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Research on Industrial Internet Talent Training Based on Enterprise Application Demand

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Abstract. The Industrial Internet can be used in enterprises for predictive maintenance, location tracking, workplace analysis, remote quality monitoring and energy optimization. To realize the development of the industrial Internet, a large number of high-quality industrial Internet talents are indispensable. These talents not only need to have a solid foundation of engineering technology and a good level of computer technology but also need to have a deep understanding and grasp of the industrial production process and be able to develop suitable industrial Internet solutions according to actual needs, to promote the steady development of the industrial Internet. Based on preliminary research and communication with enterprises, this paper designed some courses for Industrial Internet Talent Training.

Keywords. Industrial Internet, Talent Training, Enterprise Application Demand

1. Introduction

As an important part of the new generation of the information technology industry, the industrial Internet is not only an important part of the new infrastructure but also the main way and means of digital transformation of the real economy. The innovation and development of the industrial Internet have become a national strategy. Industrial Internet is a new type of infrastructure, application mode, and industrial ecology formed by the all-round and deep integration of the new generation of information technology and industrial system, which mainly consists of four parts: network, platform, security, and data. Among them, the network is the foundation, data is the element, the platform is the core, and security is the guarantee.

Industrial Internet focuses on key industries such as equipment, electronics, chemical industry, mining, food, pharmaceuticals, steel, energy, construction, and transportation, providing all-cloud and all-scene solutions for the intelligent transformation of the manufacturing industry, breaking through core technologies such as identification analysis, industrial safety, and deterministic network.

However, based on the rapid development of the industrial Internet and related industries and technologies, the existing curriculum content and teaching methods can

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no longer meet the needs, and the talent training mode urgently needs to be connected with industries and industries [1].

To fully meet the demand of industrial Internet talent, we should innovate and carry out the cooperation of "industry, education, and research", carry out the strategy of strengthening the country by talents, promote the construction of technical and skilled personnel in the new vocational field, and promote the training of talents in the new economic field. Higher education personnel training also needs to fully connect with industry and enterprise research, and carry out the reform of curriculum content and teaching methods [2].

2. Research status and current problems

According to strategic positioning and planning, the industrial Internet includes five major businesses [3]. As Table 1 shows:

Table 1. five major businesses

No.	Name	Discribe
1	industrial equipment	including special industrial equipment, digital equipment after digital transformation, and intelligent products upgraded through active labeling, to become industrial equipment layer product service providers
2	industrial communication	including identification analysis, spark chain network facilities, enterprise internal and external network hybrid networking and 5G + industrial Internet, including industrial deterministic network
3	industrial Internet platform	which mainly solves the cross-industry and cross-domain problems of enterprises, and creates many platforms with industry and regional characteristics and professional platforms
4	industrial software	including industrial design software, business management software, industrial control software, and embedded software
5	industrial safety	By creating industrial security products, it provides five layers of security to ensure the data security of enterprises from R & D, design to production and sales.

The key to the transformation and upgrading of the industrial economy is talent, which is the core element of the development of the industrial Internet. However, there are many problems in the construction of the industrial Internet talent team, which has become the main "bottleneck" restricting the rapid development of the industrial Internet. The industrial Internet is the deep integration of the new generation of information technology and the manufacturing industry, and the landing application requires cross-border talents who understand both industrial operation and network information technology. The industrial Internet education should be theoretical education, which requires hundreds of years of industrial experience to be transformed into useful knowledge to reuse and software, and its technological innovation and application need to be coordinated in many fields and disciplines, including software engineering, enterprise management, product design, robotics, and equipment [4].

3. Research course content and teaching method

This paper will study the training of industrial Internet talents from the following two aspects:

3.1. Research on course content docking with industry enterprises

In terms of course content, according to the software development needs of enterprises such as industrial control and equipment management, new engineering courses such as rapid software development and other basic, cross-cutting, and professional courses can be offered [5].

Based on preliminary research and communication with enterprises [6], the following rapid development courses are listed:

Table 2. the list of courses

No.	Course name	Content	Class hours
1	An overview of container technology	PPT/Video	2
2	Container product introduction	PPT/Video	2
3	Fundamentals of DevOps	PPT/Video	2
4	DevOps Datasheet	PPT/Video	2
5	DevOps Field Camp	PPT/Video	2
6	Agile development management	PPT/Video	2
7	Continuous delivery	PPT/Video	2
8	Technical operation	PPT/Video	2
9	Microservices	PPT/Video	2
10	Service Grid	PPT/Video	2
11	Micro-service practice	PPT/Video	4
12	Big Data Foundation	PPT/Video	4
13	Hive Data Warehouse Tool Technology	PPT/Video	4
14	HBase Real-time Distributed NoSQl Database	PPT/Video	4
15	Spark Big Data Processing Technology and Application	PPT/Video	4
16	Practical Cases of Industrial Internet Application in Different Industries and Fields	PPT/Video	4

3.2. Research on teaching methods docking with industry and enterprises

In terms of teaching methods, in addition to traditional classroom teaching and practical teaching, we can also use the industrial Internet platform of enterprises to

complete developer tasks and carry out new teaching methods reform [7]. Relying on the dominant disciplines, carry out the development and research of practical training and practice in related fields, including but not limited to the industrial Internet equipment management or control software involved in the current industrial Internet platform [8]. So, we can make full use of the platform of enterprises and help them to improve their product.

Table 3. Introduction to the courses

No.	categories	name	Introduction to the course
1	Industrial Internet of Things Training Platform	Industrial Internet of Things technology	Provide IOT equipment demonstration, in-depth understanding of IoT and hardware, wireless sensor network application technology, RFID application technology and other basic knowledge and skills, so that students can master the basic knowledge and application scenarios of IoT, and learn how to build industrial IoT based on typical manufacturing production lines [9].
2		Industrial Internet of Things Platform	Demonstrate the industrial Internet of Things platform, understand the platform architecture, understand the industrial data acquisition and data analysis module, and operate the data acquisition and data analysis process. To enable students to master the principles and methods of industrial data acquisition, data processing and presentation. Functional scenarios such as real-time monitoring of factory environment and monitoring of electricity consumption are simulated [10].
3	Industrial Application Development Training Platform	Industrial Application Development Training Platform	The training platform provides a series of basic tools and components for application and integration. Quickly generate and integrate application software based on the development mode of no code or a very small amount of code on the platform. To enable students to master the process of development and integration of industrial applications [11].
4	Industrial Big Data Training Platform	Build industry data lake/data center	The IBP data factory supports data access of multiple data sources and multiple data types, and builds a data lake through efficient processing, which is convenient for users to manage data in a unified and convenient way. At the same time, IBP data factory has accumulated rich industry models and algorithms in various business areas to analyze the data in the lake. Through practical training, students can master the data components, data source configuration and data cleaning functions of IBP data factory, and cultivate the ability to build a data platform [12].
5		Massive data computing	Capacity expansion and shrinkage of the cluster, providing a variety of relational databases and big data databases, and providing big data computing components such as MapReduce, Spark and SparkSQL. Through practical training, students can choose the appropriate system architecture to deploy the system for the customer according to the actual business scenario of the customer, and use the appropriate big data computing components to meet the customer's requirements for timeliness of business data computing [13].
6		Real-time streaming data analysis	Analyze monitoring real-time stream data and support online monitoring alarm; The analysis of traffic flow data supports real-time display of traffic hot spots, optimization of signal timing and guidance of driving routes. The analysis of user usage data supports real-time recommendation and optimizes the recommendation algorithm.

7		Data acquisition exchange	The industrial big data training platform supports the access of multiple database data sources, including but not limited to Oracle, MySQL, SQLServer, DB2, Hangao and other mainstream relational databases at home and abroad, HBase, MongoDB and other NoSQL data sources; At the same time, it supports a variety of different types of structured, semi-structured and unstructured data access. Support business system data collection, reporting and exchange requirements. Through practical training, students can master the technology of big data aggregation [14].
8		Visual application development	Industrial big data training platform has built-in rich data visualization components, while meeting the needs of business charts, dashboards, reports and large screens, supporting the construction of business application visualization. Through practical training, students can master rich data visualization components, and have business application visualization construction according to the needs of business charts, dashboards, reports and large screens.
9	Intelligent Manufacturing Training Platform	Practical Course of Introduction to Intelligent Manufacturing Engineering	System analysis method, system diagnosis method and system implementation for learning intelligent manufacturing engineering
10		Fundamentals of Intelligent Manufacturing Production Management	Understand the production management concepts such as assembly line, process and yield; Understand the PDCA process in the production process; Be able to make production plans for small production lines and realize visual display; Understand the concept of line balancing and be able to identify bottleneck processes; Conscious of quality, on-time delivery and cost control; Able to read and fill in production reports.

4. The Discussion and Conclusion

With the rapid development of a new round of scientific and technological revolution and industrial transformation, the Internet has extended rapidly from the consumption field to the production field, the industrial economy has expanded from digitalization to networking and intellectualization, and the innovative development of the Internet and the new industrial revolution have formed a historic intersection, giving birth to the industrial Internet. Accelerating the development of the industrial Internet and promoting the deep integration of the new generation of information technology and the manufacturing industry is the key to conforming to the trend of technological and industrial change, speeding up the construction of manufacturing power and network power, to deepen the structural reform of supply side, to promote the transformation and upgrading of the real economy, and to achieve the goal of "carbon peak, carbon neutralization" Therefore, with the continuous development of the industrial Internet technology, the demand for industrial Internet talents will be growing in the future. It is predicted that by 2025, the talent gap in the core industry of the industrial Internet will reach about 2.54 million. It is more and more important to strengthen the training of industrial Internet talents and continuously improve their skills and comprehensive

quality. Through the cooperation and research with many enterprises and universities in the early stage, this paper proposed the reform plan of the curriculum system and teaching method of industrial Internet talent training, hoping to meet the rapidly growing needs of industrial Internet talent.

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