

## Exploration on Cultivating Innovative and Applied Talents in Robot Industry

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**Keywords:** Innovation, Talent-cultivation, Scientific Tasks Oriented, Science& Technology Training, Depth Cooperation between University and Industry, Application-oriented Talents.

**Abstract.** Innovation is the uniquely human awareness and practical ability, as well as the human subjective initiative of high performance. Innovation-driven development is to promote the nation's progress and the inexhaustible motive force of social development. This paper mainly discusses how in the process of engineering undergraduate talents training, outstanding scientific research tasks and research tasks solution-oriented are realized. We employ the scientific research training, progressive training of applied innovation, multi-professional cross integration, university-industry depth cooperation, as well as international vision of innovation and entrepreneurship education, striving for the cultivation of application-oriented talents in robotics industry.

### Background

On June 9, 2014, Chinese President Xi Jinping addressed at the Chinese Academy of Sciences (CAS) and the Chinese Academy of Engineering (CAE) in Beijing, “the robot is the pearl of the crown at the top of the manufacturing, and it is a measure of a country's science and technology innovation and the important symbol of the levels of high-end manufacturing” [1]. Artificial intelligence technology as the representative of the breakthrough will likely lead to the fourth industrial revolution, which marks the widespread use of intelligent products such as robots, and human work and life will also be a huge change [1]. Robot Revolution is cosmopolitan, and times, only the original technology will enable us to become the new product and market rules of the important makers and leaders, so talent education should go ahead.

McKinsey released a report, listing 12 major economic subversion technology, the advanced robots, automatic cars in the fifth and sixth positions. While China has made some preliminary progress in the development and industrialization of traditional robot technology, the development of robot education in colleges is late, and the development is lagging behind. The training of robot talents is an urgent problem to be solved.

Under this background, Beijing Union University in 2012 employed Li Deyi, academician from the Chinese Academy of Engineering and chairman of Chinese Association for Artificial Intelligence, as the distinguished professor of the Beijing Municipal Education Commission Who adopts the mode of “Science task driving the cultivation of innovative talents”, and leads our school around intelligent vehicle (wheeled robots) to study the scientific task in the research and practice of talent training. An intelligent vehicle team is established by the teachers and graduate students, undergraduate students from different colleges and majors in our campus. Fortunately, a number of advanced and outstanding students are trained in the fields of robotics.

## **Innovation in Talent-cultivation Mode**

### **Innovation-driven Development**

Talent has become the core competitiveness of social development, building a talent education system, to maximize the effectiveness of talent resources to achieve the country has been available, talented people make the best use of the two-way win-win situation, become a major problem in front. In the fifth Plenary Session of the 18th CPC Central Committee, the party put forward the concept of “five development”: Innovation development, coordinated development, green development, open development and shared development. “Innovation development” is the first place. Innovation is the soul of a nation and the motivation of national development. “Whoever wants to establish unusual achievements, must rely on unusual talent”, talent is the key to innovation, the cultivation of talents lies in education. Contemporary university in China, there's no shortage of buildings, following, the paper, single discipline and the faculty, but is the lack of choice, the characteristic, and the autonomy of free exploration. Colleges and universities play an important historical mission and responsibility in the cultivation of innovative talents, thus under the new circumstances. We must further attach great importance and fully understand the importance of innovation and the cultivation of innovative talents in Colleges.

At present, the training mode of traditional engineering talents in colleges has been out of the shortcomings of the times, which is not conducive to the cultivation of innovative talents, the process is simple, the model is rigid and the development of students' personality is contained. In class the teacher as the center, students are passive, the initiative is not high. With the advent of the era of intelligence, we should keep up with the pace of the times improved, colleges should be to train innovative talents, to meet market demand, which in line with national development strategies and efforts. We should break the "stylized" teaching mode, with robot carrier of the convergence of different disciplines, scientific task driving talents' cultivation, more professional cross fusion. Combination with the depth of research efforts in the process of personnel training is very important to the construction of teachers. The construction of innovative teachers is an important guarantee for innovative talent cultivation. “Interest is the talent of the sparks, the creation of the bud. [3]” Teachers should pay attention to students' interest in personalized expertise, as well as around the interest to achieve the extreme dedication. Adhere to the combination of theory and practice, the combination of important and deepen the reform of education teaching. Promoting teaching innovation and cultivating innovative talents is the requirement of higher education in the new century, and is also an unshirkable responsibility of Higher education institutions.

### **Broken "Stylized" Teaching Mode[3] [5]- Exploration on Teaching Reform of Engineering talents Training in the Field of Robotics**

Facts proved that the power of team is greater than the habit of collective personal habits. The architecture is greater than the team. The trend is greater than the architecture. In the new round of technological and industrial revolution in the world, we have to face the future, reassess the situation, and to flow. The “Made in China 2025” plan puts forward the method of realizing the intelligent manufacturing by means of mass entrepreneurship and innovation. But how the public can go into business, and how to be creative? Beijing is the capital of China, also a first-tier and international city. The functional orientation of the capital Beijing is “four centers”, the most important is to establish a National Center for technology innovation. Given the above, technology and personnel training in Beijing should be oriented to sophisticated technology, and the industrial structure in Beijing should be oriented to the sophisticated industrial structure. Therefore, we must have a large number of the corresponding high-end and innovative talents.

Be capable of versatility, original creation, facing the trend of intelligent industrial revolution and combined with the positioning function of the capital, Beijing Union University put the robot innovation and application as a breakthrough. Science task driving the cultivation of talents. In 2015, Beijing Union University set up the first "De Yi" robot experimental class in the country, and admits students from various colleges and majors in our campus. Interest oriented the interdisciplinary penetration and interdisciplinary innovation, and enhance students' interest and scientific literacy

through scientific research activities. To well adapt to the development of intelligent era, the first robotics college in China were established in 2016 and started to enrollment. The college is composed of wheeled robot department, unmanned aerial vehicle department and special robot department, and became a training area of Engineering Applied Talents. Robotics college is exploring the new mode of applied talents training in local colleges and Universities under the background of "public entrepreneurship and innovation", and optimized the undergraduate training programs, the construction of quality courses, and continuously improve the quality of education through the construction of Applied Undergraduate Teaching system. Study & research for the purpose of application and active learning enabled students to develop into a "high quality, high level, creative" backbone talents with international vision.

### **The “Tutorial Mechanism” --- The Teaching Mode of “Science Task Oriented the Cultivation of Innovative Talents”**

The new mode of “Science task Oriented the cultivation of innovative talents” is focus on the ability oriented, scientific research training and application of innovative teaching process. This teaching mode is also lays emphasis on multi-disciplinary integration, integration of industry university research, science project and pay attention to the international perspective of innovation and entrepreneurship education method. Robotics College changed the traditional cramming method of teaching, combined theory with practice, taking the scientific research task as carrier. Under the guidance of the teacher, the students will take an active part in the specific robot project. By using the theory of knowledge, students put forward problems, explore the problem, and finally solve the problem. Practice in learning, learning in practice, students exercise themselves in scientific research projects. From passive learning to active learning, this progress enhanced students' practical ability and innovation ability.

**Firstly**, the implementation of tutor construction: Tutors guide the students directly, students can learning theory and doing scientific research practice at the same time. Freshmen can follow the mentor team and seniors from the basics. Students can learn together and solve scientific problems.

**Secondly**, in order to meet the demand of innovative talents cultivation, robotics college created an open laboratory environment. The laboratory opens 24 hours a day for students to practice and conduct scientific and technological activities. The laboratory is no longer a traditional experimental room which placed experimental items, but the students play the main role. The open laboratory is a practical comprehensive laboratory, students can make full use of their theoretical knowledge, to do scientific creation combine their interests and hobbies, give full play to their imagination and show themselves fully and delightfully.

**Thirdly**, Cultivate students' autonomous learning ability and creativity through the Student hackerspace and students' associations. Under the guidance of teachers, we can make up for the deficiency of theoretical knowledge in practice. The open laboratory raises the students' creative spirit.

To break the traditional theory course of learning methods, and change the mode to learning theory and practice at the same time. Robotics college use the “The Unity of Knowledge and Action [6]” as the guiding ideology, and improved practical ability, team awareness, innovation in practice and have complementary advantages.

### **Promote the Close Combination of Production, Learning and Research, as well as School-Enterprise Cooperation to Train Talents Meeting the Social Needs**

Famous Futurist Peter Eliade said: “Today if we do not live in the future, then the future we will live in the past.” The typical characteristic of knowledge production mode II is that “knowledge production is carried out in the application scenario” [7]. We are in an "intelligent", "network", "data" three-intertwined society. College students can not only learn in campus and classrooms, they should go out of the campus, and to practice in the factories. Establish innovative, entrepreneurial and innovation Works bases with industry leading enterprises. Robotics College, Beijing Union

University signed a school-enterprise cooperation platform with HIT Robot Group, Proturly Vision Technology Group, BAIC Automotive Group, Beijing Jingcheng Machinery Electric Holding Co., Ltd., Beijing Yunji Technology Co., Ltd., Beijing NVIDIA Technology Co. Ltd., IBM, Oracle Corp and many other well-known domestic and foreign enterprises, to provide a broad platform for the students. And is committed to work together to open up the path of intelligent robots towards large-scale industrialization, this will promote the steady, healthy and sustainable development of Chinese intelligent robot industry.

### **Training High Level Teachers' Team with the International Vision**

We need to break down the traditional way of talent training in the robot field, to organize a teachers' team of scientific tasks, and are established in domestic and foreign cooperation, which can effectively exercise training engineering and technical ability. Adhere to the guidelines about "Training and introduction of integration, on and off campus of collaboration", established of a co-teaching team around the field of robotics research, transformation of scientific research achievements and reasonable disciplinary structure. Helping young teachers to study abroad, visiting communication, expand teachers' international academic field of vision. In the process of teacher training, teacher's ability of technology research, development, and engineering practice can be trained and exercised, which project supported by the National Natural Science Foundation of China, the Newton foundation, and academic innovation team of Beijing talent education program.

At present, a new round of global technological revolution and industrial change poised. Chinese economy has entered a critical period of speed change, structural transformation and power conversion. Facing the new situation, we must further promote public entrepreneurship and innovation. Public entrepreneurship and innovation has become the social environment and cultural atmosphere, so that every person who is full of dreams and is willing to work hard can get succeed. We will continue to explore and continue to cultivate application talents who adapt to the development needs of the intelligent industry in Beijing, Tianjin and Hebei, and serve the field of intelligent robots for national economic construction.

### **Acknowledgements**

The authors thank Ying Zhen, Tian-xiang Hao from the robot experimental class which is named after Li Deyi, Academician of CAE, Gui-lin Pang, Xiu-ping Wu and Zi-xu Li, students of robots college for their contributions in this paper. This research is partially supported by the NSFC of China (NO.91420202), the Importation and Development of High-Caliber Talents Project of Beijing Municipal Institutions (NO. IDHT20140508) and the education and teaching reform project of Beijing Union University (NO. JJ2015Q024).

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