Research on the Exploration and Practice of Control Science and Engineering Discipline Construction

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Abstract: Discipline building is a long-term and fundamental strategic task in the development of a university. Vigorously studying the law of discipline construction and actively exploring the effective mode of discipline construction will be the key to enhancing the core competitiveness of universities and also an important means to enhance teaching quality, talent level and scientific research strength in colleges and universities. Improving and coordinating the organizational system, upgrading the level of teaching staff, supporting scientific research and attaching importance to international cooperation and exchange are effective ways to control science and engineering.

Keywords: Exploration, Practice, Control science, Engineering discipline, Construction

1. INTRODUCTION

Automation involves a wide range of disciplines, widely used comprehensive science and technology. In the system of graduate education in our country, there are seven second-level disciplines Dan-air theory and control engineering under the control of the first-level discipline "Control Science and Engineering", "detection technology and automatic device", "system engineering" Recognition and Intelligent Systems "," Navigation, Guidance and Control "," Enterprise Information Systems and Engineering "and" Bioinformatics. "Control Science and Engineering has played a powerful role in promoting the development of related disciplines and has made a significant contribution to the development of relevant disciplines For example, its combination with information science and computer science pioneered the field of knowledge engineering and intelligent robots, and the development of adjacent disciplines such as computers, communications, microelectronics and cognitive science also facilitated the control science With the new development of engineering, the research fields involved in control science and engineering are constantly expanding.

2 THE STATUS OF UNIVERSITY CONTROL SCIENCE AND ENGINEERING DISCIPLINE

In order to meet the need of national economy training of different types of talents in our country, the specialty of domestic colleges and universities should be oriented in the following aspects: (1) "research-led" automation subject specialty: the goal of undergraduate professional personnel training is to provide first-class and high-level automation research , engineering application, application technology and its composite talents lay the foundation, a considerable part of the graduates will enter a higher level of degree education. (2) Engineering Research Applied Automatization Specialty: The goal of undergraduate professional training is to lay the foundation for automating applied research and development, applied technology and its complex high-level talents with practical engineering capabilities. Some undergraduates enter a higher level of degree education. (3) "Applied technology-oriented" automation subject specialty: The goal of undergraduate professional personnel training is to have the automation application technology with the ability to solve practical problems and its complex specialized talents. Most undergraduate graduates will directly enter the society and can adapt to the society Request. (4) Specialized automation major of "technical skill type": to train operation, debugging and maintenance of technical talents, technicians and technicians who are engaged in automated production technology and management in the production, experiment and experiment fields as well as positions of advanced automatic control systems Intelligence skills talent. The research-led automation subject has significant research characteristics and high theoretical and experimental skills. Each of the schools has a strong scientific research team and outstanding academic leaders. The academic thinking is very active and the academic quality is excellent. High academic status, many people as a major international and domestic academic journals advisor, editorial board. In personnel training, the formation of doctoral, master's, bachelor serialized degree and non-degree education system, trained a large number of outstanding automation engineering and technical personnel. At the same time, research-led automation disciplines have certain industry characteristics, such as weapons, metallurgy, aerospace, aviation, transportation, energy and electricity, manufacturing, and so on, so the professional training programs and curriculum settings of colleges and universities also

reflect their own training Characteristics, students in electrical and electronic, information control, computer technology and other aspects of basic engineering training solid, with the professional field of professional engineering and technical problems to solve the problem of high quality graduates, by the employer's praise over the years students An employment rate has always been living in the forefront of relevant professionals.

At present, there are five second-level disciplines in control theory and engineering in our country, which are control theory and control engineering, pattern recognition and intelligence system, system engineering, navigation guidance and control, detection technology and automation equipment respectively. Here, for several key domestic schools, including Tsinghua University, Zhejiang University, Northwestern Polytechnical University, Shanghai Jiaotong University, Huazhong University of Science and Technology, Southeast University, Harbin Engineering University, Second Artillery Engineering University, Beijing Institute of Technology, Beijing Airlines Aerospace University, focusing on the analysis of their academic direction, academic standards, academic exchanges and other aspects of the situation.

Tsinghua University's control disciplines emphasize the international advanced research direction, emphasizing the application of original achievements and engineering technology in scientific research. From 2002 to 2006, more than 20 NSFC projects were funded in three major research fields: modern integrated manufacturing, complex system theory and production engineering control theory, respectively. This shows that the basic research in control disciplines is solid, significant theoretical innovation; the same time, scientific research effectively translated into productivity, for the country and made an important contribution to society. Northeastern University, relying on the needs of the metallurgical industry control disciplines, in the "basic theory of complex system structure", "basic theory of nonlinear singular system", "intelligent robot system", "process industry planning, scheduling and logistics management methods" and other fields Significant research results, scientific research comprehensive strength. Shanghai Jiao Tong University, pattern recognition and intelligent systems in the field of intelligent transportation systems, intelligent technologies and systems, biological information processing, media computing, search and multimedia network research has made remarkable achievements in the peer influential. Xi'an Jiaotong University, Department of Pattern Recognition and Intelligent Systems subject has four prominent directions: computer vision and pattern recognition, computational intelligence and learning control, multi-sensor information fusion and intelligent detection and control systems, network computing media and visualization technology These directions have a high influence in China. The disciplines of these schools closely follow the forefront of the world's information science development. By relying on their original academic backgrounds and social needs, they closely integrate scientific research with business needs and effectively turn scientific research achievements into productive forces. They cover the major research fields of disciplines and fully embody Out of the background features.

3. Exploration and Practice of Control Science and Engineering Discipline Construction

In the future, the military and society need to develop in an all-round way and need talent with both ability and political integrity. Based on the basic principle of "broad professionalism, solid foundation, heavy ability and high-quality", the research-led undergraduate automation major formulates the training suitable for the needs of talents according to the basic requirements of "broaden the foundation, dilute the professional, strengthen the practice, teach students in accordance with their aptitudes, and classify them" Plan to combine the training of ideological and political quality, cultural quality, professional quality and physical and psychological qualities, to combine imparting knowledge, cultivating abilities and improving quality, and to cultivate high-quality, high-quality students with a solid foundation, broad knowledge, High-quality talent. Therefore, our teaching work, whether undergraduate teaching or postgraduate training, should be systematic, gradual and continuous development. Not only pay attention to the teaching of basic theoretical knowledge, but also pay attention to the new achievements of subject development into the course teaching; not only pay attention to the teaching of theoretical knowledge, but also pay attention to the innovation of teaching practice in order to enhance students' understanding and mastery of knowledge, Develop students' practical ability and sense of innovation; not only pay attention to the teaching of each course, but also pay attention to the different organic links between the course content or course system.

In professional teaching, should focus on research-oriented teaching, emphasis on experimental teaching, so that graduate students and undergraduate students participate in scientific research, implementation of personalized education, develop their innovative ability. Research-based teaching puts forward higher requirements for teachers. Teachers must shoulder the double shoulder of teaching and research, pay close attention to the frontiers and directions of development of this discipline, and constantly enrich and update the teaching contents so as to provide students with the most advanced knowledge and guide students to enter scientific frontier.

Teacher is the base of education plan. Through effective incentive mechanism and restraint

mechanism, we should fully mobilize and develop teachers' enthusiasm for teaching. Make full use of the influence of national famous teachers, cultivate an excellent teaching innovation team, produce excellent courses and improve the influence of disciplines; strengthen the evaluation and supervision of courses, and supervise the young teachers through old professors, Teachers teaching level, cultivating quality courses. We should open our minds, increase the introduction of outstanding talents, and solve the problem of "inbreeding" of the ranks. Neither domestic universities nor research institutes have solved this problem well, and it will be more difficult for us to completely eradicate this problem in a short period of time. Therefore, it is necessary to adopt various forms of recruiting talents, including well-paid hired well-known scholars and academicians to teach part-time in our university. Some well-known domestic and foreign experts are invited to set up classes, lectures, and cooperative research to jointly build laboratories. The selection of young teachers to go abroad Visit and study, absorb the educational concepts from advanced countries, improve academic standards and broaden academic horizons.

On the basis of strengthening security and confidentiality of campus network, we should strengthen the construction of office system, regularly update the information of all kinds of important academic conferences in this discipline in the world, and timely communicate the academic exchange information of all kinds of disciplines so that each teacher and graduate student can obtain timely information Academic exchanges, and actively participate in these academic activities. At the same time, encourage teachers and doctoral students to participate in international high-level academic conference, through the Congress report and essay exchange, to improve academic influence. Actively recommend the academic backbone of academic development potential to participate in various professional groups of experts, academic groups and academic editorial boards, not only to improve the academic backbone and visibility, but also improve the influence of disciplines.

In view of the characteristics of military application technology research, we will continue to develop the existing advantageous disciplines for military applications and major national projects, refine the research results that are at the leading level in these directions and highlight the level and characteristics of the research. In recent years, we have made great progress in basic research and have received more funding for various types of basic research projects and achieved some success. In order to further strengthen the basic research results, we should focus on cultivating the relief work of the basic research teachers with potential for development. Likewise, we also encourage the applied researchers to conduct basic research. In this way, we can gradually form a pattern of scientific research on the sound development of "basic theoretical research, applied technology research and model tasks".

Discipline construction is a systematic project that cannot be accomplished by one or two individuals and requires a sound organizational system as a leader and coordinating body so that the level of control science and engineering disciplines can be greatly improved and the teaching staff, scientific research, personnel training and International cooperation and exchange aspects promulgated policies conducive to the development of disciplines. To this end, the "Control Science and Engineering Discipline Construction Committee" should be set up within the college, which shall be composed of the college leadership team and heads of all disciplines. It shall be responsible for formulating the overall construction plan of the discipline, supervising the implementation of the discipline construction plan and coordinating the disciplines and according to the discipline construction to the relevant collectives and individuals to be commended and rewarded, the formation of the college disciplinary "positive force."

Hired well-known professors at home and abroad to teach core courses in this discipline to guide doctoral students and master students; correctly grasp the development direction of the discipline, put forward a strategic, forward-looking and creative research idea to lead the discipline in the forefront of its catch-up or Maintain the international advanced level; actively strive for and preside over the research of major national scientific research projects in line with the major strategic needs of the country and the international scientific and technological frontiers; carry out research in original and major theoretical and practical issues and key issues in this discipline and strive to achieve major accomplishments Sexual achievement; leading the construction of academic echelon of the discipline, according to the characteristics of disciplines and the needs of discipline development, to form and lead an innovative team for teaching and research work.

Provide courses or lectures in the frontier fields of the discipline, guide or help to guide doctoral or master students, provide important advice and suggestions on the development direction and research priorities of the discipline, and lead the discipline to follow the international academic frontiers. To meet the major national strategic needs and international scientific and Technology front, actively formed or involved in the formation of an international advanced level of innovation team.

According to the young teachers' own basic conditions, technical characteristics and development potential, the young teachers are classified and cultivated, that is, basic research, applied research, theoretical teaching and practical teaching. Colleges and universities, academic leaders, and young teachers to study and formulate the research direction,

development goals, training plans and assessment methods of young teachers, encourage young teachers to go abroad to study for degrees and study abroad, and strengthen cooperation with famous universities at home and abroad through various channels Institutions and experts, for young teachers to world-class universities, teachers from first-class facilities to provide facilities. At the same time, each year reserved for teacher preparation, take the initiative to recruit foreign teachers teaching, scientific research and other outstanding young teachers and reserve personnel.

CONCLUSION

Control science is based on cybernetics, information theory and system theory. Control science has universal significance for people to recognize nature and transform nature. However, with the continuous development and progress of human society, control science has also been applied in a wide range of non-engineering fields, such as population control theory, economic control theory, and biological control theory, all of which are concrete developments of cybernetics in these fields. Control engineering is the concrete manifestation of the general principles of cybernetics in engineering systems. In all kinds of traditional and advanced engineering systems such as manufacturing system, power system, nuclear engineering system, aerospace system, aviation system, navigation system and so on, the control engineering plays an important role and even promoted the independent engineering control discipline in the corresponding professional field .

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