The Beacon

Good afternoon, everyone. Today, I’m going to introduce to you The Beacon, an academic search website and also my final project of this course. And please look at the screen, these are subjects I am going to cover.

So first, let’s begin the introduction part. Look at these pictures, which are my design manuscript. I have to admit that they seem simple and rough, but they do help me a lot when developing my website. As a contrast, let’s look at some screenshots of my website.

I think it’s much improved, right? And I’m proud to say that unlike some other teams, I do not use any front-end CSS frameworks like Bootstrap. That’s to say, I design and implement all the appearances of my website by myself.

Let’s see some statistics.

Before I begin the part of functions, I’d like to tell you that my website has been deployed on Ali Cloud, and you can visit it now at <http://thebeacon.xyz> in your browser. But note that it doesn’t fully support visiting from mobile phones yet.

Okay, now it’s the part of functions. I will demonstrate all the functions of the website. And you can also try them yourself.

First, it’s the home page. You can enter somethings and select the types of your search. Then, you will go to the search result page. Note that the content of this page depends on the search types you choose. For example, I choose these types and search “ke”. You can see that there are 8727 results in total, including results of author, paper and affiliation. And for each search type, there is a block for it, containing the number of results and the table of results.

Let’s click at this author and go to the author’s page. As you can see, on the left of the page, there is some basic information about the author: the author’s image, all his affiliations (the number means how many papers he has published in this affiliation), all the conferences he has published papers on, his description, his 10 most related authors and the number of times they have worked together, and lastly, a tag cloud showing his papers’ top words. On the right of the page, there are blocks of his papers, his relation graph (the blue node for himself, green nodes for students, red nodes for teachers, quite intuitive, right? ), and his activity graph showing how many papers he published every year.

Then we go back, to the search result. Let’s jump to the part of papers by clicking here and go to the paper’s page. Similarly, the left part contains the basic information about the paper like its publish year, citations, authors and description. The right part contains papers that cite this paper, papers that are cited by this paper and the citations graph, which shows how many times this papers are cited every year. From the graph, we can have a clear understanding of trend.

Now let’s click at a conference on this page and go to its page. Also, the left part displays its basic information. Note here, its influence, which it’s calculated by its number of papers, number of authors and the quality of its papers to evaluate its academic influence. And for its top authors, there are two numbers each, which are the number of papers he published in the conference and the number of all his papers. On the right of the page, there’re its top papers and a line graph for the number of papers every year. You may find this graph strange, but that’s not the problem of my website but the problem of the given data.

Finally, let’s go to the page of SJTU from the navigation bar on the top. The layout of affiliation page is very similar to that of conference page. But notice, for top authors, the number beside an author’s name is his academic influence, which is decided by the number of papers, the quality of his papers and his author sequences.

So, these are the main functions of my website: home, result, author, paper, conference, affiliation. You may find them look uniform, but that’s not a result of using frameworks. Instead, I implement a micro-framework and apply it all by myself.

And besides, there’s another page to display some information about the website and its developer.

Now that you know the functions of the website, let’s talk about the speed. You know, it’s very important to make your website as fast as possible. And to speed up my website, I did three parts of work. First, in the database, I add some indexes, which is a common method and I just skip it here. Besides, I add some extra columns to some tables to speed up SQL queries. For example, in affiliations table, I add columns to store its number of papers, number of authors and influence. In this way, when visiting the website, it will be swifter to get the query result. Second, in some pages which contains a large amount of data, I use AJAX to load data asynchronously. For example, in the page of author, all the data of graphs are loaded with AJAX, which reduces more than two thirds of the time to load the page. Third, when linking to remote resources like jQuery and D3.js, it’s a good idea to load them from CDNs rather than from their sources. In particular, as I use Google Font in the website, it’s extremely slow to load the font from Google and sometimes it even fails. So, I use a mirror of Google Font in China. After that, it only takes nearly 10% of time to load the font.

Finally, let’s talk about security. I find that none of the previous teams have mentioned this part, but I have to say that security is a vital thing for a website. Why? Because if you do nothing to improve the security, no matter how well you develop it, it will get destroyed soon. To illustrate it, look at this example. So to make the website safer, I have done these things: First, only allow certain characters in the URL; Second, when getting input from the user, filter it before using it to query; third, turn CodeIgniter to the production mode, then it will not display error messages in order to prevent information leakage; finally, use a low-privileged user to connect to the database instead of “root”.

In fact, when the security gets improved, better robustness and better usability are also achieved.

In conclusion, today I have introduced to you the functions of my website, speed and security.

Thanks for your listening.