Collaborative Robots: Breaking Tradition, Co-creating the Future of Manufacturing

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HONG KONG, CHINA, March 8, 2024 /EINPresswire.com/ -- Collaborative robots, also known as cobots, have gained widespread recognition since the early 2000s. The most notable feature of cobots is their ability to work alongside human workers. Unlike traditional industrial robots that require safety fences or isolation measures, cobots are designed to directly share workspace with humans. In modern factories, cobots are no longer just replacements for machinery; they have become "colleagues" to human workers. They assist humans in scenarios that require high flexibility and creativity, thereby enhancing production efficiency and customization.

Over the past decade, cobots have experienced significant growth, and this trend is expected to continue. According to Jakelectronics' forecast, the compound annual growth rate (CAGR) of cobot technology is projected to reach 32% from 2023 to 2030, with the global market size increasing from $1.58 billion in 2023 to $11.04 billion in 2030.

A similar trend has emerged in the Chinese market, where the cobot industry has steadily developed and expanded its market size, driven by technological advancements, market demand, and national policies. According to the forecast by the GGII (Global Great Industrial Intelligence) Institute, the cobot industry in China will enter a period of stable growth, with annual sales volume of cobots approaching 100,000 units and a market size exceeding 6 billion RMB by 2026. Particularly in the field of industrial production, cobots play a crucial role and serve as a significant driving force for the transformation and upgrade of the manufacturing industry, with broad application prospects.

Utilizing cobots to undertake high-precision, highly repetitive, and complex tasks is a key step in building automated intelligent manufacturing factories. For example, ABB's YuMi 14-axis dual-arm collaborative robot, introduced several years ago, revolutionized the field of robotics and automation. It was specifically designed for delicate operations requiring high precision and flexibility, such as small parts assembly. YuMi's dual arms can work together or independently, enabling it to perform complex tasks that typically require the involvement of multiple robots or human operators.

Considering the demand for high precision and flexibility in cobots, the design requires the use of multi-axis motor control. Consequently, Infineon, in collaboration with its industry partner

STMicroelectronics, developed the STEVAL-ETH001V1 kit. This kit comprises the STM32F767ZI microcontroller based on the Cortex-M7 core, the STDRIVE101 gate driver, and the STH270N8F7-2 power MOSFET, assisting developers in creating multi-axis PMSM position servo drive applications for cobots. The STEVAL-ETH001V1 kit offers a maximum output power of 700 W, supports EtherCAT real-time communication protocol, and features an interface for quadrature encoders.

It is worth noting that Infineon has also established a joint laboratory with STMicroelectronics to provide support and comprehensive solutions for customers' designs and productization, specifically targeting motor control applications.

The main advantages of cobots lie in their ability to work collaboratively with human workers, offering the following benefits:

Safety: Cobots possess safety perception and response capabilities. They can detect the surrounding environment through sensors and cameras, avoiding collisions with human workers and reducing speed or stopping movement when near the human body. This level of safety enables cobots to share workspace with humans without the need for isolation.

Flexibility: Cobots typically have small footprints and flexible mechanical structures, allowing them to adapt to different work environments and task requirements. They can perform delicate operations such as assembly, packaging, and part handling, while also accommodating rapidly changing production line demands.

Increased Production Efficiency: Introducing cobots can enhance the efficiency and capacity of production lines. They can work in collaboration with human workers, collectively completing tasks and reducing labor costs and production cycles. Cobots can also minimize errors and defects through automation and control, resulting in improved product quality and consistency.

Human-Machine Collaboration: The collaboration and interaction between cobots and human workers can enhance the humanization and comfort of work scenarios. Cobots can perform strenuous, hazardous, or monotonous tasks, freeing human workers from repetitive work and allowing them to focus more on creative and high-level tasks.

Reduced Technical Barriers: Compared to traditional industrial robots, cobots typically have simpler, more intuitive programming interfaces and learning curves, enabling non-professionals to quickly learn and use them. This lowers the technical barriers, benefiting more companies and workers with the application of cobots.

The development of cobots contributes to the transformation and upgrade of the manufacturing industry, enabling more efficient, flexible, and intelligent production methods. They will continue to play a significant role in bringing innovation and progress to industrial production.

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