text" name="updateTime" class="form-control" placeholder="update time">
</div>
<div class="form-group">
  <label >main product image </label>
  <img alt="" id="imgId" src="" width="100" height="100">
  <input type="hidden" id="main_image" name="main_image"/>
  <input type="file" name="pictureFile" onchange="uploadPic()"/>
</div>
<div class="form-group">
  <label>product image</label>
  <a href="javascript:void(0)" class="picFileUpload" id="picFileUpload">upload an image</a>
  <input type="hidden" name="sub_images" id="sub_images"/>
<div id="J_imageView"></div>
</div>
<div class="form-group">
  <label>product description</label>
  <textarea style="width:900px;height:300px;visibility:hidden;" name="detail"></textarea>
</div>

```

**Figure 4-4.** Product status code diagram

<label> labels have no special effects to show to the user, but clicking on the text in them, the label-related form controls will make the browser automatically divert attention. For example, the <label > number in the statement </label>.

## 4.4 Partial refresh code

Figure 4-5 is about the partial refresh function implementation code of ajax in the page:

```

$(function () {
  $.ajax({
    url:"${pageContext.request.contextPath}/category/parenCategoryList.action",
    dataType:'json',
    success:function (data, textStatus, ajax) {
      var html = "<option> Please select </option>"
      for (var i = 0; i < data.length; i++) {
        html += "<option value='"+data[i].id+"'> " + data[i].name + "</option>";
      }
      $("#ParentCategory").html(html);
    }
  });
});

function selectCategory (Obj) {
  var parent_id = $(Obj).val();
  $("#Category option:gt(0)").remove();
  $.ajax({
    url:"${pageContext.request.contextPath}/category/categoryList.action",
    dataTypr:'json',
    data:"parent_id="+parent_id,
    success:function (data, textStatus, ajax) {
      var html = "<option> Please select </option>";
      for (var i =0; i < data.length; i++) {
        html += "<option value='"+data[i].id+"'> " + data[i].name + "</option>";
      }
      $("#Category").html(html);
    }
  });
}

```

**Figure 4-5.** partially refreshes the code map

url:"\${pageContext.request.contextPath}/category/parenCategoryList.action", the requested address is sent via url; dataType: json", the returned data type is "json"; success:function (data, textStatus, ajax) Defines the data to be processed after the request is successfully sent according to the dataType parameter.

## 5. Implement the function

### 5.1 Login Page

The login page is designed to allow users to log in to determine whether to register, and only users who can log in can purchase products. To complete the login, you need to enter the account number and password, the entered account

and password need to retrieve the database data for comparison, and then submit the information to the server, the server reminds according to the feedback information: if it is correct, you can log in; if the password is wrong, you can forget the password; if there is no account, you will be reminded to register. The design of the login page can effectively help users manage personal information, push goods according to personal preferences, and make users' shopping cheaper.

## 5.2 Floating window

The floating window is set up with online reservation content, and the information that needs to be filled in will pop up when making an appointment, mainly including name, reservation content, and appointment date. The date uses Date Pickers (data exporter) to provide users with a date and time input box, which saves the time spent typing for date input and improves the efficiency of data processing<sup>[4]</sup>. Among them, data is to select the year, month, day, moth is to select the year, month, week is to choose the year, week, datetime is to choose the year, month, date and time. The design of this floating window is a reminder for users to make an appointment, and at the same time, the operation is simple and convenient, and the user can grasp it quickly.

## 5.3 Shopping Cart

First of all, the user needs to register and log in, and then click the shopping cart icon, you can enter the order interface of the existing items in the shopping cart, at this time you can add or delete items to the shopping cart, purchase goods and submit orders. In this process, some of the interface refresh functions of ajax will be used, and there is no need for overall reloading, and the seamless operation is very good to improve the user experience.

## 5.4 Background information maintenance

Mainly the merchants delete the existing goods on the platform, or put on and off the shelves, or change the price of the goods, the existing quantity of the goods, the statistics of the goods, view the user orders, classify the orders, speed up the delivery speed, and improve the work efficiency of the merchants. At the same time, it can also allow users to keep abreast of the information changes of the goods and purchase according to their needs.

## 6. Conclusion

The project is a platform where you can make reservations and buy pet supplies, so that pet owners can buy the right pet supplies without leaving their homes, while also eliminating the need to wait in line.

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