Django-Based Smart Educational Administration Management Service Platform

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Abstract. In order to accelerate the realization of education informatization and education modernization, our school has developed a smart educational management service platform based on the WeChat applet. The platform builds the web side through the django framework and builds the user interface through Vue.js. Under the background of epidemic prevention and control, the function of online interaction between students and teachers has been realized. Through this program, functions such as event reservation, certificate service, nucleic acid collection and statistics, textbook subscription and return, and reference textbook recommendation can be realized. It not only improves the efficiency of students' work, but also makes more reasonable use of teaching resources, and provides better and more convenient services for students.

Keywords: smart educational administration · django · interactive function · recommendation of reference materials

1 Introduction

With the rapid development of computer network technology and the wide application of mobile terminal equipment, the transmission and acquisition of information has become more abundant and convenient, which has also brought unprecedented new ideas and new directions to the current education industry. Since the arrival of the epidemic at the beginning of 2020, during the epidemic prevention and control period, with the call of the country to "suspend classes without stopping learning, and suspend classes without stopping teaching", various smart teaching platforms have emerged, realizing remote online teaching, which not only promotes my country's The development of educational informatization and intelligence has also become a part of teachers' daily teaching, providing great convenience for teachers [1]. The Academic Affairs Office of our college has developed a smart educational administration management service platform based on the WeChat applet based on the actual situation of our college. Through this platform, functions such as event reservation, certificate service, nucleic acid collection and statistics, textbook subscription and return, and reference textbook recommendation have been realized. Under the background of epidemic prevention and control, it made up for the lack of informatization student management, and cooperated with online teaching to realize the teaching goal of informatization and modernization in our college.

2 Development of Smart Educational Administration Service Platform

WeChat Mini Program is a new development method in recent years, and its advantage is to achieve rapid development. Mini Programs can be easily obtained and disseminated within WeChat, and at the same time have an excellent user experience. WeChat applets include three parts: view layer, logic layer and system layer. The view layer is developed using its own description language Wxml (Weixin Markup Language) and Wxss (Weixin Style Sheets, WeiXin Style Sheets) to complete data receiving and rendering functions; the logic layer is developed using JavaScript to realize logic processing functions; the system The layer includes functions such as local storage and network calls. WeChat applets have a wealth of development components, which greatly improves the efficiency of program development. Using the official development tools provided by WeChat, software debugging, code management and real machine simulation can be performed more conveniently, which reduces the threshold and development cost of program development.

2.1 Vue.js Framework

As the use of JavaScript has grown in popularity, web design has become more powerful and dynamic. However, when many traditional server-side codes are placed in the browser, a large number of JavaScript codes connecting html and css files will be generated. These codes lack organization and order [2]. Therefore, more and more web developers start to use JavaScript frameworks, such as ANGULAR, REACT and Vue. This service platform uses Vue. Vue is a JavaScript framework with strong performance, wide application and light weight. It can help designers create more maintainable and testable code bases; Vue is also progressive JavaScript framework, that is, if the designer already has a threaded server-side application, Vue can be embedded as part of the application to bring a richer interactive experience. Another important feature of Vue is that it realizes the separation of front and back ends. The front end is responsible for page rendering and the logic of partial page interaction, and then interacts with the back end through network requests; the back end focuses on the processing of business logic and direct manipulation database [3]. After the front-end and back-end are separated, the development mode of the front-end and back-end changes from serial to parallel, which significantly improves the development efficiency. In this way, if one day the part of the web page needs to be updated, the place where the background is connected to the database does not need to be changed, and the front and back ends are independent and related. At the same time, if the website is attacked by hackers, the hackers can only access the front-end web server and cannot access the back-end application server, which greatly improves the security [4].

2.2 Django Framework

The Django project is a python custom framework that enables rapid development and follows the MVC design. Django focuses on three points, namely model (Model), template (Template) and view (Views), called MTV mode [5]. Django can run on servers that support WSGI, FastCGI, or Apache [6].

The algorithm used in the reference textbook recommendation function is the Pearson correlation coefficient method. The Pearson correlation coefficient is a coefficient used to measure the similarity between two variables. The value of the coefficient is between -1 and $+1$, and the closer it is to $+1$, Prove that the closer the correlation between two quantities is, the more relevant they are [7, 8]. The closer to -1, the smaller the correlation between the two quantities, that is, there is no correlation, and the value of the similarity shows a linear characteristic. The formula is:

$$\text{pcc}(x, y) = \frac{\sum \alpha \varepsilon E_x \cap E_y (S_{x,\alpha} - \overline{S_x})(S_{y,\alpha} - \overline{S_y})}{\sqrt{\sum \alpha \varepsilon E_x \cap E_y (S_{x,\alpha} - \overline{S_x})^2} \sqrt{\sum \alpha \varepsilon E_x \cap E_y (S_{y,\alpha} - \overline{S_y})^2}}$$

In the above formula, α represents the reference textbook recommendation system, that is, the textbook items in our college's textbook library, E_x represents the collection of textbook items that user x has selected, and E_y represents the collection of textbook items that user y has selected. After selection, there will be For the rating of teaching materials, S represents the rating, $S_{x,i}$ represents user x's rating of teaching material α, $S_{y,i}$ represents user y's rating of teaching material α, $\overline{S_x}$ represents user x's average of all graded teaching materials Score, $\overline{S_y}$ represents the average score of all graded textbooks by user y, and the final coefficient pcc(x,y) is the Pearson correlation coefficient between user x and user y [9, 10]. When we find two users with similar x and y, that is, when the coefficient is close to 1, we filter the teaching materials that have been rated by users with similar preferences, and get the teaching materials recommended to the current user [11] (Figs. 1 and 2).
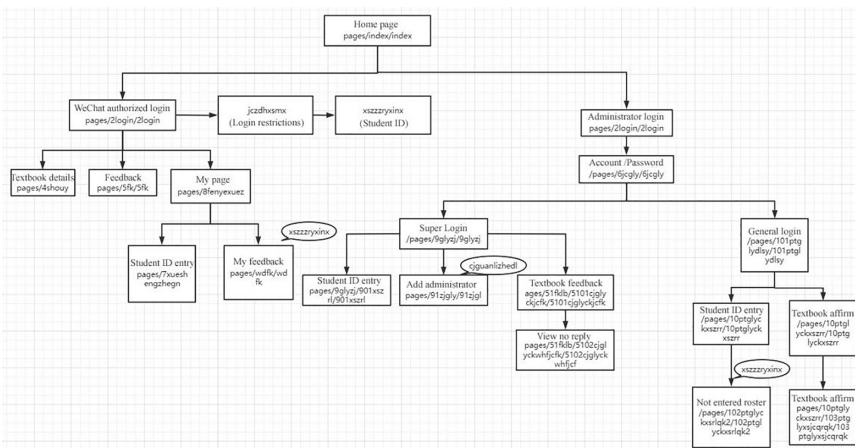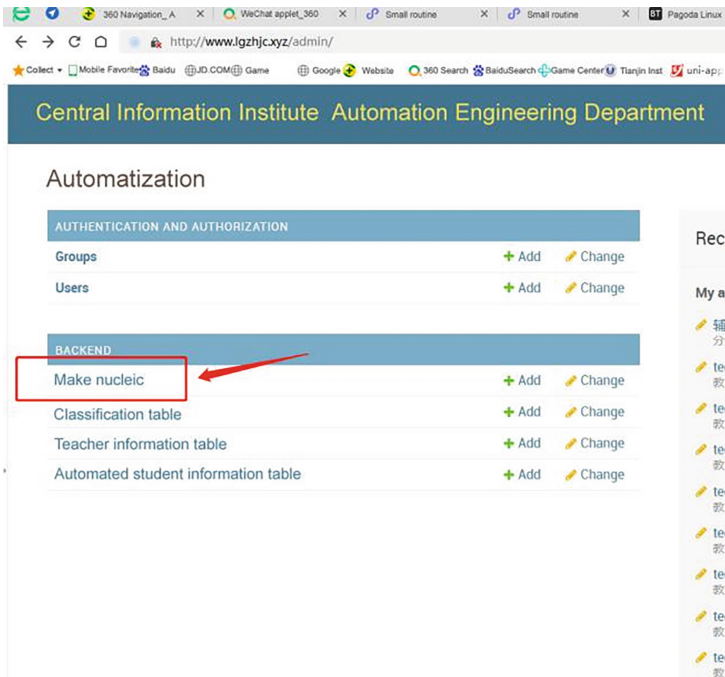

Fig. 1. Student information data

Fig. 2. Admin One

3 Introduction of Smart Educational Administration Service Platform

3.1 Introduction to Teacher Application Functions

Import teacher information through the background, set the account number and password for teacher login, and distribute it to each teacher. Each teacher realizes the WeChat applet login function, and can set and modify the password by himself. The interface after logging into the applet is shown in the figure, including various functional modules to view the reserved information, set the reserved time, answer students' questions, change the account password, confirm the student ID card and check the student's nucleic acid certificate (Fig. 3).

Teachers can set their own free time in advance and provide the service of answering questions for students. After the setting is successful and released, students can obtain the teacher's available appointment time in the student terminal applet to make an appointment. After the appointment is successful, the teacher can view the reserved time.

Teachers can log in to the applet on the teacher's side, click on the appointment question, and then they can check the students' questions and reply to the students' questions online. In addition, personal passwords can be modified by modifying the password module. By checking the nucleic acid certificate, the students' nucleic acid collection can be observed in real time. According to the requirements of the superior,

Fig. 3. Mini Program login, password change, teacher home page

the students in school should do a certain proportion of nucleic acid testing every day, covering all three days. Through this module, the completion status of the students' nucleic acid can be statistically confirmed, and the nucleic acid screening information can be accurately grasped. By querying the student ID card confirmation module, you can handle functions such as student ID card registration, student ID card reissuance, and student ID card issuance (Fig. 4).

3.2 Introduction to Student Application Functions

The student login interface is shown in the figure below. Students can make appointments and check the replies and progress of their appointments. They can upload their personal nucleic acid test results every day, complete the collection and filing, and apply for student certificates and other related documents through the My Student ID module. Service, through the My Textbook module, you can subscribe and return textbooks according to your own courses, and the applet will automatically recommend extracurricular textbooks for students to refer to according to the algorithm.
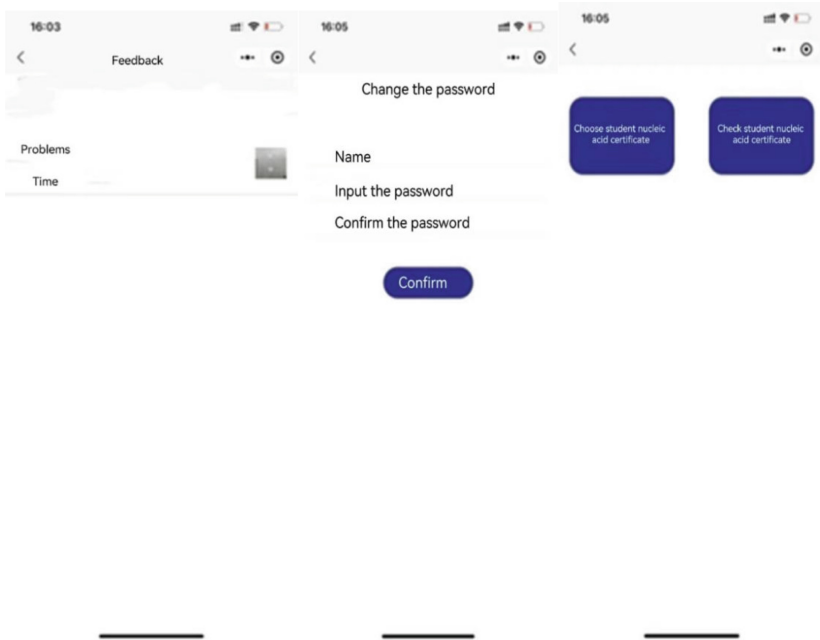
Fig. 4. Mini program reply to questions, account management, check nucleic acid

4 Conclusion

At present, this small program has been put into use in our hospital. The functions provided by this program, such as event reservation service, certificate service, nucleic acid collection statistics, textbook subscription and return [12], and reference textbook recommendation, provide great convenience and reasonable allocation for teachers and students in our hospital. In the context of epidemic prevention and control, the efficiency of educational administration management services has been improved [13]. At present, the function of the mini program is still gradually expanding. In the future, functions such as class schedule query and grade query will be added, and it will be continuously improved and updated to better realize the goal of informatization and intelligentization of our school's educational administration management [14].

References

1. Cai Baolai. Smart Teaching in the Era of Education Informatization 2.0: Concept, Characteristics and Models [J]. Chinese Journal of Education, 2019 (11): 56-61.
2. Chen Luyang. Vue js front-end development quick start and professional application [M]. Beijing: People's Posts and Telecommunications Press, 2017.
3. Liu Luchuan, Zhang Bingqian, Li Xu. The relationship between social media information overload, function overload and user anxiety: An experimental study [J]. Journal of Information Resources Management, 2019, 9 (2): 66-76.
4. Kuang Haijian, Xu Bugong, Li Weisheng, etc. Design of intelligent building energy-saving monitoring system based on Web [J]. Computer Applications, 2017, 37 (1): 344-346.
5. Qian Shijia, Chen Yulong, Li Quan. Design of Software Recommendation Platform Based on Django [J]. Information Technology and Informatization, 2021(10): 81-83.
6. Wang Jun. Design and Implementation of University Logistics Inventory Management System Based on Django [J]. Computer Age, 2022(7):59-61.
7. Xian Yuanqing, Zhang Xuxin. Design of book recommendation system based on Django [J]. Electronic Technology and Software Engineering, 2021 (7): 216-219.
8. Fan Wenxing. Design and implementation of network operation and maintenance management system based on Django [J]. Computer Science, 2012, 39 (S2): 175-177.
9. Qiu Hongli, Zhang Yashu. Web project development research based on Django framework [J]. Science and Technology Innovation, 2021 (27): 97-98.
10. Chang Jianing, Li Yangqi. Design and development of personal blog system based on Django [J]. China Science and Technology Information, 2021.
11. Zhang Swede, Qian Xiaodong. Collaborative filtering recommendation algorithm with cosine similarity correction score [J]. Computer Engineering and Science, 2020, v.42; No.306(06):149-158.
12. Wang Taotao, Shi Weili. Research on Big Data Display Design in Universities [J]. Computer Knowledge and Technology, 2021,17(03):26-27+36.
13. Lv Junlin, Chen Zuozhi, Liu Yan, etc. Design and implementation of fish identification applet [J]. Agricultural Engineering, 2021,11 (10): 42-45.
14. Lv Junlin, Wang Huanhuan, Gong Xiuyu. Application of fish identification program in teaching, science popularization and scientific research [J]. Southern Agricultural Machinery, 2021,52 (17): 15-17+29.