Artificial Intelligence for Business Applications in the Industrial Market

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Artificial intelligence in business allows the industrial equipment industry to AI adoption.

If there is an overarching technology theme to 2023 it is Artificial Intelligence. Despite its recent hype, however, Artificial Intelligence or “AI” is not a new concept. Its roots date back more than 70 years to a young British mathematician named Alan Turing. In 1950 Turing suggested that since humans have the human ability to combine available information with reason to solve problems, why can’t machines?

Fast forward to the 1990s when Artificial Intelligence went from science fiction to science fact, thanks to landmark advancements in computational processing power, rule-based algorithms, neuroscience, and data storage capacity.

Today, artificial intelligence for business applications is being fully realized in industries as diverse as entertainment, manufacturing, finance, retail, and agriculture. AI can be found in autonomous vehicles, artificial intelligence enables the optimizing of pricing based on consumer and customer behavior alone, interactive chat bots like ChatGPT, automated financial planning, healthcare management, cybersecurity, Amazon product recommendations, and, among countless other applications.

At the foundational level, AI is about extracting value from historical and real-time data. Data is a commodity in which we have virtually no limit in our capability to collect, whether it's from sensors, cameras, or importing internal and external datasets. AI analyzes patterns hidden within “big data” in mere seconds and displays human-like cognitive processing in the form of reasoning, deep learning models, planning and creativity to gain more contextual knowledge. For instance, the LinearFold AI developed by Baidu in 2020 was able to predict the RNA sequence of the COVID-19 virus in only 27 seconds, making it possible for researchers at that time to develop a vaccine.

Artificial Intelligence Subsets

As with the human mind, AI is always learning. Each time AI performs a round of data analysis and processing, it tests and measures its performance and uses those results to develop additional expertise gaining insight. This ability, better known as the AI subset Machine Learning, is constantly discovering new patterns and generating insights from collected data. Other subsets of AI are Neural Networks that utilizes nervous system science. Deep Learning which is like Machine Learning but uses a neural network of three or more layers, Robotics that enables robot control and their natural interaction with humans, and Computer Vision that trains computers to capture and interpret information from image and video data.

So how can AI improve your business? Let's look at a few examples.

AI in Industrial Automation

Perhaps more than any other field, Industrial Automation is a prime candidate for AI. Industrial automation already has many AI-driven systems with proven value. For example, asset monitoring in predictive maintenance and Industry 4.0 investments are in full swing existing systems that integrate AI.

Combining an existing industrial network with the capabilities of AI allows for more efficient and intelligent control of factory automation systems and tasks such as business functions such as automatically adapting an assembly line to manufacture products that meet changing customer requirements. Complete inference solutions are now available that bring together all the necessary hardware with ready-to-deploy AI algorithms in the cloud or in-house servers, therefore eliminating the hurdle of having an inexperienced engineering team attempt to develop the algorithms themselves. Zero-touch AI devices connect to servers on power-up for instant configuration and real-time updates without manual set-up by an on-site administrator.

By being able to quickly and seamlessly interact with a factory's IT infrastructure, business processes, and automation systems, AI can hasten the adoption of autonomous mobile robots, collaborative robots, and computer vision systems. Also, the deployment of analytic tools including intelligent digital twins, order-controlled production, supplier selection, and predictive maintenance that help drive operational efficiency and workplace safety.

Robotic process automation has growth strategies for AI technology and human jobs.

AI in Agriculture

AI in agriculture helps farmers ensure healthier food by minimizing the use of fertilizers, pesticides and irrigation. All the while, promoting greater crop yields and reducing the farm's environmental impact on human resources.

Operating a farm requires collecting, analyzing and using accurate data while monitoring hundreds of fluctuating variables that will determine a crop's success. This data-intensive task is a natural fit for AI. AI will track and analyze variables ranging from weather patterns, hours of sunlight, planting cycles, and timing the migration of insects, to the use of fertilizers, insecticides and irrigation systems. Data collected from in-ground smart sensors or from drones capturing real-time video streaming of fields can be integrated by AI with reports from the National Weather Service and the National Oceanic and Atmospheric Administration to make predictive analytics that assist in better decision making. AI can also predict potential yield rates of a given field before a vegetation cycle is ever started in a process known as yield mapping.

Applications of artificial intelligence revolve around the agricultural industry for business today.

AI in Warehouse Management

Applying AI in a warehouse or distribution center can guarantee accurate inventory data on-demand and understand customer requests in real-time. AI helps warehouses and distribution centers recognize their current situation, uncover ordering patterns, track supply chains, and lower overhead costs. It also does away business problems with antiquated Excel spreadsheets and time-consuming, overly complex formulas that always seem to come out wrong.

Modern warehouses deploy AI solutions for different technologies, such as automated robots (i.e; smart forklifts) that mimic human behavior, and software platforms for managing the inventory management, material handling, processing and packaging, supply chains and demand planning. AI interconnects all these different systems and technologies so they work in unison.

AI-driven robots, Automated Guided Vehicles (AGVs) and Autonomous Mobile Robots (AMRs) are today delivering tremendous value in warehouse operations. Robots can safely handle heavier loads than a human, and will more accurately pick, place and transport loads by following precise instructions and routes without experiencing fatigue or causing collisions with human workers. AI-driven robots, AGVs and AMRs actively collect data that enhances visibility across the enterprise that spots recurring patterns that can predict possible inventory shortages, root causes of equipment failures, or other warehousing anomalies. Warehouse systems become smarter, faster, and more efficient in providing precisely what customers need on-time worldwide.

Automating repetitive tasks for warehouse management involving ai capabilities.

AI in Healthcare

Artificial intelligence in healthcare has the potential to reshape the way patients are diagnosed, treated and monitored, resulting in drastically improved outcomes and enabling more personalized treatments. Potential applications business benefits of AI in healthcare are broad and far-reaching, from analyzing x-rays for early detection of disease to predicting outcomes

from electronic health records. There is no need to manually record data, freeing up time otherwise spent on copying data.

In medical research, AI is being used to automatically collect business processes, integrate, and analyze patient biological data around the clock to establish massive research databases. By analyzing vast amounts of clinical documentation quickly, AI helps doctors conducting research pinpoint disease markers that would otherwise be overlooked.

Industrial Ethernet Switches as AI Tools

To gain AI's competitive advantage in the business world, it requires mountains of data combined with high-performance networking muscle. This is typically driven by accelerators, Central Processing Units (CPUs), Non-Volatile Memory Express (NVMe) storage devices, and Network Interface Cards (NICs) connected to a GPU or PCIe Switch.

Industrial Ethernet switches play a critical role in AI, and data analytics as well as, acting as a central station for the connected devices to communicate with each other. Industrial PoE switches can supply up to 100W of power to Powered Devices, for instance, IP cameras, LED lighting, wireless access points, and remote IoT sensors detecting temperature, humidity, pressure, moisture and other data shared with the network. Transmitted data collected by an industrial switch is applied to artificial intelligence and machine learning algorithms. High speed, low latency industrial Gigabit switches are also finding a home in the distributed applications AI often requires, at times even replacing InfiniBand switches which have long been the preferred network interconnection technology for GPU servers.

As human decision-making and reaction times are increasingly proving insufficient for managing modern enterprises, AI is helping the business leaders overcome these shortcomings by delivering insights based on the analysis of all available information with unprecedented speed and accuracy. Antaira is here with a broad line of industrial Ethernet switches with high port counts, PoE++, fiber optic slots, and 10 Gigabit connectivity speeds to bring AI systems to life in your business to automate routine tasks, reduce waste, increase efficiency, and improve customer experience and outcomes.

Antaira offers industrial equipment where we specialize in industrial switches with power over ethernet.