TechData

AI & ML Enablement Guide for Resellers

October 2021

Adoption of AI is a top enterprise IT priority and initiative

Gartner estimates that AI will create $2.9 trillion in business value and 6.2 billion hours of worker productivity in 2021

- A June 2020 report from Gartner states that “smarter, faster, more responsible AI” is the #1 trend in data and analytics technology, as 75% of organizations will “shift from piloting to operationalizing artificial intelligence”

- In March 2020, McKinsey reported that 76% of high-performing organizations have taken a standardized approach to AI technology, compared to only 18% of others
- According to Grand View Research: The global artificial intelligence market is expected to grow at a compound annual growth rate of 42.2% from 2020 to 2027 to reach USD 997.77 billion by 2028
- By 2025, 44% of generated data will be driven by analytics, AI and Machine Learning IDC/Seagate Re-Think Data Report 2020

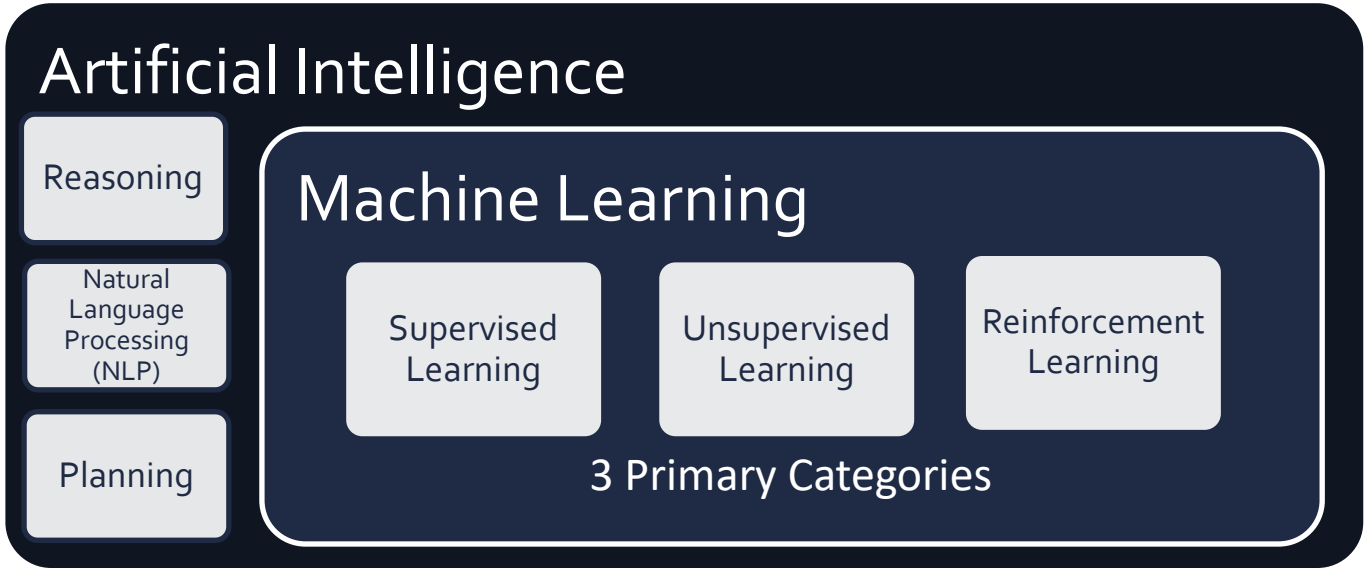
What is Artificial Intelligence (AI)

- McKinsey & Company “The ability of a machine to perform cognitive functions we associate with human minds, such as perceiving, reasoning, learning, and problem solving”

- Gartner “Advanced analysis and logic-based techniques, including machine learning, to interpret events, support and automate decisions, and take actions”

- IBM **“**Any human-like intelligence exhibited by a computer, robot, or other machine. In popular usage, artificial intelligence refers to the ability of a computer or machine to mimic the capabilities of the human mind—learning from examples and experience, recognizing objects, understanding and responding to language, making decisions, solving problems

In Machine Learning a developer uses data to train a model or algorithm how to perform a specific task



For more AI/ML details go to link: Machine Learning Training - Bing video

AI Reasoning is deriving logical conclusion and making predictions

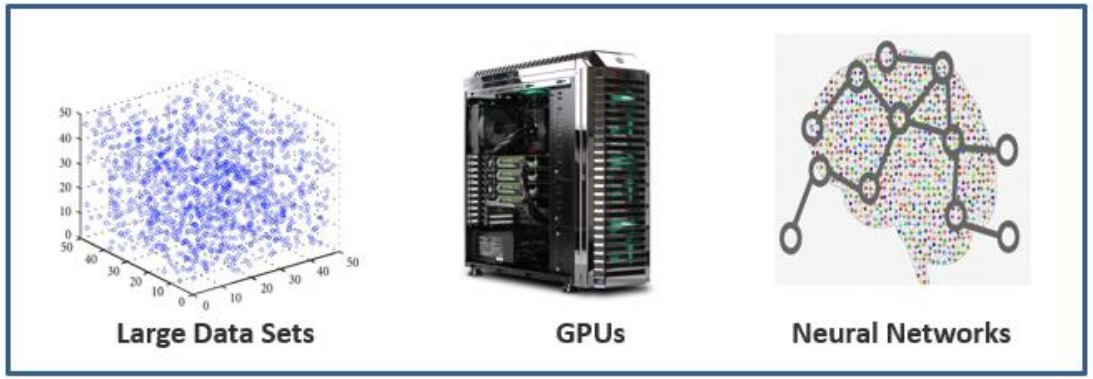
AI NLP enables machines to understand human language

AI Planning is the decision-making tasks performed to achieve a specific goal

To see a visual representation of the 3 primary machine learning categories click the following link: ML LinkedIn Post

What Makes Machine Learning “Deep Learning”?

Deep learning is a subset of machine learning that incorporates neural networks in successive layers to learn from data in an iterative manner. Deep learning complex neural networks are designed to emulate how the human brain works, so computers can be trained to deal with the more difficult computing problems, such as computer vision and natural language processing



There are three components to Deep Learning:

1. **Large Data Sets** – Lots and lots of data to train these big neural networks
2. **GPUs/VPUs/TPUs** – specialized type of hardware to handle large complex data sets
3. **Neural Network** is a series of algorithms that recognizes underlying relationships in a set of data through a process that mimics the way the human brain operates.

To access a more technical explanation of Deep Learning click on the following Link: Introduction to Deep Learning

What's an Enterprise AI Platforms

AI platforms (also called machine learning platforms or data science platforms) allow users to analyze data and process data, build machine learning models, deploy and maintain these models

AI & Machine Learning Market Landscape – 3 Categories

1. **AI Open Source Frameworks, Libraries & Components** – such as TensorFlow, Torch, IBM Watson, OpenVINO, TensorRT and many others are frequently positioned by their promoters as AI solutions. Each of these provides a valuable utility needed to develop and deploy **Enterprise AI**, but each addresses only a narrow portion of the total capabilities required. Using this approach, organizations must effectively create their own **Enterprise AI platform** by assembling, integrating, and maintaining dozens of such components.

For more information about AI Open Source Components click link: Open Source AI Software

2. **AI Cloud Service Providers (CSPs) -** such as AWS and Azure who provide a large array of native services that can be used to assemble **AI applications**. The advantage of this approach over attempting to build AI applications using open source components is that a CSP's native services have been designed to work on the CSP's infrastructure and are not portable from one CSP to another. So, **an application developed on AWS using AWS native services, would have to be substantially re-written to run on Azure**. In addition, this approach precludes the ability to build an application using services from different CSPs (for instance, an application using AWS's image recognition service in conjunction with Google's geospatial capabilities.

For more information on CSP (AI) click following link: Comparing-Machine-Learning-as-a-Service/

AI & Machine Learning Market Landscape

3. **Enterprise AI** is a powerful new category of software that is a core enabler of digital transformation. In the coming years, virtually every large organization will deploy dozens to hundreds, or even thousands of **AI-enabled software applications**. These applications leverage 21st century technologies including **elastic cloud computing, big data, the internet of things, and advanced methods of artificial intelligence** to address a broad and growing range of use cases. Enterprise AI software involves simulating a number of capabilities, including reasoning, learning, problem solving, perception, and knowledge representation.

   Today, Artificial intelligence software is at work in applications such as your smartphone assistant, ATMs that read checks, voice and image recognition software on social networks, and in the software that serves up ads on many of the websites you use.

For product details, including functions tools, options, plans, cost and others, click following links:

- Business Intelligence Software Comparison
- Best Artificial Intelligence (AI) Software for 2021
- Data Science & Machine Learning Platform Comparison

Enterprise AI Platforms

Enterprise AI Platforms - An Enterprise AI Platform is designed to provide a cohesive set of capabilities in a unified, pre-integrated suite to build, deploy, and operate Enterprise AI applications. The intention of a platform is to simplify and accelerate the development and deployment of Enterprise AI applications. AI platforms (also called machine learning platforms or data science platforms) allow users to analyze data and process data, build machine learning models, deploy and maintain these models. To be categorized as an AI platform, a product must be able to work with a variety of use cases, should not be specific to one industry and allow users to build, deploy and maintain models that power business decisions

KEY TECHNOLOGIES

- Neural Networks
- Transfer Learning
- Explainable AI
- Reinforcement Learning
- Natural Language Processing (NLP)
- Computer Vision
- **Cloud Systems:** *A robust cloud infrastructure provides improved scalability and access to resources for the implementation of complex AI and machine learning solutions*.

TECH DATA VENDORS	PRODUCT NAME
Alteryx:	Machine Learning
Cloudera:	Machine Learning Platform
IBM:	Machine Learning ML
Pentaho:	Machine Learning Orchestration
AWS:	Amazon SageMaker
Google:	AI Platform, Cloud Machine Learning Platform
Microsoft Azure:	Machine Learning Studio
Oracle:	Data Science Cloud Services
HPE:	Determined AI
Intel:	OpenVINO™

OTHER VENDORS	PRODUCT NAME
DataRobot:	DataRobot
Google:	TensorFlow, AI Platform, Cloud Machine Learning Platform
H2O.ai	H2O AI Hybrid Cloud
C3.ai	C3 AI Suite
PEGA:	Pega Platform
Salesforce:	Einstein

No Code, Low Code AI

No-code AI is a category in AI landscape that aims to democratize AI. No-code AI means using a no-code development platform with visual, code-free and often drag-and-drop interface to deploy AI and machine learning models. No code AI solutions are focused on helping **non-technical users build ML**. No Code AI systems work by essentially fine-tuning **powerful pre-trained AI algorithms**

Low-code simply stands for a reduced amount of coding. A lot of elements can be simply dragged and dropped from the library. However, it is also possible to customize them by writing your own code, which gives increased flexibility

AutoML

AutoML solutions are focused on **empowering data scientists** to be more efficient. They provide transparency on the whole machine learning pipeline which increases complexity but also allows data scientists to refine how models are built

KEY PRODUCTS

- No Code AI Platforms
- No Code AI Tools
- No Code AI Builder
- AutoML

TECH DATA VENDORS	PRODUCT NAME
Alteryx:	Machine Learning
Microsoft:	Lobe.ai, AI Builder
Amazon SageMaker:	AutoML
IBM Watson:	AutoAI
Pentaho:	AutoML Toolkit

OTHER VENDORS	PRODUCT NAME
DataRobot:	DataRobot
Google:	Cloud AutoML
C3.ai	C3 AI Suite
Levity:	Clarif.ai
Clarifai:	Create ML
Apple:	AutoML
H2O:	PyCaret
PyCaret:	BigML
BigML:	

Tech Data Enterprise AI & ML Vendors

1. Alteryx Analytics provides data scientists with a **machine-learning platform** for building models in a workflow. Alteryx's product vision aims at helping companies in cultivating a data analytics culture without necessarily hiring data scientists Automate every step of analytics, including data prep, blending, reporting, predictive analytics, and data science. Access any data source, file, application, or data type, and experience the simplicity and power of a **self-service platform** with 300+ automation building blocks

2. IBM data science solutions empower your business with the latest advances in AI, machine learning and automation to support the full data science lifecycle, from preparing and exploring data to building, deploying, managing and monitoring models. Use IBM data science software on IBM Cloud Pak® for Data, is a **containerized data and AI platform**, to build and run models anywhere on any cloud and on premises

3. Microsoft also maintains its presence in the data science and machine-learning markets through its Azure software products. These products include Azure Machine-learning (that is inclusive of Azure Machine-learning Studio), Power BI, Azure Data Lake, Azure HDInsight, Azure Stream Analytics and Azure Data Factory. Its cloud-based Azure Machine-learning Studio is ideal for data scientists who want to build test and execute predictive analytics solutions on their data

4. AWS offers the broadest and deepest set of machine learning services and supporting cloud infrastructure, putting machine learning in the hands of every developer, data scientist and expert practitioner. AWS is helping more than one hundred thousand customers accelerate their machine learning journey

Tech Data AI & ML Vendors

5. Oracle Data Science Cloud Service enables data scientists to build, train and manage machine learning models on Oracle Cloud using open-source Python ecosystem enhanced by Oracle for automated machine learning (AutoML), model evaluation and model explanation

6. Pentaho Machine Learning ML Orchestration is a platform from Hitachi Vantara that streamlines your entire machine learning workflow and enables teams of data scientists, engineers and analysts to train, tune, test and deploy predictive models

7. Intel OpenVINO™ toolkit is a comprehensive toolkit for quickly developing applications and solutions that solve a variety of tasks including emulation of human vision, automatic speech recognition, natural language processing, recommendation systems, and many others. The toolkit extends computer vision and non-vision workloads across Intel® hardware, maximizing performance. It accelerates applications with high-performance, AI and deep learning inference deployed from edge to cloud

8. HPE Determined AI is an open-source deep learning training platform that makes building models fast and easy. Determined AI enables analyst's to train models faster using state-of-the-art distributed training, without changing model code, automatically find high-quality models with advanced hyperparameter tuning, cut cloud GPU costs, track and reproduce work. Determined integrates these features into an easy-to-use, high-performance deep learning environment

Other AI & ML Vendors

1. DataRobot offers an enterprise AI platform that automates the end-to-end process for building, deploying, and maintaining AI. The product is powered by open-source algorithms and can be leveraged on-prem, in the cloud or as a fully-managed AI service. DataRobot includes several independent but fully integrated tools (Paxata Data Preparation, Automated Machine Learning, Automated Time Series, MLOps, and AI applications), and each can be deployed in multiple ways to match business needs and IT requirements.

2. H2O AI Hybrid Cloud offers an end-to-end platform that democratizes artificial intelligence, enabling every employee, customer, and citizen with sophisticated AI technology and easy-to-use AI applications.

3. Nvidia's emergence as an AI leader was hardly overnight. It has been promoting its CUDA GPU programming language for nearly two decades. AI developers have come to see the value in the GPU's massively parallel processing design and embraced Nvidia GPUs for machine learning and artificial intelligence. One area Nvidia is making a big push is in self-driving cars, but it is one of many efforts on the horizon

4. C3 AI® Suite uses a unique model-driven architecture to accelerate delivery and reduce the complexities of developing enterprise AI applications. The C3 AI model-driven architecture provides an "abstraction layer," that allows developers to build enterprise AI applications by using conceptual models of all the elements an application requires, instead of writing lengthy code

Modern Data Platforms

A Modern Data Platform is a future-proof architecture for Business Analytics. It is a functional architecture which has all components to support a Modern data warehousing, Machine Learning and AI development. Real-time **data** ingesting & processing. Data platforms include data storage, servers and data architecture

Tech Data Modern Data Platform Vendor

Cloudera is a modern platform for machine learning and analytics optimized for the cloud. Cloudera is a multi-environment analytics platform powered by integrated open source technologies that help users glean actionable business insights from their data, wherever it lives. With an enterprise data cloud, it puts data management at analysts' fingertips, with the scalability and elasticity to manage any workload

Other Modern Data Platform Vendors

Snowflake is a cloud data platform supports a multi-cloud strategy, including a cross-cloud approach to mix and match clouds as needed. Snowflake is available globally on AWS, Azure and Google Cloud Platform. Snowflake Cloud Data Platform combines the power of data warehousing, the flexibility of big data platforms, the elasticity of the cloud, and live data sharing at a fraction of the cost of traditional data platform solutions.

Databricks is using cutting-edge, open-source technology based on years of research to build next-generation software for analyzing and extracting value from data. Databricks consolidates all data workloads, across both analytics and AI, on a single platform

AI at the Edge

AI at the Edge is where AI algorithms are processed locally on a hardware device, without requiring any connection. It uses data that is generated from the device and processes it to give real-time insights in less than a few milliseconds. iPhones and self-driving cars is where complex algorithms are used to process data right there in the car or phone, because there's no time to send this data for processing in the cloud. By doing this, intelligent edge reduces latency, costs, and security risks, thus making the associated business more efficient. The three major categories of intelligent edge are operational technology edges, IoT edges, and information technology edges, with IoT edges currently being the biggest and most popular

iPhone has the ability to register and recognize your face to unlock your phone in fractions of seconds

A more complex example would include self-driving cars

To learn more about the solutions using A.I. at the edge to solve real world use-cases visit Tech Data's IoT solutions catalogue page here

Components of AI

Applications

- Image Recognition [1]
- Natural Language Processing [2]
- Chatbots
- Sentiment Analysis [3]

Categories

- Machine Learning
- Deep Learning

Programming Languages and Frameworks for Building Models

- Python, C/C++, Java, Go ..
- TensorFlow, Pytorch, Keras, Caffe, Scikit-learn *(AI Frameworks)* [4]
- OpenVINO, TensorRT *(AI Inference)* [5]

Software/Hardware for Training and Running Models

- GPUs, VPUs [6], TPUs [7]
- Parallel Processing Tools (like Spark [8])
- Cloud Data Storage and Compute Platforms

1. **Image recognition** is a term for computer technologies that can recognize certain people, animals, objects or other targeted subjects through the use of algorithms and machine learning concepts
2. **Natural language processing** (**NLP**) Natural language processing is a subfield of linguistics, computer science, and artificial intelligence concerned with the interactions between computers and human language, in particular how to program computers to process and analyze large amounts of natural language data.
3. **Sentiment analysis** studies the subjective information in an expression, that is, the opinions, appraisals, emotions, or attitudes towards a topic, person or entity. Expressions can be classified as positive, negative, or neutral. For **example**: "I really like the new design of your website!" → Positive.
4. **AI framework** allows for easier and faster creation of artificial intelligence applications
5. **AI Inference** applies knowledge from a trained neural network model and a uses it to infer a result
6. **Vision Processing Unit** (VPU) is a type of microprocessor aimed at accelerating machine learning and artificial intelligence technologies. It is a specialized processor that is made to support tasks like image processing
7. **Tensor Processing Units** (TPUs) are Google's custom-developed application-specific integrated circuits (ASICs) used to accelerate machine learning workloads
8. **Apache Spark** is a lightning-fast unified analytics engine for big data and machine learning. Spark uses Resilient Distributed Datasets (RDD) to perform parallel processing across a cluster or computer processors.

Some Industry Specific Uses of AI

Healthcare

AI is used for image analytics and to analyze vast troves of patient data to uncover patterns and insights that humans can't find on their own. Other AI tools help clinicians develop customized patient treatment plans and personalized medicine

Smart City / Public Sector

AI is used for public safety and surveillance as well as smart parking and improved traffic control. AI is also used for smart street lights, smart buildings and smart energy metering and more

Industrial/Manufacturing

AI is used to monitor machines for predictive and prescriptive maintenance. AI is also use for video analytics, worker safety and to increase operational efficiency

Retail

AI is used for video surveillance to identify shopping patterns as well inventory demand forecasting and management. AI is also used for product bundling and pricing strategy

Financial Services

AI is used for fraud detection to make near instantaneous decisions. AI is also used for wealth management, loan approvals and trading decisions among other financial services

Transportation

AI is enabling self-driving vehicles that get smarter as they gain navigation experience. AI is also used to improve traffic management and transportation logistics

How to Identify an AI Opportunity

Clients may already be working on AI/ML projects within different departments typically led by data scientists, analysts and possibly IT specialist within the organization

Following are some of the related phrases/topics, you should look out for during your conversations:

1. Get value out of Big Data
2. Digital transformation
3. Internet of Things (IoT)
4. Deploy intelligence at the edge
5. Automate translation, diagnosis, and others
6. Speech recognition
7. Natural Language Processing (NLP)
8. Virtual digital assistant
9. Video analytics/facial recognition
10. Predictive analytics

Definitions

- **Offline Reporting**: is a small software locally installed on your PC/Mobile device, designed to easily create reports based on account information downloaded daily

- **Hyper Automation**: is the application of advanced technologies like **RPA, Artificial Intelligence, machine learning** and Process Mining to augment workers and automate processes in ways that are significantly more impactful that traditional automation capabilities. (**Process mining** is an analytical discipline for discovering, monitoring, and improving **processes** as they actually are (not as you think they might be), by extracting knowledge from event logs readily available in today's information systems)

- **Modern Data Warehouse** allows to combine all kinds of data, at any scale, and easily to get business intelligence insights through dashboards, visualization tools as well as advanced analytics for all your users.

- **Unified Data Management** consolidates the data sources to create a single data narrative within a data warehouse. The resources, data model and usage are defined to access the subscription data through the Unified Data Repository services.

- **Business Process Automation**: also known as business automation or **digital transformation**, is the technology-enabled automation of complex business processes

- **Data Virtualization** can efficiently bridge data across data warehouses, data marts, and data lakes without having to create a whole new integrated physical data platform

Definitions

- **Real-time Dashboard** is used to track, analyze, and report on data in real-time with the help of data visualizations. It is automatically updated and grants instant access to valuable data
- **Embedded analytics** is the integration of analytic content and capabilities within applications, such as business process applications (e.g. CRM, ERP, EHR/EMR)
- **Data insights** refers to the understanding of a particular business phenomenon you are able to achieve by using machine learning and artificial intelligence (AI) technology to analyze a dataset
- **AI-Driven Insights**. Dive deep into the analysis of your customer journey and derive actionable insights to continuously improve your collections process
- **Data collaboration** is the practice of using **data** to enhance partnerships, alliances, go-to-market efforts, and strategic initiatives. Anytime two companies combine their **data**-driven insights to create new value, you're seeing **data collaboration** in action (MS Teams)
- **AIoT** is a term that has cropped up recently to describe the convergence **of IoT** and AI systems on a shared goal: generating useful data about the world (IoT) and drawing insights from those data
- **Database replication** is the frequent electronic copying of data from a **database** in one computer or server to a **database** in another

Definitions

- **DaaS** is a **means** of providing cloud-based workspaces to employees. The technology [makes] uses of the physical terminal, [such as a laptop, PC or tablet], to communicate with the workspace hosted by the company's cloud provider

- **IoT-Condition Monitoring** enables product quality control by detecting combinations of equipment **health**, such as spindle **vibration** frequency, engine temperature, cutting speed, and ambient parameters, such as temperature and humidity

Learn more

ON THE WEB

Learn more about Tech Data's IoT and Analytics offerings at:
iot.techdata.com

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Reach out to your Analytics and IoT solution consultant, or email us at:
iot@techdata.com

DIVE DEEPER

Explore Tech Data's solutions, products, and vendors with our interactive SPI Tool at:
recon.techdata.com/spitool