5 Big Myths of AI and Machine Learning Debunked

Demystify the role and potential of artificial intelligence (AI) and machine learning (ML) in powering positive outcomes for the enterprise.

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It's hard to believe that the now ubiquitous terms of AI and ML date back to the 1950s. AI and ML have made a massive resurgence in the past 10 years to become more widespread, powerful and easier to use than ever before, and their use cases have materialized across multiple industries.

Today, AI and ML power computer vision that detects cancer. They predict equipment failure for manufacturing. They detect fraud in banking. And they generate seemingly endless TV show and movie recommendations for Netflix users.

Consumer technology has been a driving force in AI and ML investment and advancement (e.g., Amazon, Netflix, Apple). Yet, it's not just consumer technology that's driving the advancement of AI and ML. Enterprise use cases represent nearly $6 trillion in opportunity, according to a McKinsey study, and venture capital investment in AI reached new heights in 2019, totalling $18.5 billion. Spending will only continue to grow: IDC predicts that worldwide spending on AI will reach nearly $98 billion in 2023.

But despite a rise in investment, adoption of AI and ML has been slow and steady in the enterprise. Most companies have been slow to adopt and implement change, and only a small fraction of companies have successfully launched internal AI and ML initiatives to transform their operations. A 451 Research Voice of the Enterprise: AI and Machine Learning Use Cases 2020 survey discovered that only 29% of enterprises have deployed machine learning in some capacity.

A Gartner survey discovered that 42% of respondents simply did not understand the benefits of AI and ML usage for their organization. There are additional obstacles, such the shortage of data and technology professionals who possess the necessary skills to implement the needed infrastructure and processes for AI and ML to transform workplaces, as well as the lack of a strategic approach in AI and ML adoption. But the positive outcomes are becoming clear as early adopters settle into the new norm. And, although it may be difficult to quantify the direct benefits of AI/ML investments now, that will all change by 2024. Organizations will be able to concretely tie key ML performance indicators to measured ROI.

The trend has already begun. According to Deloitte, of the more than 2,700 IT and line-of-business executives surveyed from companies that have adopted AI technologies, 90% believe AI to be "very" or "critically" important to their business. Seventy-four percent of adopters anticipate AI will be integrated into all enterprise applications over the next three years.

That said, the companies in the Deloitte survey added that AI still has room to grow before it truly transforms their businesses, but that will take less time than you might think. According to 75% of those surveyed, cognitive technologies will transform the business in three years or less, and 61% anticipate industry transformation within the same timeframe.

To be sure, some of AI's most far-reaching concepts — computers that can replicate the human brain entirely, fully autonomous robots and programs that design, code and upgrade themselves — are years away from reality, moonshots that represent the eventual apex of AI's capabilities. But considering that AI tools can already win at Jeopardy!, are able to detect breast cancer and are logging tens of thousands of miles behind the wheel of self-driving vehicles every day, the prospect of even those moonshot concepts really doesn't seem so far-fetched.

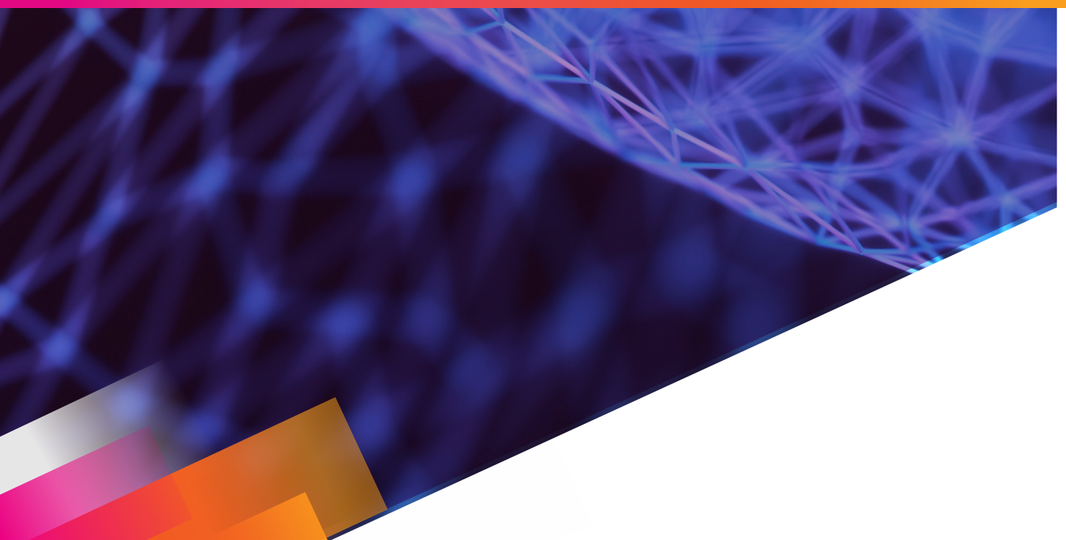
In other words, now is the time to develop an AI and ML strategy, or your business might get left behind. To help you incorporate AI and ML in your business, let's clarify some common misconceptions.

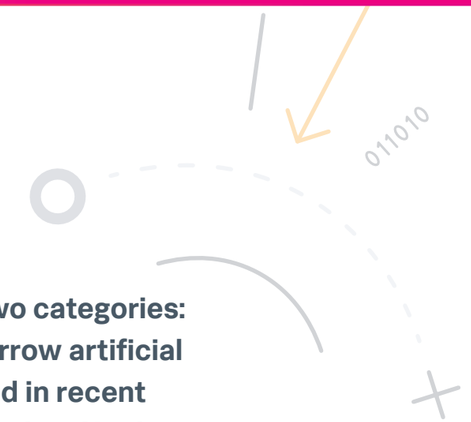
01

MYTH

AI and ML Are the Same

As with many new technologies, artificial intelligence has created a gold rush effect across many industries. All manner of products have been described as having been built with AI, to the point where the term has become a buzzword that has seemingly lost much of its meaning. So let's try to get some of that meaning back by breaking down the term "AI" to understand what it really means.





At its simplest level, AI can be split into two categories: general artificial intelligence (GAI) and narrow artificial intelligence (ANI). The names have evolved in recent years, but the terms can generally be thought of in the following ways.

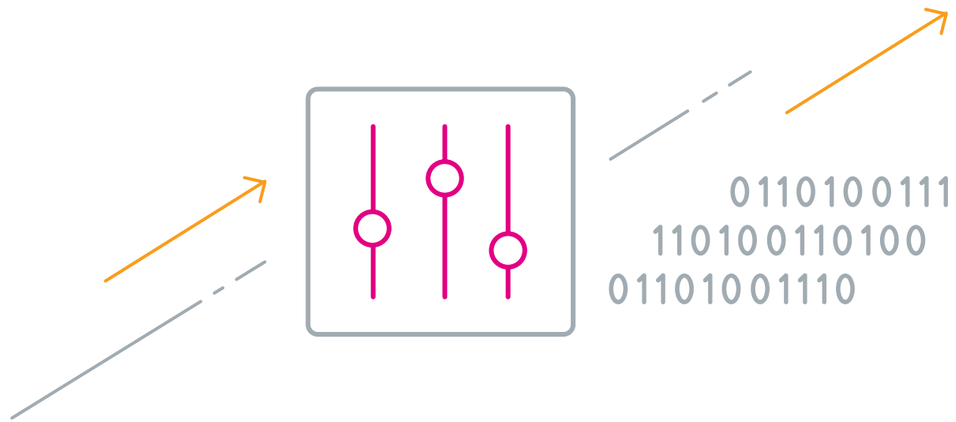
Narrow AI (ANI)

Narrow AI is a collection of technologies that rely on algorithms and programmatic responses to simulate intelligence, generally with a focus on a specific task. When you use a voice recognition system like Amazon's Alexa to turn on the lights, that's narrow AI in action. Alexa may sound smart, but it doesn't have any advanced understanding of language and can't determine the meaning behind the words you speak. The program simply listens for key sounds in your speech and, when it detects them, follows its programming to execute certain actions. To users, this can seem surprisingly intelligent — and voice recognition is far from a simple computing task — but in reality there is no actual "thinking" going on behind the scenes. Non-player characters (NPCs) in games are another good example of ANI. While they take human-like action, in reality they're simply following a pre-programmed series of actions designed to mimic how a human would play the game.

General Artificial Intelligence (GAI)

GAI, in contrast, is intended to think on its own. The goal of GAI research is to engineer AI that learns in a manner that matches or surpasses human intelligence. GAI is designed to learn and adapt, to make a decision tomorrow that is better than the one it made today. None of this is easy, which is why most examples of AI you'll encounter today are the narrow form. GAI is a new, complex and varied category with numerous sub-branches, most of which are still research topics in a lab. Modern AI systems focus on solving specific tasks, such as optimization, recommendation or prediction systems and don't learn broad concepts generally, like a human would.

With This Distinction in Mind, What Is Machine Learning?



Put simply, machine learning is a specific type of ANI, with the goal of giving a computing device access to some store of data and allowing it to learn from it — but nowhere near GAI levels. As stated above, when Alexa turns on the lights, it doesn't actually learn anything, even if it does better recognize your voice over time. When the user tells Alexa to turn off the lights, a program is then executed to carry out the command. This is an example of a rules-based approach, which is one of the simplest forms of AI where the system operates on rules coded through if-then-else statements.

But ML systems can do more, too, when given a data feed — say, temperature and tolerance information from sensors on a piece of manufacturing equipment — and be asked to draw conclusions about it based on observed examples of a task. This may involve searching that data for trends, patterns and anomalies or any information that might not be obvious to a human observer. In the case of manufacturing, the machine learning algorithm would learn to send proactive alerts when temperatures exceed a certain threshold, so operators can take action before an issue arises.

How is all this possible? ML is a subset of AI that includes supervised, unsupervised, reinforcement and deep learning systems. Supervised machine learning algorithms and models use labeled datasets, beginning with an understanding of how the data is classified, whereas unsupervised models use unlabeled datasets and figure out features and patterns from the data without explicit instructions or preexisting categorizations. Reinforcement learning, on the other hand, takes a more iterative approach. Instead of being trained with a single data set, the system learns through trial and error and receiving feedback from data analysis.

With faster and bigger computation capabilities, ML capabilities have advanced to deep learning, a specific kind of ML that applies algorithms called "artificial neural networks," composed of decision nodes to more accurately train ML systems for supervised, unsupervised and reinforcement learning tasks. Deep learning approaches are becoming more widespread, but come with high computation costs and are often harder for humans to interpret because the decision nodes are "hidden" and not exposed to the developer. Nonetheless, deep learning offers a wealth of possibilities, and already has promising applications for image recognition, self-driving cars, fraud news detection and more.

On the whole, the AI and ML space is constantly evolving. The important thing is understanding that these techniques can be applied to solve business problems, as long as there is data to train them.

02 MYTH

AI Is a Magic Wand

As exciting as an AI-enabled hair dryer and AI-powered yoga pants sound (yes, those are real things), there is a time and a place for AI, at least as it stands today.

At its most fundamental level, the key to successfully building an AI outcome, regardless of the industry in which it's deployed and its level of complexity, is data.

AI would not exist without proper training, and models need to be well-built in order to be useful. A spam filter must be trained on how to recognize a good email message from a bad one. A voice recognition AI assistant must listen to countless hours of spoken dialogue before it can parse what is being said with any degree of accuracy. AI-enabled factory floor initiatives are typically required to analyze several million gigabytes of data each week to make reasoned decisions about what might happen in the future.

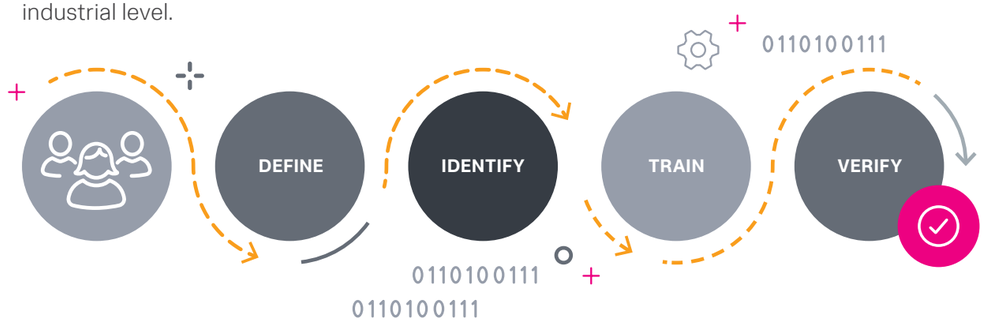
All of these are examples of training, and it's not just a game of volume, but one of quality, too. Successful AI algorithms must be trained on the right data sources, or they simply won't be able to inform good decisions. If you were to open up your email inbox and tag all the messages from your spouse as spam, then tag all the emails from Nigerian princes as good, you'll promptly see for yourself how quickly AI can go off the rails.

The same is true in a more advanced industrial setting. If a sensor is miscalibrated and feeds inaccurate information to an algorithm tasked with monitoring equipment, all those gigabytes of data will end up being useless or worse, as the AI model will use and be trained with bad data in the course of reaching inaccurate conclusions.

The point of this is that AI is not necessarily a cure-all. There is no "AI switch" or "AI plugin" that can take any old technology and somehow give it cognitive ability.

Humans have to define the problem, identify an appropriate AI technology to solve it, train the tool with the correct data and then verify that the results are valid. Even the most powerful AI tools developed to date have to be carefully managed over time so they don't run off the rails.

Many AI professionals are finding that they learn more when an AI algorithm returns the wrong answer instead of the right one. This effect is visible at both the consumer and the industrial level.



Once an AI tool has generated results, the work isn't over.

When an AI-based spam filter miscategorizes an incoming message, the user has the chance to retrain the tool by categorizing it properly. This gives the algorithm new insight into what it might have missed the first time around; learning from the error makes the tool incrementally more powerful. If the spam filter had not been retrained, it would be no more accurate the next time around and would likely make the same mistake again. Similarly, in a manufacturing setting, imagine that an AI tool directs that a machine be taken offline because a failure in a key part is imminent. If the part does not fail, then what?

What happens if security-focused AI blocks your traveling Salesforce from accessing the network because it wrongly assumed they were hackers? Because of the logical nature of AI, a developer can determine why the AI made these specific decisions and can work backwards to determine what data it relied on in the process. This may reveal flaws in the data, an error of logic processing or some other bug that would otherwise go unnoticed. And in situations like these, developers can take necessary actions to correct the code, retrain the models, or do whatever it takes once these flaws are identified.

03 MYTH

You Need a Ph.D to Understand AI and ML

Artificial intelligence and machine learning, by their very names, do not exactly convey simplicity. And in truth, these are dazzlingly complex technologies that, under the hood, are far from accessible to the layperson.

However, you don't need an advanced degree, and there is no use case too small for smart technology.

Nonetheless, it's important to understand the difference between building an artificial intelligence solution from the ground up and implementing existing AI tools within your organization. The first of these is extremely difficult. The second is getting easier every day. Consider all of the technological tools you use in the course of a day: an email client, or productivity tools like your digital assistant or spreadsheets. They're not simple technologies, but you're able to master them without knowing what's happening behind the curtain.

The same thing is happening to AI, as tools are becoming increasingly accessible. There's been an uptick in the breadth and quality of self-service analytics platforms, enabling non-technical employees to output analysis without relying purely on data scientists. Beginners can build their own machine learning models, that have pre-built algorithms and intuitive interfaces, and are aimed at developers who don't necessarily have robust backgrounds in data science or statistics.

Money is pouring into the so-called democratization of AI, with the launch of open-source and commercial tools from legacy and emerging tech companies. Some technologies have been tailored for specific tasks like helping catch fraudsters with behavioral biometrics. While we might not be at the level of pure point-and-click when it comes to implementing an AI system, these tools are now accessible to anyone willing to learn.

You may also be under the impression that your business or specific use case is too small or insignificant to merit an investment in AI, that your environment is just not complex enough to benefit from the technology. In many cases, this is not true. Even small businesses and other environments limited in scope and scale can benefit from the results provided by AI and ML. In a small business or business unit setting, you might task AI with identifying anomalous security events, testing and developing better social media ads, automating and improving customer service requests or searching for patterns around when and why competitors are changing prices or product offerings. All of these AI-driven activities are readily accessible to even single-owner operations.

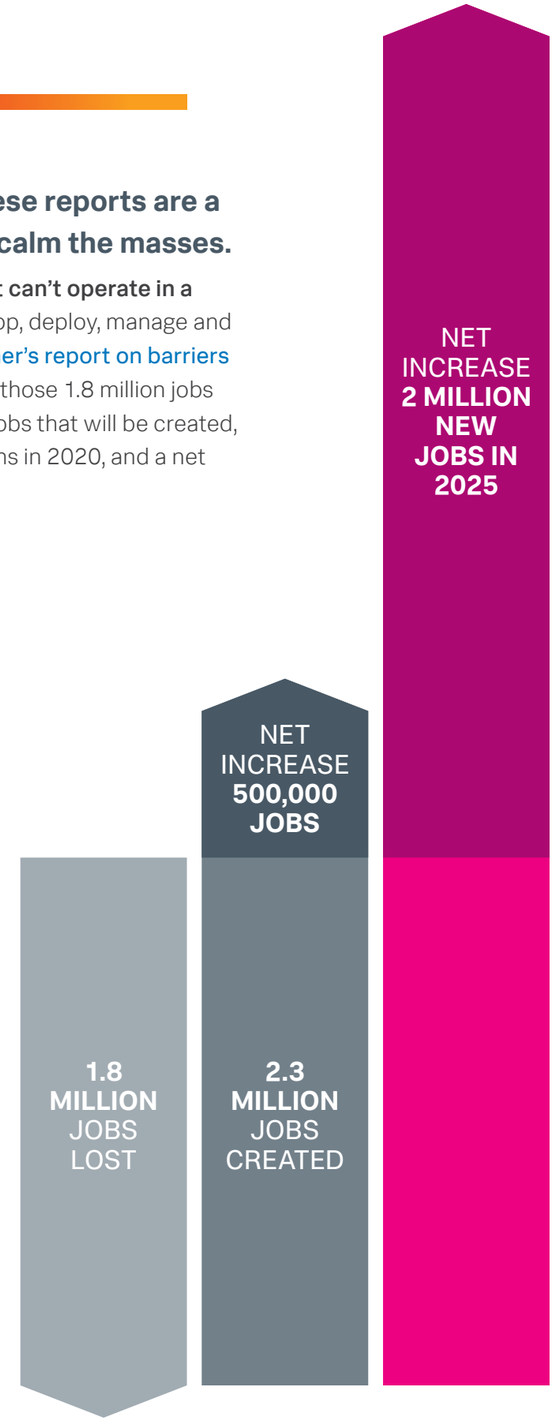
04 MYTH

AI and ML Will Replace Me

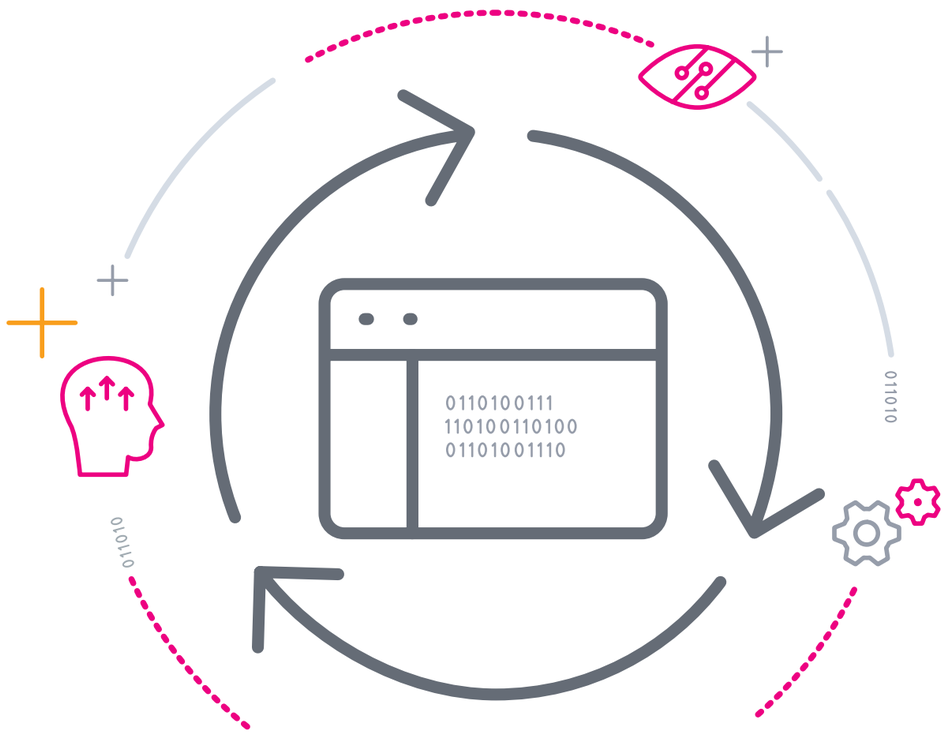
Worried that AI will eliminate your job in the near future? You're not alone. McKinsey recently suggested that by 2030, 375 million workers — 14 percent of the global workforce — would need to "switch occupational categories" as machines become increasingly capable of doing work previously reserved for humans.

But sometimes buried in these reports are a few key details that should calm the masses.

There is a fundamental truth to AI: it can't operate in a vacuum. It requires humans to develop, deploy, manage and maintain it. That means jobs. In Gartner's report on barriers to AI adoption, the firm predicts that those 1.8 million jobs lost will be offset by 2.3 million new jobs that will be created, for a net increase of 500,000 positions in 2020, and a net increase of 2 million jobs in 2025.



Why Won't AI Decimate Employment as We Know It?



To date, all AI is narrow AI — and most say that GAI won't be reality anytime soon. AI today does not consist of systems that can replicate the abstract ways that a human thinks and works, but instead target narrowly defined problems. In many cases, an AI and a human operator work hand in hand to solve that problem: The AI scours the data, looking for details that would otherwise take months of time to uncover, and the human checks that the AI's results are on target. The human operator is required to train the AI tool to perform tedious tasks, liberating the human operator to focus on the big picture. As these problems get increasingly difficult, the need for a human operator becomes even greater, not smaller.

AI doesn't have innate knowledge of business processes. While many companies are migrating their business processes to more flexible systems that allow for the fluidity that AI often requires, these transitions are often lengthy and require significant human intervention to implement. This kind of transformation requires soft skills and a substantial amount of institutional knowledge about the business, its industry and its competitive environment. Only through a collaborative effort can an AI tool effectively recommend process automation and reconfiguration activities — all of which ensure that people will remain a key part of the puzzle for the long haul.

For all of its intelligence, AI isn't always right. AI can not only go wrong — it can go catastrophically wrong. When that happens, a human — with intuition, experience and the ability to react quickly — is invariably needed to overcome the problem or pick up the pieces. What's worse: AI tools often don't even know they have made a mistake, which requires even more work from a human who can figure out how to prevent them.

> **"Leave behind notions of vast teams of infinitely duplicable 'smart agents' able to execute tasks just like humans. Get [workers] excited and engaged with the idea that AI-powered decision support can enhance and elevate the work they do every day."**
>
> — Gartner's Whit Andrews

05 MYTH

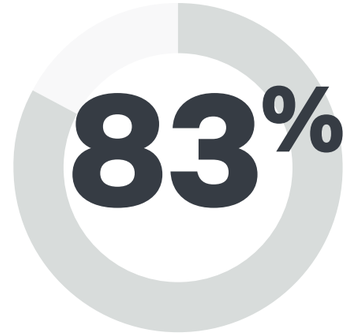
Data Has to Be Perfect in Order to Take Advantage of AI and ML

Don’t you need terabytes worth of data, all carefully curated, to train any AI tool?

While it’s true that AI as a rule thrives on a large and accurate pool of data, your business doesn’t need to have all of that data in-house for AI to be useful.

A tool that monitors and analyzes social media collects its data from external sources as it goes. An AI system that relies on data feeds such as ambient temperature, housing prices or neighborhood demographics typically pulls all of this information from publicly available sources. There’s really no need that’s “too small.” Remember that a tiny improvement in a key business vector can have a huge impact on the bottom line. A system that reduces production mistakes by a fraction of a percent or that correctly recommends a price increase of just a few pennies could equate to millions of dollars in avoided costs or additional profits. The challenge is largely in identifying where these opportunities lie.

For in-house data, it’s also possible for organizations to train models with unstructured data. Unstructured data tends to be qualitative data — think audio, video, surveillance imagery and so on — whereas structured data is highly organized and is more or less the same as quantitative data. But businesses can indeed analyze structured and unstructured data, thanks to machine learning algorithms such as pattern classification, text-mining and natural language processing, and thanks to lower costs for computing power and hard drive space as well.



have already achieved either moderate or substantial benefits from their work with these technologies.

AI Is Here to Stay

While AI can be a game-changer that takes your business to the next level, taking your first steps with AI and machine learning does not have to be a monumental undertaking. Numerous tools on the market let you experiment with AI in a sandbox, targeting small “problem areas” that might have long stymied your attempts at improvement. The important thing is that you need to get started soon, before the competition masters these tools and jumps ahead of you in the marketplace.

AI is already having a profound impact on the bottom line of businesses that were early movers into the field, with companies seeing improvements in customer satisfaction, decreases in manufacturing downtime and better overall worker productivity. There’s no blanket AI tool and no single metric that will improve once these tools are implemented, but it’s up to you to determine where to target artificial intelligence based on the specific challenges you see in your organization.

Of course, getting there means overcoming some hurdles. You may have to educate nervous staff members about the realities of AI and job displacement, instead turning those fears around by showcasing how AI can improve their work lives and actually brighten their future career prospects. Smaller businesses may also need to overcome the sentiment that AI is a game that only the largest of enterprises can play, which is where some targeted pilot projects can really help.

While AI is already showcasing real-world results, the future of these tools is even more exciting. It’s a journey, however, that you need to begin today.

Learn More

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