NVIDIA AND SAP
ACCELERATING ENTERPRISE INTELLIGENCE

Deep learning is a collection of statistical machine learning techniques that is transforming every digital business. Applications using deep learning techniques and frameworks are enabling companies across all industries to find new ways of capitalizing on the huge volumes of date they are capturing, gain new insights that simply weren't possible before and, as a result, drive competitive advantage.

INTEGRATED SOLUTION

Together SAP® and NVIDIA are bringing AI to the enterprise. SAP is using the advancements of the NVIDIA deep learning platform — including Graphics Processing Units (GPUs), systems, applications, and software — to develop and deploy machine learning offerings for SAP Leonardo, the company's digital innovation system. With 76% of the world's transaction revenue touching an SAP system and the company having one of the broadest enterprise offerings – solutions for 25 industries and 12 lines of business - SAP is uniquely qualitied to deliver machine learning applications for the enterprise.

SAP Leonardo Machine Learning reimagines the entire value chain of an enterprise and spans offerings in marketing, finance, sales, service, human resources, procurement, and logistics.

SAP Leonardo Machine Learning Solutions' capabilities are accelerated by NVIDIA® DGX™ Systems, the essential AI tools for instant productivity. DGX Systems provide the equivalent performance of up to eight hundred X86 CPUs. The DGX portfolio now includes DGX-1, the purpose-built AI supercomputer server, and DGX Station, the world's first personal AI supercomputer. Both systems feature the deep learning optimized software stack that combines the latest frameworks with the highest performance NVIDIA GPU libraries.

Together SAP and NVIDIA solutions help companies and their employees accelerate business growth, optimize and automate business processes, and do more with their data.

INDUSTRY CHALLENGES

Drowning in Data: Enterprises struggle to detect complex patterns in their data and keep up with the latest machine learning technologies they need to stay competitive.

Slow Compute Hinders Productivity: Traditional computing architectures are insufficient to keep up with the demands of next-generation business processes. With limited computing power they are slow to process and analyze information silos and abstract insights from high-cardinality data (large amounts of data with discrete values).

Human Errors Hurt Results: Human errors delay business and introduce risks when dealing with sensitive customer information. The result is missed opportunities.

Lack of skills: Using Artificial Intelligence (AI) can be a challenge as customers lack the new skillsets to deploy reliable and proven solutions.

Together, NVIDIA and SAP Deliver

AUTOMATE BUSINESS PROCESSES
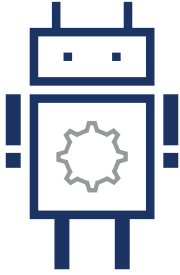
Automate business processes with applications based on machine learning building blocks like natural language processing, image, and video recognition.

OPTIMIZE COMPANY SPEND

Accelerate overall workflow and business operations with lower back-office cost and Total Cost of Ownership (TCO).

AI-POWERED PRODUCTIVITY

Detect patterns with superhuman accuracy by automating and prioritizing routine decision-making processes to increase productivity.

SAP Leonardo Machine Learning Optimized on NVIDIA GPUs

Combine the latest machine learning technologies with SAP Leonardo on the NVIDIA deep learning platform to accelerate your customers' digital transformation.

SAP Accounts Payable

WHAT IT IS:
The SAP Accounts Payable application is an ever-expanding suite of machine learning services that automates accounts payable processes. Based on deep learning, it processes invoices and then extracts and classifies relevant information from them, reducing errors and increasing cash flow.

WHAT CHALLENGES DOES IT SOLVE?
LENGTHY INVOICE PROCESSING TIMES
> Each invoice must be manually checked before payment can be made

Quality/Compliance
> The inevitable manual errors lead to quality and compliance issues

Inability to scale
> As the volume of invoices increases additional staff is required to process them

HOW DOES IT WORK?
SAP Accounts Payable, trained on NVIDIA DGX Systems, uses the deep learning neural network architecture implemented in Tensor Flow to process millions of incoming invoices and extract important information. For a high level of compliance, it also supports matching invoice vendors to the master database.

BUSINESS BENEFITS:
> Automates and accelerates the process from minutes to seconds
> Reduces the number of errors and the amount of effort when posting invoice data
> Increases quality, compliance, the number of matches, and the potential throughput of invoices
> Scales indefinitely, enabling higher volumes of invoices to be processed without increasing staffing levels

SAP Brand Impact

WHAT IT IS:

The SAP Brand Impact application automatically analyzes brand exposure in video and images by using advanced computer vision techniques. It helps media agencies, production companies, and brands to gain accurate, timely insights into sponsoring and advertising Return on Investment (ROI).

WHAT CHALLENGES DOES IT SOLVE?

Limited Content Analyzed
> On average only 3% of video content volume is analyzed

Inconsistent Quality of Reports
> Brand visibility metrics reports have low accuracy, inconsistent quality, and take a long time to obtain.
> The demand to process increasing amounts of video content is growing exponentially. Manual counting, which is the industry standard, cannot scale to accommodate the demand.
> Late analytics reports that can't be tied to business results offer little value

HOW DOES IT WORK?

SAP Brand Impact, trained on NVIDIA DGX systems, uses advanced computer vision techniques and deep learning to offer advanced reporting and visualization features and functionalities that improve brand exposure analytics.

BUSINESS BENEFITS:

> Automates logo exposure counting at near real-time speed
> Is accurate and scalable to thousands of hours
> Cross references a time annotated impact indicator with data from CRM, ERP, or website statistics
> Provides additional insights by comparing exposure with other brands
> Allows reports to be downloaded in PDF format, with aggregated data in CSV format

SAP Resume Matching

WHAT IT IS:

The SAP Resume Matching application automates the HR screening process by identifying the candidates with the best skills and education for specific positions.

WHAT CHALLENGES DOES IT SOLVE?

Organizations constantly face challenges in finding the right talent.

High Volume Of Applications
> Every corporate job opening attracts around 250 resumes and only 4 to 6 of them are considered qualified

Time-Consuming Candidate Screen Process
> On average it takes 52 days to fill open positions
> Recruiters spend up to 60% of their time on administrative tasks, candidate screening, and sourcing

Increased Spending in Recruitment Process
> US companies spend on average $4,000 to fill an open position

Inherent Human Bias in Candidate Prioritization
> Various reports have found that there is bias in employers' hiring processes

HOW DOES IT WORK?

SAP Resume Matching, trained on NVIDIA DGX Systems, uses machine and deep learning techniques and models to provide intelligent recommendations for both recruiters and candidates. From the input of text, video, image, speech, and more, the solution uses machine learning to prepare data, train models, apply models, and capture feedback, improving accuracy all the time. As a result, the best candidates for jobs are recommended to recruiters. In addition, candidates spend less time searching for jobs, as they are given recommendations about the right positions to apply for.

BUSINESS BENEFITS:

> Simplifies the hiring process by orders of magnitude
> Reduces the possibility of missing potential candidates
> Saves time and effort for HR professionals, allowing them to focus on more strategic tasks
> Mitigates the recruiter's personal bias by offering a machine learning-based, objective screening mechanism

SAP Service Ticketing Intelligence

WHAT IT IS:

The SAP Service Ticketing Intelligence application automatically routes customer inquiries to deliver best-in-class customer service.

WHAT CHALLENGES DOES IT SOLVE?

Too Many Channels of Information

> Customers have the possibility to engage the service center from more than one channel

Slow Response Rate

> 72% of customers expect a response to their complaints on social media within one hour

HOW DOES IT WORK?

SAP Service Ticketing Intelligence, trained on NVIDIA DGX Systems and GPUs, uses deep learning neural networks to understand the semantics of unstructured ticket messages, classify tickets into their most likely categories, and recommend solutions or knowledge base articles.

During the training process, SAP uses historical customer ticket messages and the assigned categories and solutions to train the deep learning model, which is based on state-of-the-art, character-level, convolutional neural networks. An attention mechanism guides the model on which words it should focus on to achieve correct predictions. The resulting model can then be used to classify new ticket messages and recommend relevant solutions. As more and more processed service ticket information and user feedback is gained, the model improves over time.

BUSINESS BENEFITS:

> Improves service response times with automated processing
> Allows customer service to easily manage increased volumes of digital interactions
> Lowers the overall cost of providing customer service
> Increases customer satisfaction

The future is an intelligent enterprise

These first machine learning applications are only the beginning. Today, teams across SAP are already building the next wave of intelligent solutions. Here are some examples:

> **Supply chain:** A recommendation engine, based on machine learning, will supercharge the supply chain, advising buyers about new suppliers and products and detecting unusual buying patterns
> **Financial Services:** Intelligent risk modeling will create a marketplace that lets suppliers apply for receivables funding, allowing banks to maximize revenues while minimizing the risk of default
> **Retail:** A computer vision application that recognizes Stock Keeping Units (SKU) from photos and videos of products will help to verify compliance with agreements about shelf placement and track sales velocity

Recommended NVIDIA Hardware

NVIDIA datacenter GPUs are available in servers, DGX Systems, and cloud platforms around the world. End-to-end accelerated machine learning solutions powered by NVIDIA GPUs with associated software technologies and support from NVIDIA experts are available.

TESLA	DGX SYSTEMS	CLOUD
SERVERS IN EVERY SHAPE AND SIZE	**AI TOOLS FOR INSTANT PRODUCTIVITY**	**EVERYWHERE**
Hewlett Packard Enterprise, IBM, Quanta Computer, DELL, Lenovo, CRAY, CISCO	NVIDIA	SAP

Find Out More

NVIDIA Deep Learning

Website: **www.nvidia.com/en-us/deep-learning-ai/**
Twitter: **@NvidiaAI**
Blog: **www.blogs.nvidia.com**

SAP Leonardo Machine Learning

Website: **www.sap.com/ml**
Twitter: **@SAPLeonardo**
Blog: **www.blog.sap.com**

SAP Global Partner | NVIDIA