

## *Original Paper*

# Design of College Students' Career Planning Guidance System Based On B/S Three-Tier Architecture

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### **Abstract**

*At present, the guidance mode of college students' career planning guidance system is imperfect, resulting in too long submission time. A college students' career planning guidance system based on B/S three-tier architecture is designed. Hardware part: on the basis of obtaining the sensor dynamic compensation filter, expand 6 static memory; Software part: obtain the influencing factors of College Students' career planning, combined with the external environment, use the B/S three-tier architecture to set the guidance mode, formulate the links of career planning, adopt the hierarchical management mode, and design the role authority management function of the system. Experimental results: the average submission time of the college students' career planning guidance system designed this time and the other two systems is 11.277s, 16.253s and 15.554s, which proves that the college students' career planning guidance system integrating the B/S three-tier architecture has a better effect.*

### **Keywords**

*B/S three-tier architecture, college student, career planning, sensors, memory, authority management*

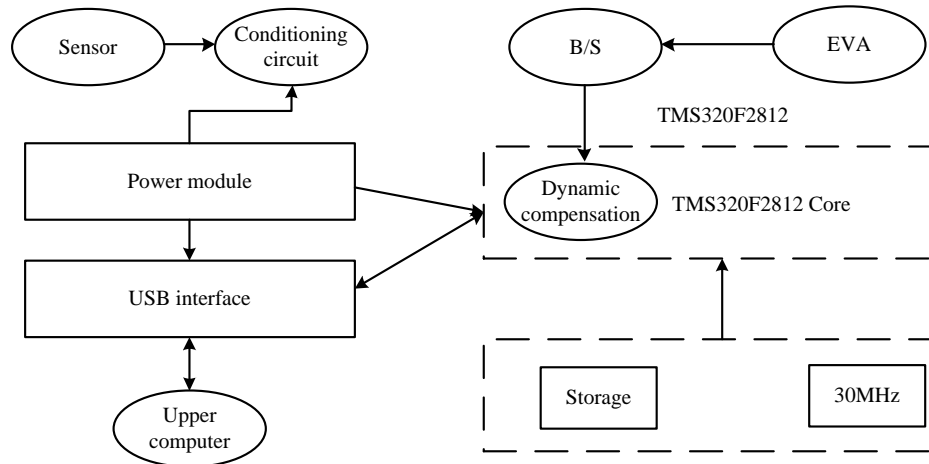
## **1. Introduction**

At present, the career mentioned by people can be divided into broad sense and narrow sense. In a broad sense, career refers to the complete career process of obtaining professional ability, cultivating professional interest, choosing a career, taking office, and finally completely withdrawing from professional labor. Therefore, its calculation cycle begins from the birth of a person. The narrow sense of career refers to the beginning of professional study or vocational training before working until the end of professional labor and leaving the job. Its calculation cycle generally starts from technical secondary school, college or university (Yuan, D. H., Zhao, W. H., Zhong, Z. Q., et al., 2019; Panina, Arkhipova, & Parnikova, 2020). American career theory experts believe that career is the continuous

progress of all kinds of things and states in life. It integrates all kinds of career and life roles in one's life, so as to show one's unique form of self-development. It is also the sum of all paid or unpaid positions in life from adolescence to retirement. In addition to positions, it also includes various work-related roles. Domestic scholars believe that career planning is also called career design, which refers to combining their own conditions and realistic environment (Pordelan, N., Sadeghi, A., Abedi, M. R., et al., 2019; Varadharajan, M., Carter, D., Buchanan, J., et al., 2020). The process of establishing one's own career goals, choosing a career path, formulating corresponding training, education and work plans, and implementing specific actions to achieve the goals according to the stage of career development. It is the combination of individual and organization. Whether college students, a specific group, can successfully plan their future plays a key role in social development and the effective utilization of talents (Tillmann, T., Wei, S., Scharfenberg, J., et al., 2020). Career planning has been concerned by people from the past to the present, and has new characteristics of the times with the continuous change of social environment. However, there is no unified opinion on the definition of college students' career planning. It is more to define the specific group of college students on the basis of career planning. This paper expounds college students' career planning as a process of further self anatomy based on a comprehensive analysis of various influencing factors during college, formulating corresponding learning and practice plans in combination with their own personality and professional expertise, and actively completing them, so as to finally realize the plan and career ideal. At present, the due role of career planning has not been brought into full play, and some colleges and universities lack guidance on career planning. Some university employment institutions only hold formal lectures. College students do not really understand the exact meaning of career planning, or do not understand the procedures of career planning, or do not understand the significance of career planning. The process of career planning is a dynamic process, which needs to reflect the current situation and characteristics of college students' career planning.

## **2. Hardware Design of College Students' Career Planning Guidance System**

Through previous studies, it can be seen that the sensor dynamic compensation filter is feasible and the compensation effect is very good under certain conditions, but the previous discussions are completed by computer afterwards, which belong to afterwards compensation. However, in many systems, the results of sensor output are directly related to the back-end decision-making. At this time, it is not feasible to compensate the sensor output signal afterwards. It is necessary to study the real-time compensation of sensor dynamic error. Therefore, on the basis of obtaining the sensor dynamic compensation filter, we will focus on how to realize the dynamic compensation filter in the real-time processing system based on B/S, so as to complete the real-time online correction of the sensor dynamic error (Arpita, G., Matthew, K., Katelyn, H., et al., 2019; Luo, 2018). For this purpose, the overall hardware structure of the system is obtained, as shown in Figure 1.



**Figure 1. Overall System Hardware Architecture**

As can be seen from Figure 1, the system is mainly composed of TMS320F2812 minimum system, front-end amplification and filtering module, external expansion memory module, USB interface module and so on. The minimum system of TMS320F2812 is mainly composed of TMS320F2812 chip, power conversion chip and external crystal oscillator. The power conversion chip is mainly composed of LP2987 and TPS76801, in which LP 2987 provides 3.3V power supply voltage for the system and TPS76801 provides 1.8V core voltage for the system. In order to avoid the design of external analog-to-digital conversion circuit, the system selects the ADC module inside TMS320F2812 to complete the analog-to-digital conversion function. In order to save the processed data in real time, the system expands two pieces of EM256J16 static memory with the capacity of 256Kx16bit. The communication between the system and the computer is mainly completed through the USB interface. The chip controlling the USB interface communication here is FT245RL. the front-end conditioning circuit filters the sensor output signal and adjusts it to the acceptable range of ADC, and the digital signal is processed by dynamic compensation algorithm, The processing results are saved to the external expansion memory, and finally the data is transmitted back to the computer through the USB interface for display and analysis. TMS320F2812 chip of the system mainly needs two voltages to supply power for it, one is the chip peripheral interface voltage of 3.3V, and the other is the chip core power supply of 1.8V. Here, the external power supply is an 8V battery, so it is necessary to convert 8V to 3.3V. Here, we select LP2987 to complete the work of 8V to 3.3V. With 3.3V voltage, we also need to convert it to 1.8V. Here, we select the conversion chip TPS7680 recommended by TI in the TMS320F2812 chip manual. Since all chips of the system except DSP chip are powered by 3.3 V, the above two power conversion chips can solve all power supply problems of the system. However, considering that there may be mutual interference between analog system and digital system, we separate analog power supply and digital power supply. In addition, in order to facilitate developers to carry out q-format calibration operation. Texas Instruments provides users with a very representative function library, which collects highly optimized and accurate mathematical function library for

developers, and accurately converts floating-point algorithm into operation code of fixed-point algorithm on TMS320F2812 chip. These functions are often used in programs with intensive real-time calculation, and the running speed and accuracy are very important. In addition, using these function libraries can significantly shorten the application development cycle. Based on this, the hardware design steps of the system are completed.

### 3. Software Design of Career Planning Guidance System for College Students

#### 3.1 Obtaining the Influencing Factors of College Students' Career Planning

The career of college students is plagued by many problems, including the choice of career path, whether they can achieve career success and career development (Huo, Q. S., Tan, H., Wu, N., et al., 2019; Bao, 2018). In the process of pursuing career development, individuals will be affected by a series of external social factors, mainly including educational background, family influence, personal needs and psychological motivation, external potential opportunities and changing social environment. Everyone has his own unique talents, skills and abilities. In the current market economy environment with clear division of labor, everyone has one or some fields he is good at, but it is difficult to become all-round talents. Some people are suitable for marketing, while others are management talents, who are good at their own fields. Therefore, in this step, college students can make a list and list their favorite things and strengths in the table according to their own factors. If you find it difficult to determine your strengths, you can choose relevant test questions for testing, and then determine your strengths according to the test results. In the same way, you can find out what you don't want to do and where you are weak. Finding out your own shortcomings is as important as finding your own strengths, because you can make two different or even opposite choices according to your strengths and weaknesses. One is to face up to their own shortcomings, make unremitting efforts to change their common mistakes and make up for their own shortcomings, so as to effectively improve their skills and abilities in all aspects and meet professional requirements. The second is to give up the career choices related to the skills and abilities you are not good at. It can be seen that different choices get the opposite results. Therefore, it is necessary for individuals to list their own advantages and disadvantages that may have an adverse impact on their career choices when planning their career (Chen, 2021; Neneh, 2020; Li, 2019). The asymptotic coefficient of College Students' achievement is tested by chi square test. The calculation formula is:

$$P = \sum_{n=1}^m S + \frac{1}{g} \quad (1)$$

In formula (1),  $S$  represents the linear combination value,  $g$  represents the number of effective cases,  $m$  represents the expected count, and  $n$  represents the minimum expected count. Different industries and even different companies in the same industry will face different external opportunities and challenges. Therefore, if college graduates want to find a suitable job smoothly, they must clearly distinguish these external factors, because these external opportunities and challenges will affect the

job choice of college graduates and the smooth development of their future career (Luo, 2019; Akos, Leonard, & Bugno, 2021). If a company is often in a passive external industry environment and is easily disturbed by various external adverse factors, there are problems in its own survival and development, let alone the choice of employment opportunities that can be provided, and the hope of career promotion is even more slim. In this step, college students can choose one or two industries they are interested in according to their own preferences and characteristics, and then carefully evaluate the current opportunities and potential challenges of these industries. The whole college students' career planning system is an organic and unified whole. We can clearly find that internal and external environmental factors affect college students' career planning. By analyzing various strengths, weaknesses, opportunities and challenges, we can formulate different strategic models. The career planning of college students using the output of the system is not complete. It should also be combined with various complex external environments, such as the current national policy-making and the demand standards of employers, and timely and appropriately reassessed or reasonably adjusted. Based on this, complete the steps to obtain the influencing factors of College Students' career planning.

### *3.2 B/S Three-tier Architecture Setting Guidance Mode*

The B/S system decomposes the server part in the initial C/S mode and reconstructs it according to the needs of modern office (Wu, 2019). Its advantages are: the operating system does not need too high professional skills, the operation interface is simple, the maintenance of the system becomes easier, it is suitable for publishing information on the Internet, and the client does not need to install programs. On the whole, the high group of career planning accounts for a minority, indicating that although most students are aware of the importance of career planning, few make clear career planning. The majority of college students are grouped in career planning, which shows that most college students have a certain career planning, but it has not reached a clear level. There are many reasons for this result: the current social employment situation is very severe. Most college students can't find a job, but can't find an ideal job. Enterprises are not simply saturated with personnel, but encounter the flow of talents and the difficulty of finding real "talents", which has led the whole society, especially educational institutions, to pay more attention to college students' career planning from simply paying attention to college students' mental health, so as to improve their mental health. The low grouping of career planning accounts for a minority, indicating that only a few college students do not consider career planning in the current severe employment situation. Therefore, it is necessary to study the dynamic characteristics and dynamic error of the sensor. The dynamic characteristic of the sensor refers to the response (output) characteristic of the sensor to the excitation (input). The dynamic characteristics of the sensor depend on the measurement principle and structure of the sensor itself, and depend on various mechanical, electrical, magnetic, optical and other parameters in the system, and this characteristic itself does not change with the input signal, time and environmental conditions. The relationship between the output and input of the sensor can be expressed by constant coefficient linear differential equation. The specific expression formula is:

$$\sum_{j=0}^c q_j = \frac{\beta}{qc} \quad (2)$$

In formula (2),  $q$  represents the system order,  $\beta$  represents the transfer coefficient,  $c$  represents the structural parameters,  $j$  represents the output and  $i$  represents the input. The differential equation expression formula of the first-order sensor in the system is:

$$\frac{\varepsilon_1}{\varepsilon_0} \times \frac{l}{e} + r = \frac{e}{l} \quad (3)$$

In formula (3),  $\varepsilon_0, \varepsilon_1$  represents the time dimension,  $l$  represents the time constant of the sensor,  $r$  represents the natural frequency of the sensor, and  $e$  represents the damping ratio coefficient of the sensor. Stability tends to play a positive role in the career planning of enterprise employees. Compared with the career planning of college students, dynamics plays a greater role in the latter. Because students in different grades and majors have different career planning. For example, freshmen have considerable plasticity if their future career expectations are ambiguous, diverse and uncertain. For sophomores or junior students, they basically have a clear career ideal and how to realize the established career ideal and career plan. Senior students should have the clearest grasp and the most accurate grasp of future career planning. They have specific career goals and skills to make them a reality. For lower grade students, the plasticity is the lowest. There are five specific links in career planning, including self-assessment, analysis of the external environment, determination of career objectives and positioning, formulation of specific measures and plans, and detailed revision of the plan. The analysis of professional environment is based on social practice, which is included in the development of society and the change of professional requirements. Therefore, whether college students' career planning can be carried out smoothly is based on scientific environmental analysis and self cognition. The analysis of the environment will produce two completely different results. One is to analyze and find problems, timely adjust and seize opportunities, and finally achieve the established goals. The second is to analyze the improper combination of their own advantages, and there is no solution. Finally, it is not conducive to the implementation of career planning. Based on this, complete the steps of setting the guidance mode.

### 3.3 Designing System Role Permission Management Function

Requirements analysis is one of the most important steps in the development of data and information management system. Developers must fully understand the needs of customers before they can well design and develop a system that meets the needs of customers. Users need to provide developers with software requirements specifications. There are great differences in career planning and guidance in colleges and universities due to different specific conditions. Taking the career planning guidance of a university as the research object, this paper analyzes the actual operation steps of the career planning guidance of each level college, which is the main responsible unit of career planning guidance, and obtains the needs of college students' career planning guidance system. The college needs to reasonably refine and adjust the career planning guidance standards according to the current situation and situation

of the college, the college's career planning guidance documents and the college's own characteristics. Role is an abstract layer designed for system security. Although a role is not a real entity, members in the same role have the same module operation permissions, and roles can be created and deleted arbitrarily according to specific needs. Members of roles can be combined arbitrarily without restrictions. Members of roles are users of the system. Role access control management includes role management, user management and module management. Hierarchical authority management is realized through hierarchical management. Access to the module is obtained through the access permission of the role to the module. For a stable linear system with constant coefficients, Fourier transform can be used instead of Laplace transform. The specific expression formula is:

$$y(\phi) = \int_0^{\infty} \phi(k)^{-v} \quad (4)$$

In formula (4),  $\phi$  represents the frequency response times of the sensor,  $k$  represents the amplitude frequency characteristics of the sensor, and  $v$  represents the phase frequency characteristics of the sensor. Based on formula (4), the transfer function of the first-order sensor system is obtained after Laplace transform. The calculation formula is:

$$G(h) = \frac{h_{\eta}}{h\sigma + 1} \quad (5)$$

In formula (5),  $h$  represents the input step signal,  $\sigma$  represents the static sensitivity constant, and  $\eta$  represents the output step signal. The career planning guidance system for college students is a B/S three-tier architecture. All software is installed on the server and "zero" installation is realized on the client. System maintenance, software and hardware upgrading and system updating have nothing to do with user data. All management and upgrading are carried out on the server side. Users can access database server and website server at any time through campus network. The career planning guidance system makes the regular system maintenance and upgrading work more convenient and fast in the future. Users are at the bottom of the B / S three-tier architecture and are associated with roles. By associating with different roles, they can get corresponding permissions. Therefore, each login has several different roles at the same time. It can be said that the login permission is the sum of the permissions of all roles. If the same module has its permissions in different roles, the highest permission is taken. Combining the advantages and disadvantages of the access control model with the network permission control of the school, it is decided to form a permission control model with flexible permission granting, simple algorithm, clear structure and simple maintenance based on the role-based access control model on the basis of combining the other two models. The multi role inheritance relationship of RBAC model is simplified. In the system, user access is achieved through access to information objects. Role is the middle layer of the B/S three-tier architecture. The upper layer is the operation permission of the system module, and the lower layer is the system user. Users get access to modules through roles. Each role represents an operation right. Roles correspond users to modules. Not only the system runs smoothly and network security, but also the operation steps of administrators are

simpler. The rationality of user authority design is the basis to ensure the normal operation of the system, give full play to the maximum efficiency and security. Because some communication contents have certain personal privacy and considerable confidentiality to outsiders, users must register for future reference. After the user is registered, the corresponding permissions can be assigned according to the authorization of the system administrator. The system administrator has the highest authority in the system. He can not only assign authority to other users, but also manage data and modules of the system. Ordinary users and super users can browse some data of the system, but they have no right to modify the restricted data. Based on the above description, complete the steps of designing the role permission management function of the system.

#### **4. Experimental Test**

##### *4.1 Build an Experimental Environment*

In order to verify the effectiveness of the designed system, experimental tests are carried out. The database adopts Microsoft SQLSERVER large database to manage relevant data. The radio frequency transceiver chip CC2520 works in the 2.4GHz frequency band and the circuit works in the high frequency band. It is designed as a PCB separately and connected with the main circuit through a 14 pin socket, which can avoid the interference of the main circuit and the interference to the main circuit. When it needs to be applied to longer distance wireless communication, a RF power amplifier, such as CC2591, can be added to the front end of CC2520 RF transceiver to increase the transmission power and improve the communication distance. It can be applied to new occasions by adopting a compatible 14 pin interface, that is, replacing the RF module. The subject only needs a communication distance of hundreds of meters, CC2520 can meet the communication distance requirements of the subject without adding power amplifier. The signal routing from RF pin has distributed parameter effect. When the RF differential output is connected with the antenna of SMA connector with single terminal characteristic impedance of 50Ω, it needs circuit conversion. During the design, reference is made to the official design of TI, 6 capacitors of discrete components are used to realize impedance matching and conversion, and PCB bending routing switch circuit is used for compensation. The experimental test is carried out in the above environment, and the experimental results are obtained.

##### *4.2 Experimental Result*

The college students' career planning guidance system based on SWOFT analysis and the college students' career planning guidance system based on WEB analysis are selected for experimental comparison with the designed system. Test the submission time of the three systems under different concurrent document users. The shorter the time, the better the system performance. The experimental results are shown in Tables 1 and 2.



**Table 1. Number of Concurrent Document Users 10 People System Submission Time (s)**

| Number of experiments | Career planning guidance system for college students based on SWOFT analysis | Career planning guidance system for college students based on Web Analysis | Career planning guidance system for college students of designed in this paper |
|-----------------------|--|--|--|
| 1                     | 6.651  | 6.447  | 5.116  |
| 2                     | 7.225  | 6.209  | 4.887  |
| 3                     | 6.843  | 7.345  | 5.206  |
| 4                     | 6.103  | 7.204  | 5.118  |
| 5                     | 7.114  | 6.898  | 4.774  |
| 6                     | 6.558  | 7.231  | 5.160  |
| 7                     | 5.998  | 6.245  | 4.885  |
| 8                     | 6.331  | 7.116  | 5.342  |
| 9                     | 7.101  | 6.988  | 4.661  |
| 10                    | 6.225  | 7.032  | 5.264  |

**Table 2. Number of Concurrent Document Users 50 People System Submission Time (s)**

| Number of experiments | Career planning guidance system for college students based on SWOFT analysis | Career planning guidance system for college students based on Web Analysis | Career planning guidance system for college students of designed in this paper |
|-----------------------|--|--|--|
| 1                     | 26.415   | 28.414   | 18.154   |
| 2                     | 23.024   | 27.006   | 19.403   |
| 3                     | 24.711   | 27.316   | 17.461   |
| 4                     | 23.461   | 26.222   | 18.205   |
| 5                     | 22.551   | 25.003   | 16.312   |
| 6                     | 25.026   | 26.787   | 17.414   |
| 7                     | 25.212   | 24.103   | 18.202   |
| 8                     | 24.316   | 25.116   | 16.334   |
| 9                     | 27.101   | 24.391   | 17.454   |
| 10                    | 23.117   | 22.005   | 16.202   |

It can be seen from table 1 that the average submission time of the designed college students' career planning guidance system and the other two systems is 5.041s, 6.614s and 6.871s; It can be seen from table 2 that the average submission time of the designed college students' career planning guidance system and the other two systems is 17.514s, 24.493s and 25.636s, indicating that the actual use performance of the designed college students' career planning guidance system is better.

## 5. Conclusion

The college students' career planning guidance system designed in this paper, through the summary of relevant theories and the analysis of the leading role of correct life values education on career planning education, takes this as the basis to explore the problems and cause analysis in career planning education, and puts forward the research topic of college students' career education path. It aims to explore a more effective educational path with the characteristics of the times on the basis of learning from and optimizing the previous exploration path and combined with the development of the times. Due to the limited research conditions, this paper does not conduct in-depth test on the compatibility of the system, and will continue to study this topic in the future.

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