International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 9 Issue 10, October-2020

Artificial Intelligent Manufacturing for Modern Industry Sector

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***Abstract*:- Since the release of Artificial Intelligent manufacturing like China proposes "Made in China 2025",Germany proposes "Industry 4.0",U.S. Proposes "Design Innovation and Digital Manufacturing", UK proposes "leading technology network sand and innovation", Netherlands proposes "high-end technology strategy" and others related countries are proposed in different areas, and the traditional manufacturing industry has accelerated the pace of transition to Artificial intelligent manufacturing, which has caused tremendous changes in the entire product life cycle of design, production, management, and service in the manufacturing industry. The Artificial intelligent manufacturing space characterized by information perception, network collaboration and human-machine integration will promote the development of Artificial intelligent manufacturing.**

Keywords:- Artificial intelligent manufacturing, which has caused tremendous changes in the entire product life cycle of design, production, management, and service in the manufacturing industry.

INTRODUCTION

Artificial Intelligent Manufacturing is shifting the production system of every manufacturing industry. As the technology matures and costs drop, Artificial Intelligent Manufacturing is becoming more accessible for Industries, and that includes all priority manufacturing Industry sector.

The manufacturing industry has always been enthusiastic to hug and new technologies. Artificial Intelligent Manufacturing acceptance means industrial companies and manufacturers can make faster, data-driven decisions, optimize manufacturing processes, improve the supply chain and improve customer service. In fact, Artificial Intelligent Manufacturing in manufacturing sector is moving right to the point of process, computing at the machine level, instead of sending data up to the cloud and processing it there. This means Artificial Intelligent Manufacturing is transforming manufacturing Industries and Manufacturing Sector in real-time.

1. Combination of virtual and real

The combination of virtual and real refers to the use of computer software (like CAD, CAPP, CAE and CAM to explore design alternatives in hardware), simulation technology (like NC, CNC and Robotics) and virtual reality technology to generate virtual manufacturing space. During the period, design analysis, strength analysis, virtual pre-assembly, etc. of product structure, manufacturing process, assembly relationship, etc. are implemented to realize the simulation of product prototype manufacturing, which can evaluate the product manufacturing process in advance, effectively reduce processing costs, and achieve product reduction the purpose of the manufacturing cycle. With the transformation and upgrading of countries manufacturing industry, it has also driven the development of virtual reality technology. For example, mold manufacturing companies use CAD software to design the two-dimensional and three-dimensional structure of products, use CAPP software to simulate the processing technology of parts, use CAM software to simulate the processing process of production equipment, and use CAE software to perform reliability analysis and inspection of products, etc. , In the virtual manufacturing environment, product design, production and processing, quality inspection and assembly are vividly displayed, which greatly reduces the time for repeated trial production of products, and quickly produces products that are consistent with user needs.

The combination of virtual and real manufacturing methods not only cover product design, process planning, and process simulation, but also cover production links such as after-sales maintenance, recycling and remanufacturing[1]. As the reality of the entire life cycle of the product reflected in the virtual manufacturing space continues to increase, it not only enables manufacturing companies to improve production efficiency, but also better meets the needs of personalized customization. The combination of virtual and real is the Artificial intelligent

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manufacturing enterprise to shorten the product manufacturing cycle and reduce the production cost.

This is the main technical means to ensure product quality. In recent years, the application software of mold enterprises has been updated very quickly, and the software functions have gradually changed from singularity to integration. The same software can complete multiple functions such as design, technology, processing, assembly, and testing. It is highly standardized, modular and integrated. This greatly saves the product life cycle development cost, and can realize the dynamic configuration of various resources such as design, production, logistics and sales in the virtual manufacturing environment. Product quality tracking and testing are also inseparable from the support of software, combining virtual and real. While the production methods improve product quality, they also realize flexible production and personalized customization. At present, the combination of virtual and real is widely used in the design and manufacture of complex molds such as die castings, automobile panels, high-speed rail streamlined headstock parts.

The combination of virtual and actual manufacturing methods is not only widely used in mold companies, but also in the teaching of Technical and Vocational Education and Training Artificial intelligent manufacturing, such as cast design, process planning, processing simulation, etc., especially the CNC machining of cast products, due to the Technical and Vocational Education and Training centers CNC machine tool equipment it is expensive and small in quantity, and it is difficult to control manually once the processing procedure has problems. Therefore, the machine tool accidents should be avoided as much as possible in actual processing. Therefore, the trainees (Students) simulate the actual machining process in the numerical control simulation system before actual operation, and check whether the blank, machining route, cutting tool, cutting amount, machining accuracy, etc. are qualified in the virtual manufacturing environment.

In summary, as product manufacturing shifts from mass production to mass customization, the product structure of molds changes from relatively fixed to uncertain. Simulating physical processing in a virtual environment is an Artificial intelligent manufacturing enterprise that shortens product manufacturing cycles, reduces production costs, and guarantees products is the main technical means of quality. Therefore, Technical and Vocational Education and Training Institutes, colleges and Centers should focus on cultivating trainees (students') innovative ability through the combination of virtual and real, so that trainees (students') can be more exposed to advanced manufacturing technology in the virtual manufacturing environment, strengthen the practical teaching of multi-disciplinary, multi-module combination of virtual and real, and strengthen students' individualization and the development of innovative capabilities.

2. INFORMATION PERCEPTION

Information perception refers to the use of video technology, sensors, QR codes and other methods to efficiently collect, store, analyze, Process and recognize massive amounts of data and information to realize automatic perception and rapid claim. Information perception greatly improves the tracking ability of items on the production line, so as to realize the visualization, refinement and Artificial intelligent control of product design, production, management and service by managers[2].

Compared with traditional manufacturing, the Artificial intelligent manufacturing system highly integrates the various subsystems in the production process into a whole and realizes the overall intelligence. This is the most fundamental difference from the "production island" of the traditional manufacturing system. The Artificial intelligent manufacturing system can obtain various data throughout the production life cycle.

First, The customer information is analyzed scientifically in real time. The manufacturing workshop uses sensors and radio frequency technology to accurately collect and perceive processing information;

Secondly, The production execution system monitors the collected data in real time For management and analysis, Artificial intelligent numerical control equipment automatically adjusts the production process according to the production information of the product, and can perceive the changes in the surrounding processing environment during the processing;

Finally, Through system analysis, independent decision-making, independent judgment of processing parameters and real-time optimization, Actively execute the production tasks of intelligent manufacturing, automatically identify quality inspection data and deal with product quality fluctuations and abnormalities in a timely manner. Because the product uses electronic tags, QR codes or barcodes to give unique One identification, so it is easy to trace the production data involved in the process of product processing, such as suppliers, material batches, staff, processing locations, processing equipment, processing time, quality inspection and judgment of defective products, etc. At present, the smart factories of some companies use sensors, radio frequency technology and smart chips to automatically identify, perceive, transmit, automatic scheduling, high-efficiency automatic processing, precision inspection, and automatic warehousing of automatic guided vehicles. 24-hour processing, black light operation can be achieved at nigh [3].

To summaries, it can be seen that the Artificial intelligent manufacturing production site is highly automated. Under normal circumstances, humans rarely interfere with the production process. The work of employees at the production site has changed from operating equipment in front of the scene to monitoring equipment behind the scenes, and from manual labor to mental labor. When a production alarm occurs, on-site staff can quickly find the cause and quickly solve the problem. This requires much higher ability of on-site staff than in traditional manufacturing, because they can only better understand the cause of the failure if they are familiar with the entire production process. This requires them not only to possess this professional knowledge, but also related knowledge related to a new generation of information technology, automatic control, and data analysis. Through the above analysis, it can be seen that the curriculum system of Technical and Vocational Education and Training (TVET) in Artificial Intelligent Manufacturing training must be integrated across disciplines, otherwise it will be difficult to produce well educated, skilled and talented trainees(Students)

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based on need of labour market analysis for artificial intelligent manufacturing industries that meet the development needs of the times. In addition, since Artificial intelligent manufacturing has the characteristics of information perception, in Technical and Vocational Education and Training (TVET).

3. NETWORK COLLABORATION

Network collaboration is the use of Internet, Internet of Things, wireless networks, information technology and other means to break time Empty constraints, to realize the collaborative research and development, collaborative design, precision logistics, Artificial intelligent production, real-time production data analysis, Artificial intelligent services, etc. of different enterprises or individuals in the industry chain, to achieve the purpose of making full use of corporate resources [4].

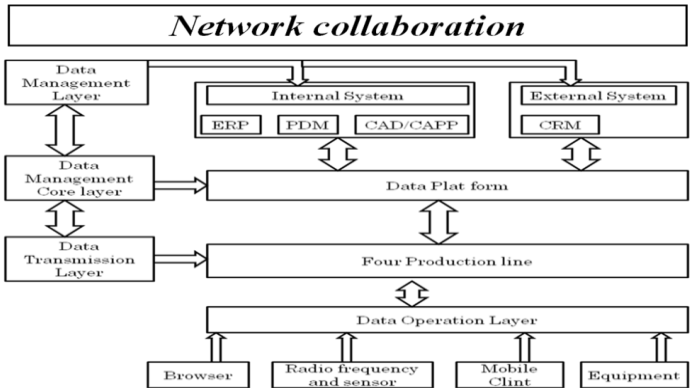

Figure 1 Network collaboration

Network collaboration promotes Artificial intelligent manufacturing from the centralized production model in the factory.

In the past to the distributed production model instead, for example, some or all of the links in production can be distributed across the country or the world for collaborative manufacturing, so that the cost-effectiveness of production can be optimized. With the rapid development of network technology, the development and utilization of network information resources is an effective way for enterprises to achieve optimal allocation of resources[5].Network collaboration is a new production model for enterprises to quickly seize the market and carry out large-span integration and innovation. At present, enterprises use the Internet and cloud manufacturing platforms to realize joint research and development, design, manufacturing, supply chain, etc., regardless of time and geographical constraints, to achieve resources shared networked collaborative manufacturing greatly improves production efficiency and technology update speed[6][7].

At present, industry-university-research cooperation between enterprises and universities and research institutions is also a form of network collaborative innovation, and is an important part of the national innovation system[9]. Industry-university-research cooperation is an important measure to coordinate technological innovation, accelerate technology promotion and application, and industrial transformation of scientific research results. In the industry-university-research cooperation, it mainly involves the integration and application of knowledge. James March believes that knowledge is divided into academic knowledge and empirical knowledge. Academic knowledge emphasizes the degree of understanding of things, while empirical knowledge emphasizes understanding and implementation in a specific environment [10] . For Technical and Vocational Education and Training, "production", "learning", and "research" are mutually dependent and mutually reinforcing. The integration of production and teaching is more in line with the characteristics of Technical and Vocational Education and Training. Trainees or Students promote knowledge and skill talent while producing and operating. Enterprise technology innovation forces trainees or students to study in depth and stimulate their enthusiasm for learning; Trainees or students are integrated into teachers' scientific research projects in their studies, helping teachers to complete projects while expanding their thinking skills, thus fostering students' independent innovation thinking.

4. HUMAN-MACHINE INTEGRATION

Human-machine integration is to give full play to the respective advantages of man and machine, The decision-making ability and empirical wisdom in manufacturing, on the other hand, use the rapid analysis, judgment and calculation capabilities of computers to highlight the intelligence of machine production, so that humans and machines can learn from each other at different levels, cooperate with each other and show their abilities.

In the study of human-computer integration and artificial intelligence, as early as the 1990s, Lu Yongxiang and others proposed that human-computer integration and artificial intelligence are a complex and meta-intelligent project[11], and human-computer integration emphasizes The "new partnership" formed by humans and machines[12]. In the work, humans and machines perceive, coordinate decision-making, and cooperate on an equal footing. This cooperative relationship can achieve a level that exceeds human ability and even intelligence[13].

As computer technology, new generation information technology, sensors, artificial intelligence and wearable devices continue to make breakthroughs, the integration of humans and machines has attracted more and more attention. Artificial intelligence-based equipment can only perform mechanical prediction, reasoning and judgment. Therefore, it has logical thinking and image thinking, but does not have inspirational thinking. Only human experts have the above three thinking abilities at the same time. The intelligent manufacturing system is not only an "artificial intelligence" system, but also a hybrid intelligent manufacturing system that integrates human experts and intelligent machines. It not only highlights the core position of humans in intelligent manufacturing, but also makes better use of humans with the cooperation of intelligent equipment. Potential. smart device

The use of, improves production efficiency and reduces the work intensity of employees, but at the same time puts forward higher requirements for people who use smart devices. For example, the use of industrial robots requires programming and maintenance of industrial robots, and the ability to interact with robots. Perform remote interaction, etc.

In summary, in Artificial intelligent production, only by greatly reducing the errors of human factors, can human-

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machine integration be better realized. Human intelligence and machine intelligence work together to coordinate and complement each other. High-quality and high-intelligence people will play a better role in intelligent production. With the development of intelligent manufacturing technology, the company's demand for human positions has changed, and future production will develop in the direction of human-machine integration, teamwork, and cross-border knowledge.

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