SUCCESS STORY

Business Services

Cambridge Consultants

CAMBRIDGE CONSULTANTS | PROBLEM SOLVED

Cambridge Consultants needed exceptional data accessibility to deliver best-in-class artificial intelligence. The leader in technology-based consulting partnered with NetApp and NVIDIA to bring deep-learning to organizations worldwide, expanding its presence in critical markets.

Cambridge Consultants Uses AI for World-Changing Innovation

Advances in artificial intelligence (AI) are changing how we live, work, shop, commute, and care for ourselves and each other. AI helps us diagnose disease, automate transportation, and maximize crop yields. How? Experts around the world are teaching machines to teach themselves. Cambridge Consultants is at the nexus of this effort, enabling life-changing innovation through AI.

400+
projects a year

Petaflop-scale
containerized computer on site

Another NetApp solution delivered by:

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SCAN

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NetApp

"Deep learning is revolutionizing almost every market we work in. We're applying deep learning in diverse markets, driving forward the art of the possible."

Tim Ensor
Director of Artificial Intelligence, Cambridge Consultants

Breakneck innovation makes it harder than ever for organizations to gain and maintain a competitive edge. That's why the world's most ambitious companies are turning to Cambridge Consultants. They understand that today's organizations require best-in-class AI, from machine-learning algorithms to deep-learning neural networks.

"Deep learning is revolutionizing almost every market we work in," says Tim Ensor, director of Artificial Intelligence at Cambridge Consultants. "We're applying deep learning in diverse markets, driving forward the art of the possible."

Cambridge Consultants is advancing the use of AI to:

- Make machines more valuable through enhanced perception and decisions
- Take AI into the real world by optimizing silicon and redefining possibilities at the edge
- Help clients create new data-driven services to meet real-world needs

Applications include:

- Empowering healthcare professionals with more accurate medical imaging
- Helping farmers monitor crop health
- Enabling autonomous vehicles to tackle more complex scenarios

In the traditional approach to AI, teams of programmers and experts worked together to develop explicit algorithms that solved specific problems. Today, machines create their own algorithms that enable them to learn by experience. With these deep-learning algorithms, and with even more complex neural networks, machines can outperform humans in activities such as health diagnosis, games of strategy, and complex pattern recognition.

These innovations are possible because of strategic partnerships. Cambridge Consultants, NetApp, and NVIDIA together help organizations worldwide understand and harness the potential of AI.

AI MOVES BEYOND HUMAN VISION

Cambridge Consultants has developed deep-learning technology that enables machines to interpret real-world scenes faster and more accurately than ever, in many cases outperforming humans. This ability sparks a new era of machine-vision and sensing applications.

An example is SharpWave™, an AI technology that transforms damaged or obscured moving images into clear pictures. Based on recent advances in deep learning, SharpWave's power to render clarity in difficult, unpredictable environments could transform medical imaging, autonomous driving, and numerous other machine-vision and imaging applications.

Another example is the company's BacillAi™ concept system, which harnesses AI to improve the monitoring of tuberculosis in resource-limited countries using a low-cost smartphone to capture images from an ordinary lab-grade microscope. Traditionally TB is monitored manually by analyzing bacteria under a microscope,

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which is a slow, labor intensive process with variable performance. BacillAi speeds up this process significantly, using deep learning to identify, count and classify the TB cells consistently.

RECORD OF SUCCESS

To get ahead of the trends in AI, Cambridge Consultants built its own research lab and development facilities, known as the Digital Greenhouse. With this investment, the company is able to discover, develop, and test machine-learning approaches in a fast, secure environment. Researchers are continually assessing algorithmic models developed in the Digital Greenhouse to understand how to solve their clients' challenges across diverse fields such as medical diagnostics, security, industrial automation, and much more.

DATA COST CENTER TO PROFIT CENTER

AI thrives on three key inputs: algorithm, compute, and data.

"People never have enough data," says Ensor. "There are always duplications and holes. We often need to patch holes and synthesize data to work around problems." The process that Ensor alludes to is known as *generative AI*, which evolved from a breakthrough in generative adversarial networks and is at the heart of the SharpWave technology.

Generative AI employs algorithms, compute power, and data efficiency to crunch massive datasets at lightning speed. This capability is crucial for machines to understand and process unstructured data such as text, audio, and images. Essentially, generative AI combines several neural network computations simultaneously, generating the fastest and most cost-effective decisions and outcomes. The challenge? This training process is immensely data intensive.

"We usually end up needing access to all of the data at once during training," says Ensor. "That can be tens of terabytes, which is more than you can easily fit into RAM." In addition to requiring large datasets, a generative AI approach must randomly read every file in those datasets hundreds of times. Every random read request means waiting for the server to acknowledge it. With multiple teams working simultaneously on the same dataset, processing and storage can quickly become a bottleneck. To fuel its deep-learning machines, Cambridge Consultants needs fast access to every file with high throughput for millions of random reads.

ONTAP AI UPGRADE

Recently, Cambridge Consultants embraced an important upgrade to all-flash storage with the NetApp® AFF A300 system for its Digital Greenhouse ONTAP AI deployment, built on NVIDIA DGX supercomputers. This enhancement is helping Cambridge Consultants (and its customers) converge big data, machine learning, and compute capacity to advance the utility of AI.

PROVEN PERFORMANCE

To keep pace with the demands of AI in its Digital Greenhouse, Cambridge Consultants started working with Scan Computers in the UK to deploy NVIDIA DGX compute servers. To give a sense

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of the servers' power, one DGX-1 system replaces 400 traditional servers and provides more than 40,000 parallel compute cores.

To feed these servers, Scan Computers recommended high-performance NetApp storage to complement petaflop-scale compute on site. This choice was built on the great experience that Cambridge Consultants already had with NetApp for other applications, including their continuous integration servers and on-premises project clouds.

NetApp's solution provides flexibility for a variety of workloads. For example, Digital Greenhouse data engineers use NetApp ONTAP® cloning capabilities for continuous integration. They easily handle a steady stream of setting up and tearing down thousands of virtual machines daily in their test environment. Based on this experience, Cambridge Consultants chose NetApp exclusively for their Digital Greenhouse on-premises storage.

"One of the key reasons our deep-learning storage is based on NetApp technology is the positive experience we have had with the technology in the past. We view it as tried and tested in what can be highly demanding conditions for storage. Today with neural networks and deep learning, AI can exceed our wildest imagination," says Ensor. "We're at the beginning of a new era—fueled by data and enabled by new technologies—and we are writing the story as we go."

SOLUTION COMPONENTS

NETAPP PRODUCTS

- NetApp AFF A300
- NVIDIA DGX
- ONTAP
- ONTAP AI

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