Construction of Real Estate Network Marketing System based on mobile Internet

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Abstract: Nowadays, Internet marketing has spread to all walks of life, and the marketing method of the real estate industry is gradually transitioning from traditional offline marketing to online marketing. On the one hand, this method of network marketing can change the way consumers acquire housing data and consumption behavior; on the other hand, it is convenient for enterprises to collect user information and needs. This paper designs and develops a real estate marketing system based on the idea of mobile Internet and Python technology by analyzing the current situation of real estate industry marketing and users' needs for housing information, and supports logging in webpages on different devices by setting webpage adaptation. The system can collect statistics on sales performance, consumer behavior records, etc., to provide reliable data for real estate companies to formulate marketing strategies; and use webVR technology to realize virtual reality viewing, allowing consumers to grasp better housing information. The communication between customers and sales is transferred online, which improves work efficiency while saving costs for both parties.

Keywords: Python; Real Estate Sales; webvr; Marketing system

1   Introduction

With the rapid development of mobile Internet technology, the real estate marketing model has undergone tremendous changes from a micro to macro perspective, including external micro changes such as the way consumers obtain housing information, consumption patterns, and corporate marketing footholds. The rapid development of network marketing has made the communication between real estate companies and customers real-time and unobstructed, and customers' needs for personalized house inspections and house purchases can be fully satisfied. It is particularly important to construct a new real estate marketing method, using the Internet for marketing can not only reduce the cost of selling real estate commodities, but also broaden the sales channels of real estate companies and improve the sales efficiency of housing listings [5]. The most important part of real estate sales is to look at the housing stock, in the traditional sales method, the sales should bring consumers to check each real estate apartment type they intend. Moreover, it is very likely that after taking customers to see many houses, customers have not confirmed their purchase intentions. This kind of sales method consumes a lot of capital and time and has low sales efficiency. Using the method of Internet marketing, consumers can

log in to the real estate sales system of the enterprise through a mobile phone or computer to view the information of the house and confirm the purchase intention by communicating with the online customer service sales which not only saves the time for customers to inspect the house, but also improves the sales efficiency. The use of Internet marketing can improve publicity under the principle of cost saving more than traditional marketing. Real estate developers can use Internet marketing to promote real estate. In the past, if real estate developers wanted customers to understand their products, they needed to use many publicity methods. The cost of publicity is high and the audience and customer base are limited [1]. Internet marketing is not the case. Consumers can log in to the system on the browser to obtain information about the real estate company's real estate by themselves, and have a more thorough understanding of the real estate, sign up to discover some potential customer, Internet marketing can also help enterprises to better formulate marketing strategies. By collecting information, we can understand the needs of customers for housing listings, and recommend housing listings according to these needs, which increases the effective communication between consumers and sales, and is more conducive to increasing consumer-to-business Loyalty can even generate more orders through a chain reaction of old customers recommending new customers.

The author believes that the Internet can be used as a new marketing channel for real estate, and it is easier to facilitate transactions with the advantages of the Internet. The real estate network marketing system developed based on the mobile Internet, combined with the Django framework and the rem layout elastic box model in the front-end technology, can not only move the real estate sales to the Internet platform, but also realize web page adaptation on the mobile and web page adaptation on pc. It can also use the unity 3d technology to realize online VR real-time viewing, allowing customers to open a browser on the mobile terminal and computer and enter the URL at any time, and they can see the house online and have a better viewing without leaving home. After confirming the purchase intention, you can directly contact the online sales customer service to reach a transaction [10]. The combination of MySQL and Python technology in this system provides data support for real estate companies to formulate marketing strategies, and can formulate relevant real estate marketing strategies more scientifically and reasonably. The marketing system in this paper can not only improve the current marketing methods of real estate enterprises, but also collect and count more user information and sales information within the company to facilitate analysis and make corresponding marketing decisions. Online communication can shorten the distance between customers and sales, increase the effectiveness of communication, and increase the possibility of promoting sales.

2 Technical overview

2.1 Python

Python is an object-oriented, high-level scripting programming language that combines a variety of features. Python is an interpreted language that combines the advantages of C# and Java. It directly skips the compilation link during development, so the dependency on the platform is reduced. Python has relatively few keywords, a simple structure, and a well-defined syntax, making it easier to learn. Python has many advantages, one of which is worth mentioning is that it has a rich standard library that can run cross-platform in UNIX, Windows and other operating systems [8]. It supports a variety of interactions such as user input and execution of code directly

from the terminal, acquisition of corresponding results, interactive testing and debugging of code snippets. Python is widely used in the development of system servers because of its easy learning, open source, and high compatibility, many websites and applications at home and abroad are developed based on the Python language, such as the commonly used software Zhihu.

2.2 Django Framework

Python has many development frameworks in the development of web servers, at present, there are two commonly used frameworks, namely Flask and Django. Django has more complete components than Flask. Django is a free and open source web framework, the difference between its design pattern and other web frameworks is that it is based on the MVC design pattern, but its internal URLconf replaces the work of the controller and is responsible for receiving user requests and forwarding requests. So its internals actually follow the MTV design pattern. Figure 1 shows the interaction flow chart of Django's MTV mode, this design mode supports the development method that the front and back ends are not separated. The Django web framework has a very useful automated management interface, which allows developers to manage user data simply and flexibly [2]. The design of URLs in Django is powerful and concise in coding. It uses matching patterns and processing operations using Python functions. The use of Django is very simple, and developers can easily develop most of the required content of the system with very little code, which is why the system in this article chooses this framework.
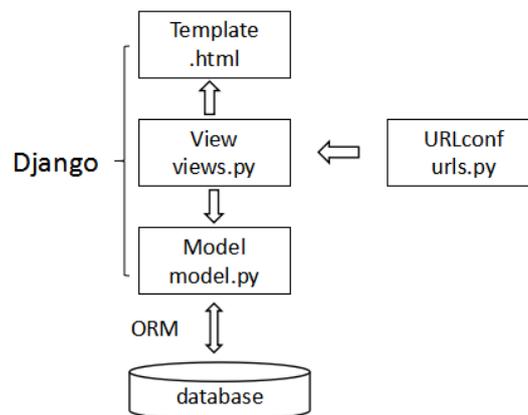
Figure 1: MTV mode

2.3 3D max and unity 3D

There are many ways to develop Webvr, and there are many frameworks, but most of them have their limitations. In contrast, the combination of 3d max and unity 3d technology on the web to achieve VR effects is more maneuverable and gives users a better experience. Simply put, 3D MAX is a modeling software, and unity 3D is a tool used to build virtual reality scenes. Usually, to develop a 3D effect presented on the web side, it is necessary to use 3dmax to map the collected materials and data, 3D modeling and modify the format of the model, object coordinate system, etc., and then import the built model into the Unity 3d to add components and scripts, build virtual scenes, write scripts for interactive operations, and finally publish them to web

pages through the webgl standard. The VR real-view house in the system in this paper is designed and completed based on these two technologies.

2.4 Development Environment

Next, the development environment is arranged according to the needs of the system development. The development of the real estate marketing system based on the mobile Internet is completed under the windows system. First configure the front-end environment: Go to the Node official website to download and install the latest Node long-term support version and complete the setup and testing, then download and install Visual Studio Code and install the required plugins, download and install the Git distributed version control tool and configure personal information , in order to solve the adaptation problem of the mobile terminal, it needs to be used, install and configure webpack, as shown in Figure 2, webpack automatically converts px to rem to adapt and coordinate the content display of the mobile terminal, install the development tool Atom and configure related plug-ins, download and install scss (css preprocessor). Install the Markdown document editor – Typora. Next, configure the backend, server and VR environment: Install and configure the IIS server and CGI, deploy Django on IIS, download and install Python 3.7.3 version and configure environment variables, install and upgrade pip, install Pycharm and complete the configuration, in The use of uwsgi is not supported under Windows, you need to install wfastcgi to replace it, add the module mapping in CGI, then copy the wfastcgi.py file to the root directory of the Django project, and change its path to c:\python\python .exe|<Path to Django App>\wfastcgi.py, then add the project website to IIS, create a new web.config configuration file, fill in the relevant configuration commands and place it in the project root directory. Download, install and configure the mysql database; the VR environment needs to download Unity 5.4.0f3 (64-bit) and 3d max software and coordinate the configuration of the 3dmax model size in unity3d. Finally, the configuration and installation of the above-mentioned development environment guarantees the development feasibility of the real estate network marketing system in this paper.

```
export default class Rem {
    static init(){
        //Set default size
        Rem.defaultStyle();
        //After scaling, recalculate html font size
        Rem.resizeHandler();
        //Listen for browser zoom events
        window.addEventListener("resize", Rem.resizeHandler);
    }
    //Calculate html font size
    static resizeHandler() {
        let contW = Math.floor(document.documentElement.clientWidth);
        let fontS = (contW / screen.width) * 100;
        document.documentElement.style.fontSize = fontS + "px";
    }
    //Set the html default font to 100px and the body font to 16px
    static defaultStyle(){
        document.documentElement.style.fontSize = "100px";
        document.body.style.fontSize = "16px";
    }
    //Convert px to rem
    static getRem(size) {
        var fontSize = parseFloat(getComputedStyle(document.documentElement).fontSize);
        return size / fontSize;
    }
}
```

Figure 2: Px converted to rem

3   Demand analysis

3.1 System Requirements Analysis

The real estate network marketing system designed and developed in this paper establishes two major demand groups by analyzing the current situation and demands of real estate marketing, namely, buyers of houses and internal employees of real estate enterprises. Consumers need to consider various factors when buying a house, such as: apartment type and internal structure, external environmental facilities and transportation, facing floor and area, and due to factors such as time and location, it is inconvenient to visit and communicate intentions on the spot [6]. In this system, the function of VR real-time viewing will be set up, for office workers or people who buy houses in different places, it is more time-saving to be able to view houses in cross-regional virtual reality. Consumers can choose the type of apartment they want to see through the screening conditions, and can intuitively see the internal layout, overall structure, orientation and light and shade of the house through the 3D form, as well as the overall structure of the community and surrounding environmental facilities. In addition to logging in through the computer browser, consumers can also log in to the system through the mobile browser anytime, anywhere, which is convenient and fast. After browsing, you can also communicate with the online customer service and conduct online transactions. This system provides a list of top listings for people who have no specific purchasing direction for their reference. The internal personnel of the enterprise mainly include employees and managers of the company's marketing

department: employees can edit the information of the established 3D real-life housing listings to ensure that consumers can see what they want to see; Describe the purchase intention to communicate and facilitate the transaction; you can also edit and modify the top ranking list to display the company's listings for users to choose from. Marketing managers can formulate corresponding marketing strategies by viewing data statistics charts.

3.2 Overall Design

The overall design mode of the real estate marketing system in this paper is the MVC architecture, which is divided into display layer, application layer and data layer as shown in Figure 3. Among them, the display layer (user layer) is written by HTML5 to display the layout page; CSS3 modifies the HTML element style and animation, and can realize web page adaptation by adding meta tags, the proportion of the page is proportional, which avoids the phenomenon of stretching and deformation of the page; JavaScript is responsible for realizing the interaction of user behavior, and rendering and presenting 3D visualization and related interaction events in the browser. Send request information to the IIS server through Ajax asynchronous interaction technology, IIS accepts the request and sends a call request to Python to call the parameters of the database, and then passes the parameters to unity3d for loading; the IIS server responds to the request and passes the Http-related request through the CGI mapping module Send it to the wfastcgi protocol to process the request and pass the key data to Django in the application layer to initiate a data interaction request, the application layer receives the request and calls the access data layer, calls out the corresponding data and returns. The service layer architecture of the system is mainly composed of the Model and View of the Django framework in Python, the Model is defined in the form of Python classes, the database is operated, and the ORM engine that comes with Django is used to access and operate the database. The Ajax request initiated by the presentation layer is processed in the form of Python functions or classes in the View. The Ajax request sent by the user layer in the system has its corresponding View in the application layer to receive the request and respond with the returned result. The data layer is responsible for storing the information and operations of the user layer, as well as the interactive operations of the application layer, the operations of adding, deleting, modifying and checking, and the materials and data required for 3D modeling. The system's VR real scene viewing function relies on the 3Dmax modeling tool to build a model based on the materials and data stored in the database, and then import it into unity3d to build a 3D scene, export the scene and deploy it on the IIS server according to the webgl standard and finally publish it to the HTML page Render the effect in the browser and implement interactive events such as dragging, zooming and clicking.
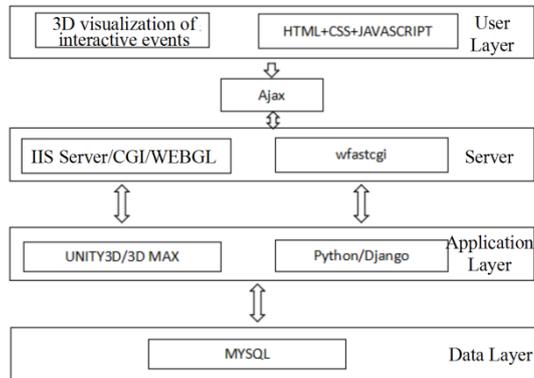
Figure 3: System architecture

4   Function realization

The users of the real estate network sales system are divided into two categories: consumers and employees and managers of the company's marketing department.

Consumers can open the browser through a computer or mobile phone and enter the website of the system, fill in the personal information and the intention form to register and log in, and then they can enter the system:

Housing information: The customer first filters the housing information, such as: housing price, location (distance from hospitals, shopping malls, schools, bus stops), floor To view the information and browse the rooms of the screened listings, you can click the listing to enter the details page, and intuitively see the specific information and plane model diagram of the listing [7]. Click on the picture to enter the 3d of the listing. Virtual reality, the viewing angle at this time is the same as the viewing angle of the living room of the house and the actual viewing angle. Click the ground with the mouse or finger to change the position. Click the door frame or the ground of the room you want to see to enter the room, and the ground will always be displayed, a compass to avoid confusion, to clearly see the direction of the room and the brightness of the light. Clicking the perspective switch can switch to the floor plan of the house, the overall structure, and the model diagram of the external environment structure and facilities.

Intention communication: After viewing the listing and confirming the desired apartment type and purchase intention, you can communicate and consult with the online customer service. For example, you can ask whether the listing has preferential activities, delivery time, mortgage payment policy, etc [3].

Top Ranking List: This function mainly helps home buyers without specific goals and directions to provide housing reference. You can select sales rankings, apartment type rankings, location rankings, etc. to view, such as: click on the apartment type rankings to view Go to the apartment types and rankings of all the real estates of our company, and refer to them from high to low, as a reference to determine your favorite apartment type.

Purchase transaction: After confirming the apartment type, floor and other information, you can reach a transaction online, that is, pay the purchase deposit, so that the customer service can temporarily stay the promising house. After confirming the purchase, you can take the deposit transaction order and sign it at the sales office, purchase contract.

Employees within the company not only have the right to view but also have the right to modify and add content.

Listing information: Employees and managers of the marketing department can view and modify the data in the listing information, such as: area, location, floor, to provide customers with as much listing information as possible, and when prices change Adjust the price.

Exchange sales: The online customer service of the marketing department logs in to the system to communicate with customers in a targeted manner, answer customer questions, and sell houses according to the purchase intention form filled in when customers register [4]. Since the system supports login from various devices, sales can log in to communicate and sell with customers not only during off-duty hours but also anytime and anywhere, which improves their efficiency.

Data statistics: The authority of this function is only open to the managers of the enterprise sales department. The managers log in the system to enter the data statistics module, and can view the statistical charts of consumer information, user browsing information, sales reports and other data. As shown in Figure 4, it is a statistical chart of real estate apartment sales made by using Python to access the mysql database and obtain sales data. Managers can intuitively see the statistical results of various data, analyze them according to the results, and formulate relevant marketing strategies and plans. Corresponding statistical results, based on the statistics of real estate sales data, you can see which real estate has a good sales performance and which real estate has a low current sales volume. Then analyze the specific reasons and design solutions, and formulate a marketing plan that matches the real estate situation [9].

Top Ranking List: Marketing staff can make a top ranking list based on the statistical chart given by the manager, in order to provide reference for customers, attract attention, and promote consumption. For example, employees can make a list of the most popular apartment types according to the sales statistics chart of a certain real estate given by the manager and write down the specific characteristics and reasons for their popularity. decorate the packaging to attract the attention of customers and increase the likelihood of the listing being sold.

```
# -*- coding: utf-8 -*-
import   pymysql
import matplotlib.pyplot as plt
##Get a database connection, note that if it is UTF-8 type, you need to specify the
databasedb=pymysql.connect(host="master",user='root',passwd="123456",port=3306,db="lagou",
charset='utf8')
cursor=db.cursor()#Get a cursor
sql="select xiaoshou,need from xiaoshous"
cursor.execute(sql)
result=cursor.fetchall() #result is a tuple
#Store tuple data in a list
xiaoshou=[]
need=[]
for x in result:
    xiaoshou.append(x[0])
    need.append(x[1])

#Histogram
plt.bar(range(len(need)), need, color='steelblue', tick_label=city)
plt.xlabel("House type")
plt.ylabel("Quantity")
plt.title e("House type sales statistics")
for   x,y in enumerate(need):
    plt.text(x-0.4, y+0.4, '%s' % y)
plt.show()
cursor.close()#Close cursor
db.close()#Close data
```

Figure 4: Part of the code for making a statistical chart

5   Conclusions

In this paper, the real estate marketing system developed based on the mobile Internet has effectively improved and optimized the current form of real estate sales, through web VR technology, customers have a better viewing experience, providing convenience for customers who want to see properties in different places, and setting up rankings List for customer reference. It not only saves the time and capital cost of customers and sales, but also increases the effective communication between sales and customers, and improves the probability of successful housing sales. At the same time, it provides reliable data statistical results for the company's marketing department managers to make marketing strategies, saving the managers' time spent on statistical data, and only needs to make corresponding marketing strategies according to the statistical results, and communicate them down to the sales executive. This system provides a low-cost and high-efficiency network platform for the marketing of real estate enterprises.

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