

IDC MarketScape

IDC MarketScape: Worldwide Advanced Machine Learning Software Platforms 2020 Vendor Assessment

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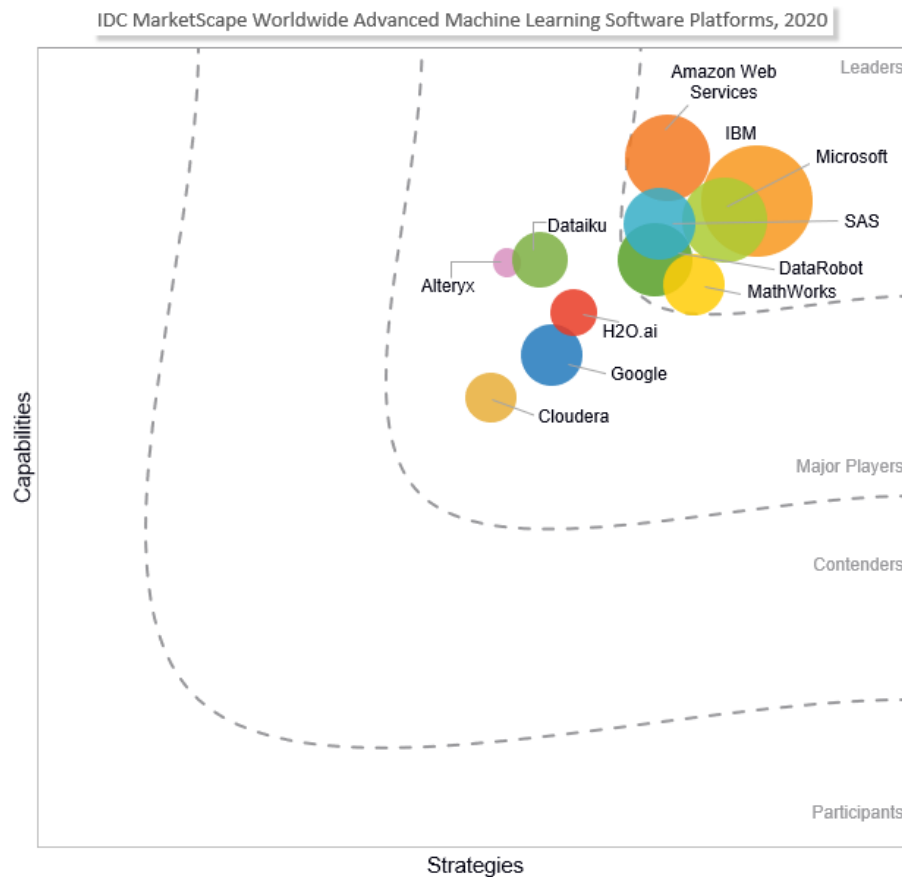
David Schubmehl

THIS IDC MARKETSCAPE EXCERPT FEATURES IBM

IDC MARKETSCAPE FIGURE

FIGURE 1

IDC MarketScape Worldwide Advance Machine Learning Software Platforms Vendor Assessment



Source: IDC, 2020

Please see the Appendix for detailed methodology, market definition, and scoring criteria.

IN THIS EXCERPT

The content for this excerpt was taken directly from IDC MarketScape: Worldwide Advanced Machine Learning Software Platforms 2020 Vendor Assessment (Doc # US45358820). All or parts of the following sections are included in this excerpt: IDC Opinion, IDC MarketScape Vendor Inclusion Criteria, Essential Guidance, Vendor Summary Profile, Appendix and Learn More. Also included is Figure 1.

IDC OPINION

In this document, IDC has evaluated vendors offering the tools and frameworks for developing advanced machine learning (ML) models and solutions.

To be clear about these topics, it helps understand how IDC defines machine learning and related processes:

- **Machine learning** is a subset of artificial intelligence (AI) techniques that enables computer systems to learn from previous experience (i.e., data observations) and improve their behavior for a given task. It is the process of creating a statistical model from various types of data that performs various functions without having to be programmed by a human.
- **Neural networks** (NNs) or artificial NNs are a subset of ML techniques, loosely inspired by biological neural networks. They are usually described as a collection of connected units, called artificial neurons, organized in layers.
- **Deep learning (DL)** is a subset of NNs that makes the computational multilayer NN feasible. Typical DL architectures are deep neural networks (DNNs), convolutional neural networks (CNNs), recurrent neural networks (RNNs), generative adversarial networks (GAN), and so forth.

Collectively, we define these topics as aspects of advanced machine learning. Advanced machine learning platforms provide a range of ML methods primarily working with structured and semi-structured data to create predictive and prescriptive models that are then used in applications.

Organizations across a variety of industries are using these techniques as a catalyst for business process disruption, digital transformation, and the creation of new economies of scale. There is an increasing influence of machine learning in business applications, with many solutions already implemented and many more being explored. Enterprises are embracing machine learning applications across all lines of business. Implementations vary across a breadth of use cases from intelligent financial closing to sales next best action and from production recommendations to personalized recommendations for learning and career. Large healthcare organizations are examining machine learning to predict illness and treatment to help physicians and payers intervene earlier, predict population health risk by identifying patterns and surfacing high risk markers and model disease progression and more. Application of machine learning in the management of banking risks such as credit risk, market risk, operational risk, and liquidity risk is being explored. For the modern marketing team, ML allows you to uncover predictive knowledge. By harnessing data analyzing ability, your team can use ML to your advantage to engage with hyper-targeted prospects at multiple touch points along the sales funnel. These are just a few of the hundreds of use cases that organizations are beginning to examine as their marketplaces and competition begin to embrace advanced machine learning and deep learning models and applications.

At the same time as these advanced machine learning-enabled applications are beginning to emerge, we are seeing a growing market for machine learning tools and solutions based on open source

running in a variety of deployments: on premises, private cloud, public cloud, and even at the edge. A powerful combination of motivated, capable developers; multiple open source community development models and vibrant open source community; and the need and desire for agile just-in-time advanced machine learning software development and execution environments has led to a growing market segment producing advanced machine learning/deep learning software libraries and tools.

IDC MARKETSCOPE VENDOR INCLUSION CRITERIA

This IDC MarketScope evaluated advanced machine learning platforms. Advanced machine learning platforms provide a range of ML methods primarily working with structured and semi-structured data to create predictive and prescriptive models that are then used in applications. These platforms facilitate the development of advanced machine learning models and applications. Advanced machine learning platforms can also include development, training, and deployment tools, including pretrained models and automatic machine learning methods that help developers and business users to experiment, automate machine learning, and build and deploy artificial intelligence models into production. The platforms provide functionality to apply a broad range of supervised, unsupervised, reinforcement, and transfer learning methods into models and applications put into production and can be deployed in several ways.

The inclusion criteria are as follows:

- The offering must be commercially available for use as a single product or a suite of services and purchased by customers for at least one year (i.e., calendar year 2019).
- It must have the ability to develop custom advanced machine learning models and APIs or microservices that developers can include in their applications. It should also support third-party recipes.
- The product must have at least 10 commercial customers that used this product in calendar year 2019.
- The product must be offered and available on a worldwide basis.
- The offering must include development tools for creating, developing, testing, and deploying advanced machine learning applications and models into production. The offering should include the following capabilities:
 - Must support data collection/ingestion natively in the platform or through third-party integration
 - Experimentation and feature identification/extraction
 - Building models
 - Training models
 - Model tuning
 - Deploying models
- The vendor must have at least \$25 million in software revenue in calendar year 2019.

ADVICE FOR TECHNOLOGY BUYERS

The emergence of tools, frameworks, and libraries that provide services for machine learning and deep learning is setting the stage for a low-cost enabler of machine learning-enabled applications to be built by developers today. Organizations are looking at these services to replace rule- or heuristics-based

approaches that must be extensively programmed and maintained today. The combination of high-performance compute resources, tremendous agility to adapt resources to needs, and cloud-based frameworks and libraries for machine learning/deep learning is solving problems and challenges without the need to resort to traditional heuristic programming.

The vendors evaluated and profiled in the sections that follow are being used for an ever-wider array of use cases, from pricing optimization to predictive analytics and product recommendations to intelligent accruals and reconciliations. Machine learning/deep learning is a key component of most AI applications and is also being added to many enterprise applications. Improvements in the variety, efficiency, and reliability of machine learning will make these applications more usable and stable and help increase their popularity.

These vendors offer a very wide array of tools and capabilities for collecting, exploring, and evaluating data for machine learning, identifying features, choosing, and developing algorithms and models as well as testing and deploying models into production. A number of these vendors also offer capabilities as an integrated or standalone offering for creating and determining the explainability and trust of advanced machine learning models. Some of them also support monitoring capabilities to detect model drift and other anomalous results.

IDC believes that the market for AI in general and advanced machine learning platforms in particular is evolving at a very rapid pace and that the next two to four years will be pivotal for these vendors as the techniques and approaches for developing and deploying models advance. Organizations should be aware of this and carefully select a vendor or vendors that they believe will evolve along with the market. Some of the key areas to consider:

- The offering helps you democratize AI – serves the needs of both the advanced machine learning developers/data scientists and the business analysts with intuitive tools and techniques.
- The offering is open and helps you extend the capabilities with the ecosystem of partners/integrators.
- The offering supports natively or through third-party integrations' ability to deploy models at scale from core to edge to cloud, building on and integrating with existing DevOps tools and best practices.
- The offering supports natively or through third-party integrations the foundational elements of trustworthy AI – fairness, explainability, adversarial robustness, data lineage, and transparency to help mitigate associated business risks.
- The offering is optimized for performance and cost to balance the needs of use cases and deployment variances.

VENDOR SUMMARY PROFILES

This section briefly explains IDC's key observations resulting in a vendor's position in the IDC MarketScape. While every vendor is evaluated against each of the criteria outlined in the Appendix, the description here provides a summary of each vendor's strengths and challenges.

IBM

IBM is positioned in the Leaders category in the 2020 IDC MarketScape for worldwide advanced machine learning software platforms.

IBM offers a wide range of innovative machine learning capabilities as part of its IBM Watson portfolio on a worldwide level. IBM has a Watson Anywhere approach that brings AI to wherever the data resides – across any cloud – to help companies unearth hidden insights, automate processes, and ultimately drive business performance. With IBM Cloud Pak for Data running on Red Hat OpenShift, Watson tools and apps can be used on IBM Cloud, AWS, Azure, Google, or customers' own private cloud using Kubernetes technology. It also has interoperability with an array of open source cloud-native, data, and AI capabilities. IBM has established the Center for Open Source Data and AI Technologies (CODAIT) with the mission to make AI models dramatically easier to create, deploy, and manage in the enterprise. CODAIT contributes to the development and improvement of open source AI frameworks and drives specific IBM contributions to the open source community.

As part of its corporate mission, IBM provides a wide range of assistance to help organizations get the most from its ML initiatives including services, education, and training. The IBM Garage experience is a services-led approach to enable enterprises to accelerate, break through, and work more like start-ups. IBM Garage blends business strategy, design, and technology into a single end-to-end engagement. It provides access to experts in design, architecture, development, data science, and security and taps into IBM's latest hybrid multicloud and AI technologies. IBM's Data Science Elite team is made up of a global and diverse set of data scientists and AI experts providing organizations with guidance, skills, tools, and a proven methodology to put AI projects on an accelerated track and scale. IBM continues to be a leader in research around the fields of artificial intelligence and machine learning, with an extensive number of patents and patent applications being granted and filed on an annual basis.

IBM has made great progress over the past three to five years to tighten the relationship between IBM Research and IBM product organization. This operating model continues beyond initial GA so continued innovation from Research can be delivered in the product. As reported in the 2019 annual report, IBM invested \$5,989 million – approximately 8% of total revenue – in R&D, focusing on high-growth, high-value opportunities, including artificial intelligence. In February 2019, IBM announced plans to invest \$2 billion into its new AI research hub based in New York. This includes the establishment of an "AI Hardware Center" at SUNY Poly for artificial intelligence-focused computer chip research, development, prototyping, testing, and simulation. In recognition that the greatest advances in AI will come from the collective ideas and energy of researchers and stakeholders from across academia and industry, on September 17, 2019 – the MIT-IBM Watson AI Lab's second anniversary – the Lab announced a new initiative to engage with leading companies to advance AI research. IBM is leveraging partnerships to accelerate the delivery of AI capabilities to its clients. In June 2019, IBM announced InfoSphere Advanced Data Preparation, a new solution jointly developed with Trifacta to bring ML-enabled self-service data preparation to market. This helps organizations automate many data preparation tasks, free up resources previously focused on getting data ready for consumption, and get to the business of conducting data science and building AI models faster.

Strengths

IBM has key strengths in its delivery model and growth strategies for the business and in its current range of services and product innovation. As per IDC research, customers are very satisfied with IBM's comprehensive support for the end-to-end ML life cycle in combination with flexible deployment and management options. Buyers and IDC both scored IBM's proven, prescriptive, and trusted track record to client success highly. IBM initiatives such as support for varied learning paths (e.g., courses in foundational AI, product proficiency, and organizational change/adoption), provision for providing Data Science and AI Elite Team (an international team of data scientists who engage with customers for

four to six weeks to validate feasibility), and support through IBM Garage engagements (where customers work with IBM Design Thinking practitioners to build out their own road maps to AI success) and through IBM's "Journey to AI" workshops (bringing in the stakeholders across an organization and produce a prioritized solution plan that helps enumerate milestones where value is achieved) are highly valued and differentiated.

Watson Studio AutoAI significantly accelerates model creation and deployment by automating data preparation, model development, feature engineering, and hyper-parameter optimization, as well as offering one-click deployment through Watson Machine Learning (WML). In addition, AutoAI provides open standards code generation in Python to boost the productivity of data scientists. IBM Watson OpenScale makes it possible for organizations to take their AI assets out of development and into the real world – helping solve business problems and deliver value while significantly mitigating risk. For example, it provides the ability for users to manage model risk through automated tests and the ability to sync metrics with governance, risk, and compliance (GRC) systems. It enables deployment of trusted AI through monitoring for fairness, model drift, and explainability. It provides local explanation at a per transaction level in runtime and generates the explanation on demand through an API or the UI. The explanation consists of the most important attributes used to make that prediction during runtime as well as the values of the attributes that impacted the prediction. The Contrastive Explanations capability generates the values of attributes that will change the prediction from the model to a different class or remain in the same class, thus allowing exploration of the boundaries of a black box model.

Watson Studio also differentiates itself in the provision of prescriptive analytics capabilities for the design and deployment of optimization models. This enables business decision systems to use the output of predictive models in operational research (OR) scenarios. A natural language-based model builder allows OR experts as well as data scientists at any skill level to construct and solve optimization problems.

Challenges

As per IDC research, cost of an AI solution is noted to be one of the top 3 challenges for scaling AI adoption. Because of IBM's play across the technology stack, customers are looking for IBM to optimize hardware-software performance, limiting the need for expensive accelerators. In addition, some of the customers we spoke to would also like IBM to offer better flexibility in pricing, including bundled pricing and support for monthly recurring charges. IBM could also improve speed for ticketed issues for support.

Consider IBM When

Consider IBM when you are embarking on your business transformation that exploits build and deployment of a broad set of ML and optimization solutions in hybrid and multicloud environments. IBM offers a wealth of flexible options and capabilities to support automation of business functions, from call centers to business operations and from business planning to code development, DevOps, and IT operations. Given IBM's focus on robustness and enterprise readiness, IBM Watson Studio appeals to a wide variety of customers looking to accelerate the development and deployment of AI/ML and optimization models into large-scale production. IBM enables the continuum of user types – data scientists, data engineers, developers, citizen data scientists, business analysts, and so forth – to leverage the power of machine learning. IBM's offerings and capabilities are designed to give CXOs a playbook for operating in the new crisis and resilient environment. They help address customer challenges around the volume, complexity, and distributed nature of data and around developing and

operationalizing AI at scale. Overall, IBM is a great ML technology supplier and enabler to help predict and shape business outcomes, including to improve customer experience, grow revenue, and reduce costs. IBM has many business partners including systems integrators, consultants, and vendors that enhance IBM's offerings and help organizations achieve success with AI solutions.

APPENDIX

Reading an IDC MarketScape Graph

For the purposes of this analysis, IDC divided potential key measures for success into two primary categories: capabilities and strategies.

Positioning on the y-axis reflects the vendor's current capabilities and menu of services and how well aligned the vendor is to customer needs. The capabilities category focuses on the capabilities of the company and product today, here and now. Under this category, IDC analysts will look at how well a vendor is building/delivering capabilities that enable it to execute its chosen strategy in the market.

Positioning on the x-axis, or strategies axis, indicates how well the vendor's future strategy aligns with what customers will require in three to five years. The strategies category focuses on high-level decisions and underlying assumptions about offerings, customer segments, and business and go-to-market plans for the next three to five years.

The size of the individual vendor markers in the IDC MarketScape represents the market share of each individual vendor within the specific market segment being assessed.

IDC MarketScape Methodology

IDC MarketScape criteria selection, weightings, and vendor scores represent well-researched IDC judgment about the market and specific vendors. IDC analysts tailor the range of standard characteristics by which vendors are measured through structured discussions, surveys, and interviews with market leaders, participants, and end users. Market weightings are based on user interviews, buyer surveys, and the input of IDC experts in each market. IDC analysts base individual vendor scores, and ultimately vendor positions on the IDC MarketScape, on detailed surveys and interviews with the vendors, publicly available information, and end-user experiences in an effort to provide an accurate and consistent assessment of each vendor's characteristics, behavior, and capability.

Market Definition

Advanced Machine Learning Software Platforms

Advanced machine learning platforms are a segment of the AI software platforms market. Advanced machine learning platforms provide a range of ML methods primarily working with structured and semi-structured data to create predictive and prescriptive models that are then used in applications. These platforms facilitate the development of advanced machine learning models and applications. Advanced machine learning platforms can also include development, training, and deployment tools, including pretrained models and automatic machine learning methods that help developers and business users to experiment, automate machine learning, and build and deploy artificial intelligence models into production. The platforms provide functionality to apply a broad range of supervised, unsupervised, reinforcement, and transfer learning methods into models and applications put into production and can be deployed in several ways.

LEARN MORE

Related Research

- *Market Analysis Perspective: Worldwide AI Software Platforms, 2020* (IDC #US46868020, September 2020)
- *Market Analysis Perspective: Worldwide Artificial Intelligence Software, 2020* (IDC #US46853020, September 2020)
- *Worldwide Artificial Intelligence Applications Market Shares, 2019: Adoption Driven by Accelerated Innovation* (IDC #US46753120, August 2020)
- *Worldwide Artificial Intelligence Software Platforms Market Shares, 2019: The Battle Has Begun* (IDC #US46652020, July 2020)
- *Worldwide Artificial Intelligence Software Platforms Forecast, 2020-2024* (IDC #US45724520, June 2020)
- *IDC FutureScape: Worldwide Artificial Intelligence 2020 Predictions* (IDC #US45576319, October 2019)
- *IDC's Worldwide Artificial Intelligence Taxonomy, 2019* (IDC #US45013419, April 2019)
- *IDC Market Glance: Artificial Intelligence, 1Q19* (IDC #US44808719, February 2019)

Synopsis

This IDC study represents a vendor assessment of the advanced machine learning software platforms market through the IDC MarketScape model. This assessment discusses both quantitative and qualitative characteristics that provide guidance about advanced machine learning software platform vendors and their offerings. This IDC MarketScape covers a variety of vendors participating in the advanced machine learning software platforms market. The evaluation is based on a comprehensive and rigorous framework that assesses vendors relative to the criteria and to one another and highlights the factors expected to be the most influential for success in the market in both the short term and the long term.

"Success in the rapidly evolving AI software platforms market requires advanced machine learning software platform vendors to continue to innovate and provide tools to help customers accelerate development and deployment and monitoring of machine learning models," says David Schubmehl, research director, AI Software Platforms at IDC.

"AI adoption is past the tipping point. The rapid rise of digital transformation has pushed AI to the top of the corporate agenda and machine learning infusion is ubiquitous across all business processes," adds Ritu Jyoti, program vice president for AI Research. "However, as we accelerate into the mainstream, organizations will need to embrace innovative machine learning platforms to realize AI/ML at scale and enjoy sustainable competitive advantage."

About IDC

International Data Corporation (IDC) is the premier global provider of market intelligence, advisory services, and events for the information technology, telecommunications and consumer technology markets. IDC helps IT professionals, business executives, and the investment community make fact-based decisions on technology purchases and business strategy. More than 1,100 IDC analysts provide global, regional, and local expertise on technology and industry opportunities and trends in over 110 countries worldwide. For 50 years, IDC has provided strategic insights to help our clients achieve their key business objectives. IDC is a subsidiary of IDG, the world's leading technology media, research, and events company.

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