

Research on Collaborative Education Mechanism of IoT for “Artificial Intelligence + Encourage Startups and Innovation”

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Abstract: Aiming at the training mode of application-oriented undergraduate talents under the background of new engineering, this paper discusses the construction ideas of the Internet of Things (IoTs) major in the new engineering background. Currently, a lack of clarity persists concerning the establishment of the IoTs major in many colleges and universities. As the IoTs represents a novel concept for both enterprises and education, it is imperative to deeply explore its curriculum system design and talent training model. This article analyzes the current status of talent cultivation in the field of IoTs applications. Based on the guiding ideology of artificial intelligence + encourage startups and innovation talents proposed by the new engineering education reform direction, we put forward the reform goals, ideas, and methods for cultivating talents in IoT applications. We focus on innovative cultivation and carry out practical applications. By relying on a collaborative education plan that integrates industry, academia, and research, we explore and study an innovative compound talent cultivation model suitable for positioning applied undergraduate talents in IoT.

Keywords: IoTs Professional Training Model; Artificial Intelligence; Encourage Startups and Innovation; New Engineering Background.

1. Introduction

The rapid rise and development of Artificial Intelligence (AI) not only drives the intelligent industry to take root in various fields, but also accelerates the development transformation from “the Internet of everything” to “AI+” [1]. As a national strategic information industry, the Internet of Things plays a vital role in the development of national economy. The development of the Internet of Things to AIoT (AI+IoT) has become an inevitable trend. Therefore, all countries are actively promoting the integration of artificial intelligence and the IoTs industry, striving to develop the opportunities, encouraging the society to actively promote “artificial intelligence” and entrepreneurship and innovation, and giving full play to the optimization and integration effect of artificial intelligence in the allocation of social resources in the Internet of everything.

The development of innovation economy and technology, which is driven by new technologies, new ideas, new industries, and new trends, has put forward higher and updated requirements for the cultivation of engineering applications and professional innovative talents. As a new engineering discipline, the IoTs engineering program should cultivate high-quality and versatile new engineering professionals who have strong practical and innovative abilities and possess international competitiveness, in accordance with the demands of technological revolution and industrial transformation. The IoTs technology, as a key approach in driving innovation and realizing artificial intelligence [2-4], has been widely applied in various fields such as modern industry, agriculture, power, healthcare, transportation, and shipping. It requires more than ever before a versatile workforce that can apply IoTs technology in multiple domains [5-9]. Such professionals are essential in implementing the strategy of innovation-driven development

and providing strong technological support and talent assurance for the intelligent ecosystem of everything connected.

The in-depth application of the IoTs technology has strongly promoted the deep integration and rapid development of artificial intelligence, big data and cloud computing, and constituted a complete intelligent closed-loop control and optimization system. In recent years, with China’s increased investment in infrastructure such as IPv6, NB-IoTs, and 5G, the penetration rate of the IoTs into traditional industries has continued to rise. Applications such as industrial IoTs, smart cities, and connected vehicles have rapidly expanded. Under the accelerated integration of information technologies such as cloud computing and big data, the scale of the IoTs industry has surpassed trillions. With the advancement of 5G implementation, more and more enterprises are increasing their deployment of the IoTs. In order to meet the development needs of the IoTs industry, we need to establish a multi-level talent training mechanism, a multi-channel talent introduction mechanism and a flexible employment mechanism. This includes accelerating the construction of innovative talent teams, increasing the training of relevant professionals, and carrying out multi-level talent training programs. At the same time, we should support universities, scientific research institutions and IoTs enterprises to cooperate, establish technology research and development bases, employment and entrepreneurship bases and internship training bases, in order to build a multi-level talent team to meet the needs of industrial development. Such initiatives can promote the cultivation and flow of talents, improve the quality and quantity of IoT professionals, and provide strong support for the rapid development of the IoT industry [10-13].

In the construction of new engineering disciplines in China, the gradual introduction of innovation and entrepreneurship

education concepts has become an important means of higher education professional development. Particularly in the field of IoTs, we have incorporated “artificial intelligence + encourage startups and innovation” education into the professional practical teaching system, which plays a significant role in the cultivation of IoT talents. Through daily practical teaching, we can subtly guide, instruct, and mentor students in developing their innovation and entrepreneurship abilities, thereby promoting their comprehensive development.

2. Analysis of the Current Situation of Talent Training in the IoTs

At present, the IoTs industry faces a gap between strong demand for talents and low quality of talent training. Therefore, exploring the cultivation of applied, composite and innovative IoTs talents is an important issue that application-oriented undergraduate colleges urgently need to study and solve. There are still deficiencies in encourage startups and innovation, which still lead to quality improvement, and mainly exist the following disadvantages:

2.1. The Curriculum System has a Single Setting and Lacks a Macro-Integrated Layout

The curriculum system for the IoTs is still being explored and discussed, with most of the focus on theoretical and profound content, lacking practical case studies. Although many courses such as “Analog Circuit Electronic Technology”, “Internet of Things Technology and Applications” and “Grain Storage Information Science” have been introduced into the current curriculum system, the overall curriculum system, knowledge system. However, practical training are still in the exploratory stage, and students lack practical innovation and entrepreneurship training. The curriculum design is disconnected from professional education, focusing more on traditional theoretical knowledge and related skills, neglecting the macroscopic integrity of the education in the IoTs. Therefore, students find it difficult to apply their professional knowledge to the field of innovation and entrepreneurship practice.

2.2. The Teaching Method is Slightly Outdated, and the Connection between the First and Second Classrooms is Insufficient

The major courses of the IoTs mainly focus on the first classroom teaching, the teaching method is teacher-centered traditional classroom teaching method. Although the new “online +offline” mixed teaching method has been introduced, the training of students’ innovation and entrepreneurship practical skills is very limited. The teachers are generally doctoral graduates who pay attention to theoretical research. In the teaching process, they only focus on the teaching materials of the Internet of Things and lack deep practical training and learning, which makes it difficult to achieve the goal of cultivating innovation and entrepreneurship ability. The integration degree of the first classroom and the second classroom is not high, and the collaborative education mechanism is not perfect, which leads to the low conversion rate of students’ learning results, the sense of learning acquisition is not strong, and the learning effect is difficult to reach the expected goal in general.

2.3. Discipline Construction Lacks Connection with the Overall Background of “Artificial Intelligence+ Encourage Startups and Innovation”

Integrating the training of new engineering IoT professionals into the background of artificial intelligence and innovation and entrepreneurship is an inevitable requirement to meet the needs of social development. The existing IoT innovation and entrepreneurship competitions at all levels are disconnected from professional practice activities. At the same time, due to resource constraints, professional construction lacks effective school-enterprise cooperation education links, and practical activities of the IoTs generally have problems of insufficient depth and lack of application combined with the background characteristics of “artificial intelligence”.

3. Research Content, Research Objectives and Innovation

3.1. Research Contents

The main research content of this topic includes the following parts:

3.1.1. Research on Curriculum System Design

This paper studies the training goals and positioning of professional talents in the IoTs, and summarizes the teaching system of professional characteristics such as the method and process of course design for the IoTs in combination with the actual employment of college students. Specifically, it includes the construction of theoretical teaching system, practical teaching system, optional course auxiliary system and second classroom auxiliary system. In the establishment of the curriculum system mechanism, the gradual introduction of “entrepreneurship and innovation education” education, through the continuous improvement of students’ practical ability of the IoTs, the use of various intelligent algorithms under the background of artificial intelligence, so that students can complete the IoTs competition or innovation and entrepreneurship competition, through the establishment of “entrepreneurship and innovation education” thinking, students after graduation and entrepreneurship, employment more closely.

3.1.2. Research on Teaching Process Design

According to the existing teaching outline, we are gradually exploring and improving the content and methods of teaching in the Internet of Things major. We will clarify the emphasis of IoT professional education and the skills goals to be achieved, and determine the teaching characteristics and means of the IoT major under the “artificial intelligence + entrepreneurship and innovation education” driving force. We will utilize the key laboratory resources related to grain information in the school and the college, and through the combination of theoretical teaching and practical training, design specific practical training and learning programs and evaluation indicators to promote students’ enthusiasm for learning in and out of class. At the same time, we will attract professional mentors to participate in coaching for IoT innovation and entrepreneurship competitions, introduce enterprise mentor training for the college’s faculty, research assessment methods and reward mechanisms, and increase teachers' sense of participation and achievement.

3.1.3. Research on Professional Practice Design

The threshold for practical education in the IoTs is relatively high, which requires students to study IoT basic knowledge as a reserve and have a foundation in embedded development and artificial intelligence. Moreover, they need to possess innovative and entrepreneurial thinking methods. Most IoT professional training lacks practical AIoT-related case scenarios. It is essential to introduce enterprise equipment for AIoT business scenario teaching, including sensor, integrated circuit, and robot motion programming practical projects. The design of course practices mainly focuses on the technical content of IoT platforms, while also involving content related to artificial intelligence and innovation and entrepreneurship. However, the key lies in how to integrate and form a collaborative education mechanism for IoT professionals, aiming to cultivate IoT application-oriented talents with innovative spirit and practical abilities.

3.2. Research Objectives

3.2.1. Collaborative Education Through School-Enterprise Cooperation

Precisely, we necessitate the amalgamation of the academic and corporate resources, fostering a collaborative establishment and management approach to design a pragmatic teaching platform. This platform provides essential conditions for the cultivation of high-quality IoTs engineering application professionals. In the training of applied talents for IoT engineering, higher education institutions should shift from a disciplinary to an industry-oriented approach, and transform from a traditional knowledge-driven to an application-driven model. To accomplish these two changes, higher education institutions should establish close communication with enterprises to modify the pace of talent cultivation, while enterprises should proactively engage with higher education institutions and encourage them to train IoT application talents according to the needs of industries and enterprises. The collaboration between the school and enterprise facilitates the implementation of classroom teaching, practical guidance, and graduation design supervision. The professional core curriculum is defined, and industry engineering and technical personnel, management personnel, or educators with significant industry experience and “dual-professional dual-ability” are employed to teach.

3.2.2. Competition to Promote Learning, Industry-University-Research Coordinated Development

In the context of student training, the project-oriented curriculum serves as the nucleus, with the competition team consisting of professional instructors and students. The fundamental and specialized skills required for IoT engineering courses are integrated into the competition. By implementing disciplinary competitions and integrating industry resources, we aim to stimulate students' interest and unleash their potential. This approach can enhance the motivation for independent learning and technological expertise. Moreover, it reinforces the core competitiveness of students' employability and entrepreneurial abilities. By organizing a variety of student competitions and pooling competition resources, we can provide a platform for educators and learners to bridge the gap between competition outcomes and industry partnerships. This approach significantly enhances the implementation of competition results and spurs the creativity of students. Moreover, it has a profound impact on fostering the transformation of

technological achievements among faculty and students in higher education institutions and promoting the seamless integration of industry, academia, and research applications.

4. Research Features

The key issue of this research is mainly to study how to implement it in the specific teaching process to simultaneously achieve the goal of “artificial intelligence + entrepreneurship and innovation education” collaboratively driven IoTs talent training. Obviously, actively exploring the construction of professional curriculum system has certain theoretical guiding significance and practical application value. There is still a process of continuous optimization and improvement on how to more effectively integrate knowledge and skills related to artificial intelligence. We accelerate the training of AI-enabled talents for the Internet of Things, and realize the application experience of AI penetrating into various scenarios of the IoTs. Moreover, the integration of “entrepreneurship and innovation education” and practical teaching should be strengthened to realize the integration of artificial intelligence for professional education of the IoTs and entrepreneurship and innovation education. Human mechanism, integrating and optimizing the education system structure of artificial intelligence and innovation and entrepreneurship, taking multiple measures simultaneously and working in the same direction.

According to the development needs of new engineering, combined with the characteristics of the IoTs engineering specialty and talent training objectives, it is particularly important to form a new engineering talent training model for the IoTs engineering discipline system, and strive to train new engineering talents of the IoTs to adapt to the new era. Centering on the training goal of professionals in the IoTs, reform the teaching methods and teaching methods, restructure the curriculum system, meet the needs of the industry, the school-enterprise collaborative education model, improve the quality of talent training for the IoTs, and contribute to the IoTs in the national strategic emerging industries.

5. Conclusion

The key issue of this research is mainly focused on exploring how to implement the simultaneous achievement of the goal of cultivating IoT talents through the coordinated drive of “artificial intelligence + entrepreneurship and innovation education” in the specific teaching process. It involves active exploration in constructing a professional curriculum system, with a certain theoretical guidance and practical application value. The continuous optimization and improvement process also exist in effectively integrating artificial intelligence-related knowledge and skills. Accelerating the empowerment of artificial intelligence in cultivating IoT talents, achieving the full-scenario application experience of artificial intelligence permeating the Internet of Things, strengthening the integration of entrepreneurship and innovation education and practical teaching, and realizing the organic integration of artificial intelligence and innovation and entrepreneurship in the IoT professional education mechanism. This involves integrating and optimizing the education system structure of artificial intelligence and innovation and entrepreneurship, and taking multiple measures in the same direction.

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