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Research on display and promotion platform of intelligent image processing technology achievements

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ABSTRACT--- Objective In order to improve the promotion of scientific and technological achievements, we propose a modular network platform to display the research results of intelligent image processing technology. A keywords search engine is added to the home page of the platform to optimize the interaction experience of the home page and expand the target customer group of the platform. Method We set up the web page by five modules : home page, publications, codes and data, search engine and members. The architecture of the modular website is based on C# and HTML language. We connect SQL Server database with Visual Studio 2019 to build the dynamic web platform. Conclusion Our research can help users better understand the development status of intelligent image processing technology, so as to actively cooperate with researchers and achieve effective utilization of scientific research results.

Keywords--- Website architecture, Network display platform, Database, Intelligent image processing technology.

1. INTRODUCTION

With the rapid development of artificial intelligence technology, intelligent image processing technology has made great progress in the fields of military, medical, education and transportation. Universities and research institutes have made remarkable achievements in the theoretical research of intelligent image, but only when these achievements are converted into actual productivity can their value be sublimated. Therefore, we propose to carry out a website construction based on the scientific research achievements of intelligent image processing technology, and plan to integrate the scientific research achievements of university research and development and carry out publicity and modular display.

In the existing scientific research achievements display platform, UCL team proposed an intelligent geometry technology display website SGP, showing the team's rich scientific research achievements. However, the website only classifies research results in chronological order and a small number of research topics, with few items for project classification and no user personalized experience, which is not targeted. Muntoi's web page displays items classified by type [1], which are clearly classified, but with a large number of items, it is difficult to index. Team of Pavan Kumar Alluri developed a big data platform BDPGx [2] based on pharmacogenomic data. The access results are returned in charts and downloadable text format. This website allows visitors to query and visualize pharmacogenomic data stored in graphical form in an easy-to-use interface. The visualization component is monotonous and cannot support functions such as search, dynamic link generation, and visualization based on node names or attributes. Sajarwo Anggai et al. proposed a theme-based virtual museum web page developed based on Go Language network programming [3], with the concept and design of search engine analysis as the core of the system. Visitors can easily search for specific content, and the theme will be presented in a 3D environment. However, the search engine is not perfect, and not all objects in real museums are presented in 3D models. Omeka, an online publishing display tool, provides users with a low-cost, technology-friendly platform for sharing resources [4], allowing website visitors to share, download and contribute resources. However, the scalability of the platform for large data sets and the ability to support highly active communities still need to be improved. Gregory A. Krudysz and

James H. McClellan proposed A web-based teaching system [5] designed to enhance students' conceptual understanding by providing many concept-centered exercises. However, the system cannot record and analyze the student's activities and fails to modify the student model effectively

and accurately. The virtual museum system developed by Xiaofang Liu and Yan Liu solves the temporal and spatial limitations of traditional museums very well [6], and users browse quickly through the Internet anytime and anywhere. The distributed digital information resource system constructed by the team provides permanent digital preservation of cultural relics, as well as means of maintenance, management and display. However, there is a lack of collection and processing of user preference information. If users can make recommendations based on their preferences, the experience can be better improved. To sum up, we find that the present platforms for displaying scientific research achievements mainly focus on large-scale projects and data display, but lack systematic standardized, modular presentation, real-time update of the latest dynamic and friendly search engines for entry classification.

Therefore, we propose a modular network platform to display the research results of intelligent image processing technology, add keyword search engine to the home page of the platform, optimize the interaction experience of the home page, and expand the target customer group of the platform. In addition, we propose to set the project display chart rotation on the platform home page to push the latest researches and development project achievements in real time, so as to make the platform more personalized. Through this platform, students, teachers and other researchers can instantly obtain the latest developments of intelligent image processing technology. People from all walks of life and enterprises can better understand the development status, research direction and future trend of the technology, cooperate with researchers to actively carry out cooperation, complete the effective use of scientific research results, build a virtuous circle of universities and enterprises complementing each other, and transform the intelligent image processing technology into actual productivity.

2. NETWORK PLATFORM FRAMEWORK DESIGN

This network platform aims to display the research results of intelligent image processing technology, optimize user experience, and enable users to view and retrieve the required content conveniently and quickly. According to the above demands, the intelligent image processing technology achievements display platform proposed by us can be divided into five modules: homepage, publication, codes and data, search engine and members. The main functions of each module are shown in Fig. 1.

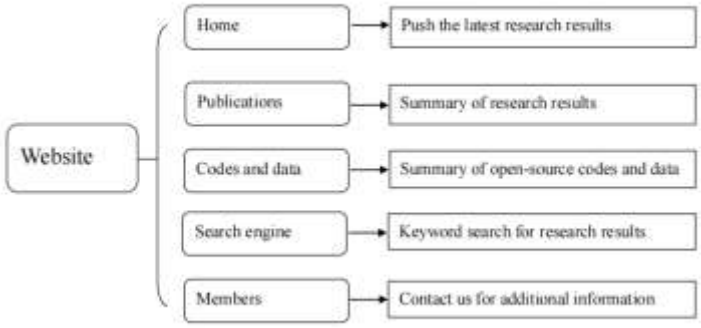


Fig. 1 the five modules of the platform and their functions

2.1. Home page

After a registered user can log in by the user name and passwords, and it will turn to the main page. In the function module bar, users can click to enter the home page, publications, codes and data, search engine, members and other function modules according to their requirements. In the home page, we set a rotating picture in the view center that changes the content over time, which are from the latest research results of intelligent image processing technology. Users can click the picture to jump to the page of details of corresponding research results. At the bottom of the view, we set two columns of relevant recommended contents, including the pictures, titles, release time and click times of research results. The push contents will change according to the release time of research results. Users can click on a picture or caption to jump to the relevant page.

2.2. Publications

In the publications page, we summarize all the project achievements stored in the platform database and classify them by keywords such as years and fields (hyperspectral image classification, densely connected convolutional neural network, deep learning, etc.). Users can click a variety of keywords for fuzzy search. After selecting keywords, all corresponding research results will be displayed at the bottom of the page, and users can click to jump to the details page.

2.3. Codes and data

In the codes and data page, we summarize the open-source research code and data in the platform database in chronological order, which is convenient for users to find and use directly. At the same time, users can also click the link of the article from this page to jump to the page of details of the research results and get the project content matching the code data.

2.4. Search Engine

We set the search engine on the left side of the module bar, so that users can find the target content at any time. Users can enter multiple keywords in the search bar to search for research results. After clicking search, the search engine will push and present the articles according to keywords. Keywords search engine makes up for the user in the publication or codes and data module of the web page cannot quickly find the defect of article content, so that the web page use experience is more user-friendly.

2.5. Members

In the members page, we display the information of the faculty advisor, team members, and website designers. In this page, users can learn about researchers' universities, majors, phone number and email address so as to contact relevant personnel for further understanding of the project and give suggestions.

3. REALIZATION OF KEY TECHNOLOGY OF NETWORK PLATFORM

In the implementation of the web page, we use Visual Studio 2019 (hereinafter referred to as VS2019) with C# and HTML language and visual tools for the website structure. First of all, we divide the frames of the web page from top to bottom into three parts (Fig. 2): the header and the horizontal bar, the main content of the web page, the tail information. Based on this division, we lay out three block diagrams using the HTML toolbox in the visual toolbox of VS2019.

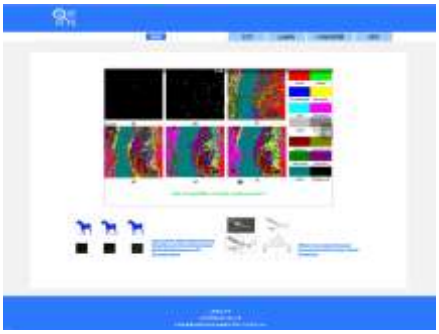


Fig. 2 Overall layout of web page

3.1. Implementation of function module jump

Based on the five functional modules in the module design: Home, Publication, Codes and Data, Search Engine, and Members, we used the Division tag in the HTML toolbox to divide the bar into two areas to place these modules. Among them, the search bar is composed of text box and click the jump button "search". According to the user in the text box entry for fuzzy query, query results return to meet the conditions of the article catalog pages. In addition, we set the jump function for the home page, publication, code and data, and member buttons in the horizontal bar of each page, which can make the page jump to different module areas under the same address, so that the page is clearly divided and the function is easy to realize.

3.2. Realization of web page body

(1) Home page function realization

We define a thread method to implement image rotation. By setting the number of cycles and calling this method, the home page can rotate the images pushed within a certain time interval. The titles and pictures of the rotation picture and push bar are linked with the corresponding project addresses to realize the jump by clicking.

(2) Publication page realization

We arrange the titles and pictures according to the years, fields and other keywords stored in the database. Keywords are connected with database. Click on the corresponding entry to achieve the page of the project research results jump presentation. Title and picture links corresponding to the address of the project, to achieve click jump.

(3) Codes and Data page realization

We use a year keyword classification method similar to the publication page. Click on any year to jump to the corresponding time item. The codes and data are linked to the GitHub site for download.

(4) Search engine function realization

Extract the characters entered in the text box, compare the data in the database, and jump to the search results page when the returned value is obtained.

(5) Members page realization

We used the Division tags to arrange groups of images and texts.

3.3. Database establishment and invocation

We created a local database by Microsoft SQL Sever 2019. The following are the specific steps to establish and invoke the database:

(1) Set up the administrator table. The administrator table stores the user names and passwords of web administrators.

(2) Establish the user table. The user table stores the user names and passwords of web site users.

(3) Establish the project data table. Project data storage website displays project titles, keywords, addresses, pictures, etc.

(4) Fill in the data in the above three tables.

(5) Connect the local database to VS 2019. We create an instance of a database connection object in VS2019 to open the database by getting a string matching the database. And we initialize an instance that can operate in the database, click the corresponding button or enter the character to complete the database call.

4. EXPERIMENTAL RESULTS AND ANALYSIS

In order to verify the validity of this website, we will log in the website as a user and show each function of the website in turn.

First of all, after the user enters the homepage of this website, the website pops up a login window (Fig. 3.a-b), and the user enters the correct user name and password to return to the homepage. Click the round enlargement of the home page to enter the corresponding project page. Click Home to return to the home page. Click the recommended picture to enter the corresponding project page, click Home, and return to the home page again.

(a) Login (b) Home

Fig.3 Login and Home

Then, click on a publication to jump to the publication page (Fig. 4). Click words in the field, the page will move to the relevant project catalogs, and then click 2019 in the year, the page will only have the project achievements of 2019 based on the previous catalogs. Click the project picture to enter the paper-page.

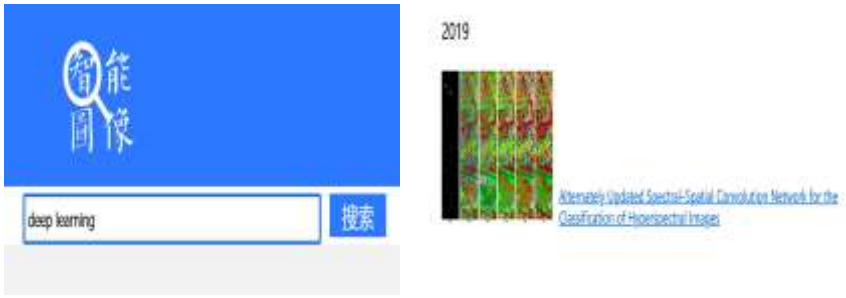
(a)Whole page (b)Paper-Page

Fig.4 Publication

Click Codes and Data to jump to the codes and data page (Fig. 5). Click 2020 in the year to jump to the codes and data directory of the year 2020. Click web page to jump to the corresponding project page. Click Codes and Data to jump to the corresponding projects.

Fig.5 Codes and data

Click the text box of the search engine (Fig. 6. a-c) and enter "deep learning" to jump to the corresponding project achievement page. Click the picture or title to enter the project details page.



(a) (b)

(c)

Fig.6 Search engine

Click on members to jump to the members page (Fig. 7). Browse for information about the project advisor, team members, and website creators.

Fig.7 Members

Through the experiment, we verify the feasibility and validity of this website. Users can browse the latest research results of intelligent image processing technology online on this website, download the open source, and acquire the information of project members.

5. Conclusion

Through CSS web design, database establishment, flexible use of C# and HTML language, we build the web based platform for display and promotion of intelligent image processing technology achievements, so that users can easily and quickly understand the latest scientific research results, accurate access to relevant data and information. It can help teachers and students of universities and enterprise personnel to better understand the development status, research directions and future trends of such technology, and cooperate with researchers actively to complete the effective utilization of scientific research results.

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