Data is the Brainfood of Artificial Intelligence

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Understanding the value of artificial intelligence (AI) in today's enterprise simply requires following the data. Whether training self-driving vehicles to navigate the streets, predicting customer behavior or efficiently responding to millions of customer service requests, AI helps organizations make sense of the mountains of data they gather daily.

It is an opportune time to be in the AI ecosystem. IDC predicts the market for AI hardware, software and services will become a $500 billion market by 2024. The Nasdaq CTA Artificial Intelligence Index (NQINTEL) tracks companies applying AI in the technology, industrial, medical and other economic sectors. With an inclusion strategy that features companies building chips and software platforms that enable AI applications as well as those that are harnessing AI as part of their business, NQINTEL captures the value derived from AI's ability to automate existing processes that are time- or resource-intensive.

While AI is being deployed in numerous ways, there are several distinct applications that garner the most attention.

Natural Language Processing

The popularity of voice assistants like Google, Siri and Alexa may cause some people to take natural language processing (NLP) for granted, but the technology underpins business operations across many industries and continues to attract IT professionals for its potential to create value for the organization. In fact, more than half of business are using NLP applications today, and one-quarter plan to begin using it in the next 12 months, according to IBM's Global AI Adoption Index 2021.

Customer service is one of the most popular applications for NLP. While chatbots (a.k.a. conversational bots) are the most visible uses of NLP, language analytics provide value throughout the customer service process. Companies such as NICE Ltd. offer their clients a fully cloud-based, digital-first customer experience which incorporates bots and automated communications to resolve and escalate customer interactions. The benefit of NLP applied across the customer experience is the ability to identify real-time trends and emerging problems that the company can focus on resolving rapidly.

Making large waves in the NLP space, Microsoft's announcement to acquire Nuance Communications for $19.7 billion affirms the value of NLP in cloud platforms and personal computing. Nuance has long been a leader in NLP solutions and has years of experience training data. Their ambient clinical intelligence solution automates health care documentation by capturing keywords from doctor-patient interactions and further providing real-time insights and recommendations on clinical solutions that improve patient care. The acquisition will help bolster Microsoft's Cloud for Healthcare, but on a broader scale, will likely give natural language processing a larger role in Microsoft's Windows, Office and Azure offerings in the future.

Robotic Process Automation

Not to be confused with robotics, which deals with physical robots, robotic process automation (RPA) uses software to perform repetitive tasks throughout the organization. This is a growing field, with Gartner forecasting the RPA market to grow to $1.9 billion in 2021, up 20 percent year-over-year.

To understand how RPA can help in the workplace, picture a customer service center that receives thousands of requests a day. RPA software can read through those emails and extract key data points to pre-populate forms and queue up information that moves customer requests closer to resolution.

Companies like Blue Prism, Pegasystems, UiPath are leading the way in RPA solutions, each offering an array of 'software robots' that tackle these time-consuming business tasks. RPA companies are often focused on offering low-code or no-code products that require minimal programming skills to implement their solutions.

Some RPA operations are focusing on specific verticals and business functions to better integrate with existing software solutions. Black Knight, for example, helps automate processes in the mortgage lending industry by processing income, asset and credit data to speed up loan origination. Meanwhile, Avalara is focused on automating sales tax tracking and filing for small businesses.

AI and Edge Computing

While both NLP and RPA are great examples of AI software enabling corporations to find new efficiencies, the scope of the NQINTEL index also includes hardware that enables AI processes. One key area of growth for AI enabling hardware technologies is at the edge of the cloud.

Broadly defined, edge computing solutions offer computing power on or near endpoint devices on a network. Edge computing is particularly advantageous in situations where security or latency concerns require computing power for local tasks, but communications with other locations or centralized servers is sometimes needed.

AI at the edge refers to edge computing equipment specially designed to accelerate machine learning and AI algorithms. It carries significant potential in the context the Internet of Things (IoT) and 5G. 5G enhances IoT devices by making them quicker and easier to coordinate communications among many devices and sensors. When it comes to processing the data generated by those communications, AI is being deployed to learn, inference and make decisions in real-time.

For example, Qualcomm's new Gloria AI Edge Box, created in partnership with Foxconn Industrial Internet, is an edge AI machine vision product that can support up to 24 high-definition cameras for applications like traffic analysis, security, warehouse monitoring or retail environments, with a focus on image recognition. Its built-in 5G guarantees that it will be able to take advantage of the low latency, high bandwidth capabilities of the next generation of wireless.

Meanwhile, the U.S. Postal Service is utilizing NVIDIA's EGX platform to run distributed AI software that analyzes the flow of packages through its processing centers to improve tracking of missing packages and to increase delivery time. The system's EGX servers process 20 terabytes of images each day from over 1,000 mail processing machines.

Just Scraping the Surface

Research Note

These are just a few examples of the AI applications underlying the NQINTEL index. In future research notes, we will address the autonomous vehicle sector, where auto manufacturers are tackling big engineering challenges in machine learning, sensor technology and robotics to develop safer roads. We will also look at how AI is shaping the future of the semiconductor industry in the face of the current chip shortage.