aws | Deloitte.

Realizing the benefits of AI and ML

Artificial intelligence (AI) and machine learning (ML) have demonstrated their power. Now it's time to demonstrate their business value. Tackling real enterprise challenges and seizing real opportunities isn't a job for an ongoing science project. It takes a practical ecosystem of applied and innovative technology to turn innovation into ROI.

What's inside

Realizing the benefits of AI and ML

Whether they are swimming in data or teaching voice bots to search and read from company literature, the state of AI/ML today means very little is out of reach. This report is designed to pinpoint where the people with the most experience in these tools think there is "low-hanging fruit" from which organizations can benefit from right now.

Everyone today has high-volume data. Can yours help you anticipate customer demands, outflank competitors, manage high-skill workforces, master risk and compliance, or excel in any of the other disciplines that set leading enterprises apart? Getting to yes starts with knowing your industry and organization. But it's just as important to master the most advanced tools available—because your competitors have the same access to them you have.

What makes AI and ML worth your attention is that they go beyond the utility you're accustomed to seeing in other tools. Where traditional computing follows instructions, AI emulates human judgment. Where traditional computing knows only what you feed into it, ML gathers knowledge from previous operations and the world around it.

These capabilities can lead directly to business advantages: First, they can derive value from high-volume data flows that humans just can't keep up with, much less interpret. Second, they can take over certain levels of decision-making and process completion so humans have more time for the higher-order tasks that technology still can't handle. An enterprise powered by AI and ML gains "brainpower" and perception to know, predict, and act in previously unattainable ways.

Some of the most advanced realizations of what AI/ML makes possible happen also to be technologies you can put into action today, in flexible ways that have direct business impact. For that reason, and because they represent approachable "on-ramps" into the larger world of AI/ML implementation, this book focuses on three game-changing AI and ML applications:

1. MLOps

The continuing work of placing AI/ML in a framework of repeatable process and reliable governance. This is the difference between ML as isolated projects and ML as part of an organization's overall plan for getting things done.

2. Conversational AI

The ability for machines to handle unscripted human interaction in meaningful and productive ways. A chatbot, virtual assistant, or smart home device is the most familiar version of this, but there are many other uses.

3. Computer Vision

Not only the eyes, but also the brains, that turn unstructured visual information into useful data. Anyplace an AI/ML system can "see," it can turn what it sees into useful information—from scanning objects to monitoring environments and even beyond the visible spectrum of light.

These aren't the only AI/ML applications at the frontier of business today, but they are among the most wide-ranging and influential, across a variety of industries and use cases. For each of them, we'll examine what's possible, what's happening in real organizations right now, and what it takes to make these advantages your own. Where can each of these innovations help move your business forward?

"The ways that conversational AI is leveraging unstructured data is inspiring. I don't expect it to be long off for people to be able to have AI-generated conversations with historical figures. 'What inspired this work' or 'how were you feeling that day' will be answered as if Michaelangelo or Martin Luther King Jr were sitting right in front of you and all because of the strides made in this technology. Our part, beyond making it real, will, most certainly, involve applying ethical standards and trustworthy frameworks for sure."

—Deloitte Partner Development Leader

Perspective

It's likely most people reading this have heard of AI and ML, and have interacted with those technologies in some way—whether they realized it or not. Conversing with a chatbot or having a retail site predict what you might like to buy next are examples of AI/ML applications in widespread use today.

But it's just as likely the true potential of these tools will surprise even experienced technology devotees. Today, AI and ML are in what future generations will recognize as their infancy. Some of the places they're poised to take us sound like science fiction. But then, so did computers once. So did electricity. That's the kind of ubiquity that lies in store for machines that can think, learn, adapt, predict, and decide in non-linear ways.

Striving toward limits we can't see yet

Harnessing a potential like this while it grows is like building a car you've already started to drive down the road. You know you're headed somewhere, you aren't sure where or how, but it's a ride like no other. The one thing you know is that whatever lies ahead, it's worth getting there first.

That's the perspective each of the AI/ML team members from Deloitte and AWS bring to their work—and the spirit they hope you'll catch from reading this. Inside every buttoned-up, sober scientific professional, there's a kernel of mad scientist waiting to get out. In the same sense, this book carries a dual message: mostly "let's harness emerging technologies to generate measurable business ROI."
But also: "let's do this."

A practical perspective on incredible opportunities

Deloitte and AWS bring that state of mind to our shared work as we bring AI/ML out of the test lab and into the crucible of everyday accomplishment. Together we offer a virtually unparalleled breadth of services that span the strategy, implementation, and operation of AI/ML platforms and systems that make a real difference. Hundreds of major public- and private-sector organizations have relied on our combined experience to meet their unique and complex needs.

The joint work of Deloitte and AWS rests on a foundation of industry-leading cloud strategy and implementation. More than most, we can point to accomplishment to back up theory. We've walked the AI/ML walk, and we're breaking into a jog. Where does this story end up?
Let's find out together.

A quick state of the union

The three specific AI/ML technologies we'll examine, MLOps, Conversational AI, and Computer Vision, are valuable not only for their specific attributes.

Each is part of a larger maturity mosaic: You're either progressing along an AI/ML journey that empowers you to get real value out of the data all around us, or you aren't. With a call to action that broad, it can be hard to know where or how to start. The three areas we focus on are among the strongest opportunities to jump-start that AI/ML maturity and path to value.

You are here:
What different levels of AIML maturity looks like

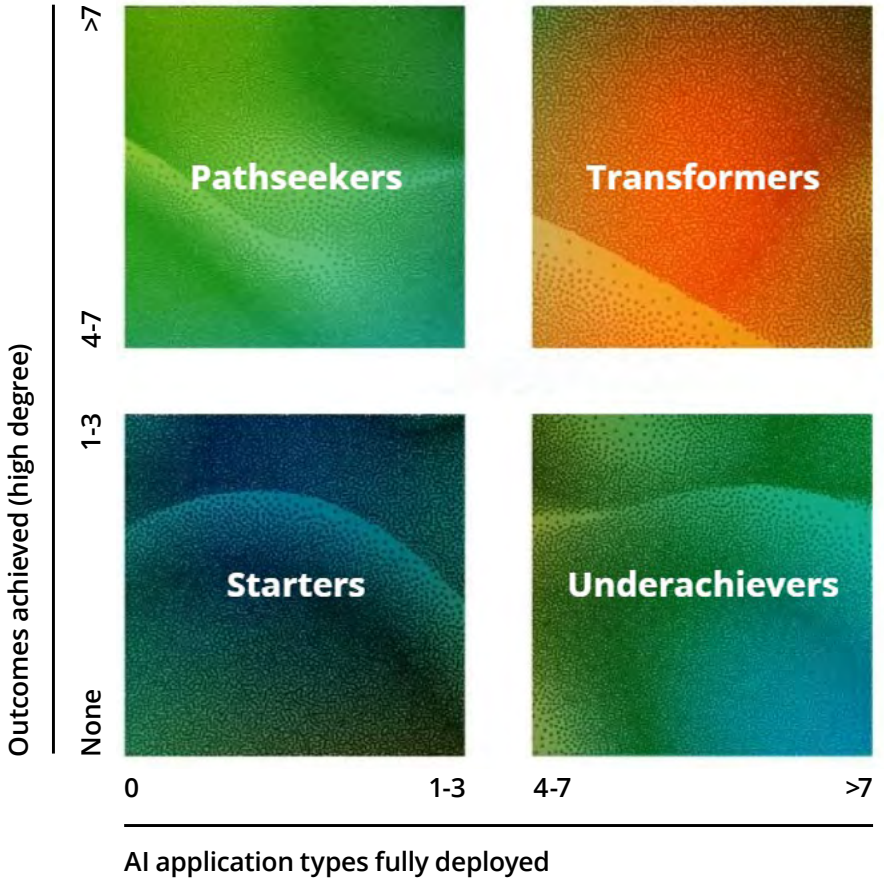
According to Deloitte's most recent *State of AI in the Enterprise* survey, a significant and growing percentage of organizations are displaying the behaviors of an "AI-fueled organization." 94% expect AI to be critical for their business success in the next 5 years. In addition, while a growing number of organizations that are using more than three AI-powered applications have increased; the outcomes of their efforts has decreased. This is due to many factors including culture, access to skilled talent, and integration complexity. It is because of this, the 5th edition of this research ties maturity to the number of AI application-types an organization has fully deployed and the outcomes it's achieving. As result, the data presents four maturity quadrants:

Transformers
lead the pack. Transforming but not fully transformed, Gartner says,"Companies in this stage rely on AI to do significant lifting for the business." Companies at this level use AIML pervasively and responsibly.

Pathseekers
are on the move. They've adopted effective AI capabilities and behaviors in their day-to-day operations, but on fewer initiatives. They have the infrastructure but lack either the vision or the ability to scale.

Starters
are in the game but have gotten a late start. Their AI commitments are real, and in motion, but still mostly experimental.

Underachievers
may have development and deployment under way, but they haven't adopted enough leading practices to have seen meaningful outcomes yet. Where other players have strategies, Underachievers have ideas. But their advantage is they have a lot of other players' examples to learn from in catching up.



The next step in your AIML journey

Wherever you are and wherever you need to go, the foundation of your plan doesn't have to be a mystery. AI and ML may be new to your organization, but the ends you're working to achieve are very much home-grown. That means the answers spring from your core strategy—from inventing new products and services to managing your workforce, from reinvigorating your supply chain to enhancing regulatory compliance, or even creating a whole new business model.

Why now

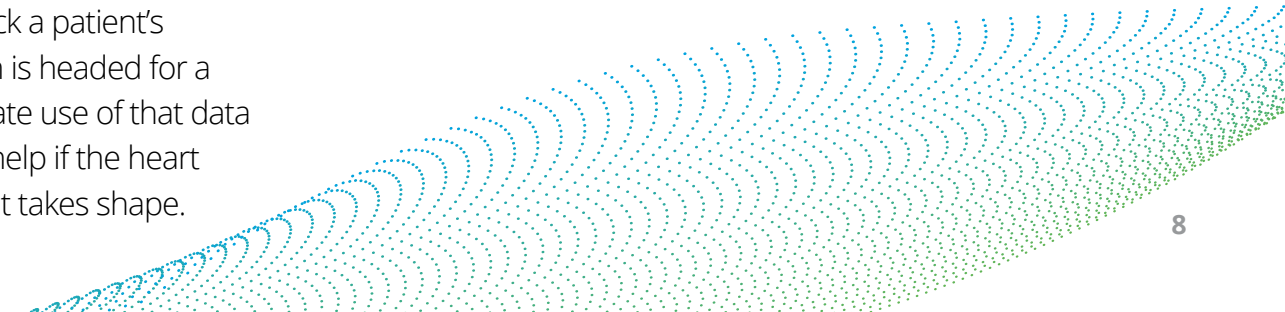
In the "Age of With", it takes a practical ecosystem of applied technology to unlock the barriers that stand between you and the places data modernization and AI/ML can take you next. Many companies may be in a position to say: Thanks, we already make data-based decisions. But are those decisions based on timely data?

Today, information that's even a few hours old may be past the point of yielding useful insight. If your predictions or decisions aren't as accurate as you hope, that may be part of the reason—and if your solution for keeping current relies on human intervention, you're likely to find operating at human speed leaves you behind the curve. Consider a medical parallel. Today's diagnostic prowess makes it possible to track a patient's readings and predict: this person is headed for a heart attack. But the most accurate use of that data and analytical capability doesn't help if the heart attack happens before the insight takes shape.

Why MLOps, Conversational AI, and Computer Vision?

The short answer? You need to start someplace, and these three domains have broad applications that are already past the "what if" stage in a variety of settings and industries. Each of them, or all of them, can be a valuable track to grab in your efforts to get on the AI/ML train.

Their widespread use also means there are plenty of lessons waiting out there for you to absorb and benefit from. As you grow your AI/ML muscles, you will likely head toward a degree of capability that lets you pioneer something no one else has done before. But it's okay if you walk before you run.



MLOps

As AI and ML applications grow in number, complexity, and importance, they need to be what other business tools are: part of a plan. That means developing and applying quality controls that keep models on a production path that's consistent, scalable, and repeatable. The discipline that achieves this is machine learning operations, or MLOps. While ML may be pure technology, MLOps is equal parts technology, process, and people.

It's likely you're familiar with DevOps, the process that surrounds application development with standards and rules. That's a process that ends—at some point, the application is finished and in use. In contrast, MLOps is ongoing, because an organization's use of ML never ends. That means it's an opportunity not only to do things right, but also to do them better over time. A continuous process is a chance for continuous improvement.

MLOps is part automation, because it sets work on a repeatable path. But it's also control, because it holds ML projects to defined standards and makes adherence to them transparent. Every organization that works to build an MLOps machine will progress through stages of maturity, from improvised learning to semi-autonomous learning to continuous learning.

Along that path, organizations will likely encounter ten distinct dimensions that contribute to growing MLOps maturity:

- Data collection
- Data validation
- Feature engineering
- Experimentation
- Training
- Model validation
- Integration
- Deployment
- Model management
- Feedback

What's possible

Machine learning is supposed to be about reducing the resource commitment it takes to solve a problem or achieve a goal, whether it is human, financial, or other. But if ML is undisciplined, it can become a vortex that sucks up resources instead. An array of outputs that have to be reconciled with business imperatives, and with each other, isn't valuable just because they emerged from an automated tool. But if those outputs are part of a coordinated approach, they're more likely to move the business in a valuable direction.

With MLOps, ML is able to keep the promise of enhancing performance while reducing resource commitments. Not only do models deploy more quickly, but they emerge ready to drive identifiable business value, and more of it. Because they're subject to governance from the moment they're born, they carry fewer defects and less risk.

Even at early stages of MLOps maturity, an organization can reap benefits by standardizing and streamlining access to data, tracking the effectiveness of ongoing experiments, and reducing handoffs.

What's happening

MLOps is making inroads in most places where ML is, which is to say, most places. Consumer and Banking & Capital Investments organizations are among the places it has made the most inroads to date, and heavily regulated industries are finding its advantages suited to their high-stakes needs as well.

Deloitte's approach to MLOps emphasizes its shift from improvised to semi-autonomous and eventually continuous learning. In an environment in which only 8 percent of organizations report achieving their anticipated return on investment from ML programs, it's clear MLOps is the key to maturing the technology's overall role in industry. When an organization streamlines and automates the AI/ML lifecycle by regularizing development, it can realize business benefits with clear value: taking deployments from months to minutes, adapting on the fly to address shifting behaviors, and getting more value from assets by using them more than once. When efficiency, communications, and user experience improve inside the company, the company's performance for external markets and stakeholders improves as a result.

AWS reflects its own commitment to this vision, and puts it into practice, with SageMaker—a cloud-based MLOps solution whose built-in tools help automate and standardize processes across the ML lifecycle. Because model deployment, collaboration, workflows, troubleshooting, and tracking are all standardized within a coherent environment, it's easier to standardize and improve ML implementation across the enterprise.

This combined approach is making a difference right now in diverse industries.

"Machine learning will only increase in importance for companies that want to remain competitive and develop in a world based on modern technologies and data. Those that have already started are seeking more maturity in feature engineering, model management, and feedback. Of the main 'dimensions' that go into MLOps maturity, those are the ones that have been leveraging our industry experience the most."

—Deloitte Product and Project Manager

"What's next year? It's all moving very fast and has been incredible to watch unfold. The use of large language models (LLMs) is a particularly interesting area to watch. We are seeing clients use these to augment their natural language understanding. For example, LLMs can be used to expand the possible list of sample training phrases for intent. If a user says something that does not quite match an anticipated response, instead of responding with an 'I don't know' message, LLMs can be used to expand the user's initial utterance to see if the expanded messages actually do have a match."

—AWS Conversational AI Leader

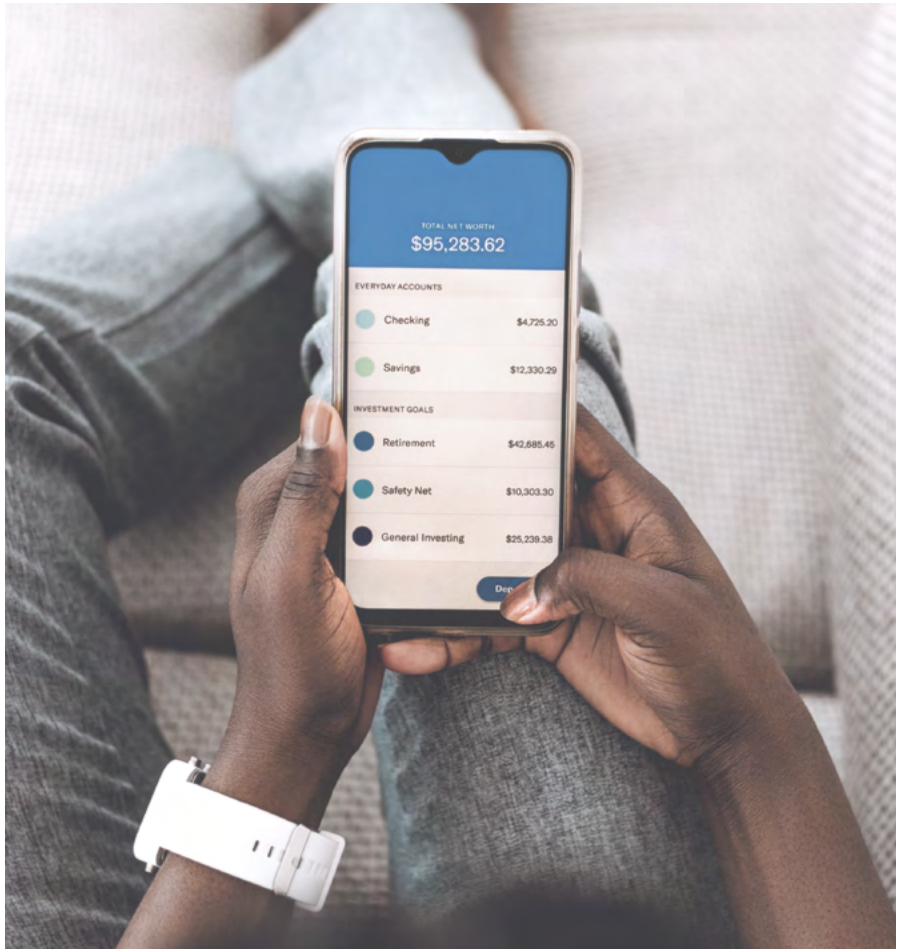
Use cases

Western Union

Western Union had a big data environment but it lived on a legacy in-house infrastructure. The payments giant wanted to evolve to a serverless, “no-ops” environment that could support its growing digital and retail footprints. That meant new tools had to operate with business governance, making MLOps a key consideration. The company turned to Deloitte and AWS to accelerate its digital adoption and cloud migration and build new go-to—market capabilities. After taking advantage of AWS services and Deloitte industry acumen, Western Union’s chief data officer praised the business relationship as “a huge driver to innovate and transform our business.”

NatWest

NatWest, the UK’s largest business and commercial bank, sought a scalable, secure, sustainable, cloud-first MLOps platform to help support data science workflows across multiple functions. Existing development and release times for the ML models that served more than 19 million customers and businesses were not responsive enough. Using Amazon SageMaker, the company built a federated self-service approach that cut development times from weeks to minutes, streamlined internal data sharing, and drove down costs. In only nine months, the joint team went from discovery to launch, training more than 300 data scientists on the new platform, slashing idea-to-value timelines for multiple deliverables, and reducing technical debt to speed future development even further.



What it takes

If you use ML, you should use MLOps to shape and direct it. But that doesn't have to represent a large commitment to build it from the ground up. The experience of other organizations can provide a valuable roadmap, and useful examples of what works.

But you do need a commitment to the journey that roadmap represents—not just from the technology leadership of your organization, but from everyone.

The essence of MLOps is to integrate technology fully into the business, and that means expectations and responsibilities will span every role. It's vital for the top levels of the business leadership to understand what MLOps is, what it isn't, why it's worth embracing, and what rewards it promises. But that top-level sponsorship is the beginning, not the end, of a process that should bring everyone into a shared understanding.

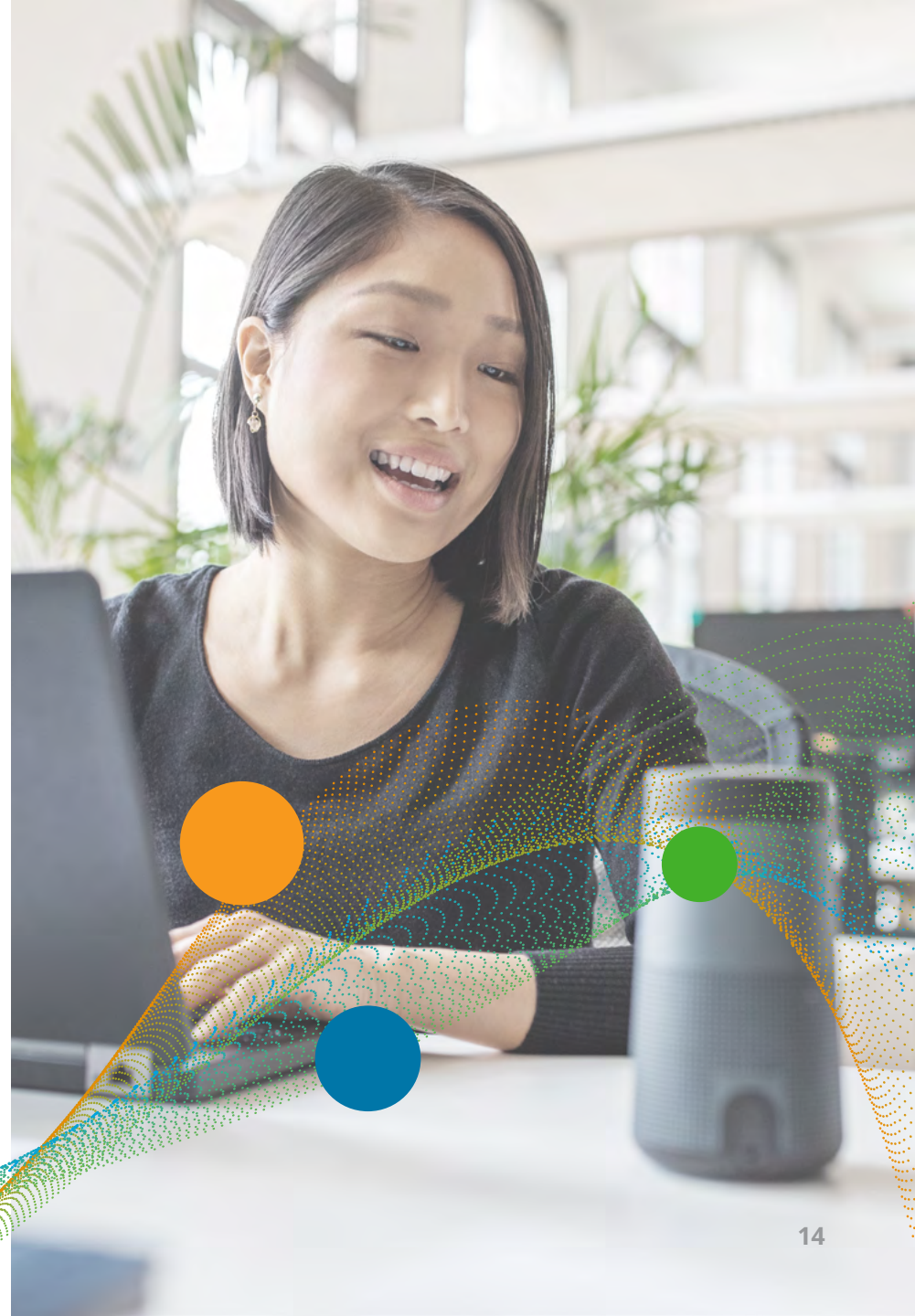
This won't happen overnight. It isn't meant to. The necessary changes are cultural and procedural, and those don't "go live" the way a pure tech installation might. This is a journey.

Conversational AI

Machines have been trying to talk with us for a long time. Touch tones replaced rotary dials about 50 years ago, and soon after, companies started directing people to "press 1" instead of talking to live humans. Voice technology has surprisingly deep roots (a machine called "Voder" dates to the 1930s), but interactive voice response (IVR) as we know it today emerged in the 1980s. Those systems could provide information and they could gather it. But not much in between. Which sets the stage for today's Conversational AI (CAI).

AI-enabled chatbots are becoming widely familiar to consumers who call retailers. But think more widely—for example, about children interacting with a home smart speaker. When someone who doesn't know how to type yet can command entertainment, information, and retail just by speaking out loud, that's a sea change in the ways people and machines interact. CAI is a fast-moving frontier, the latest evolution of the human-to-computer interface, and it's already enriching solutions in the contact center with natural language voice and chat inputs as the new modality for communication. When implemented correctly, CAI allows users to self-service with their own voices.

That potential for AI-driven self-service extends beyond checking the delivery date of a purchase. CAI can bring speed and accuracy to medical triage, account management, workplace training, research, and other more complex tasks. It gives organizations the capability to speed, automate, and scale human-style contact while taking less time from humans, in a way that actually enhances responsiveness and user satisfaction.



What's possible

Whenever machines become capable of a previously human-exclusive operation, it's natural that cost containment is one of the first outcomes that springs to mind: Now we can increase throughput using fewer employees. But CAI is not about replacing human labor. It's about making the digital world bend to the human one by communicating in our language rather than its own.

Like other effective forms of automation, CAI is showing it can augment human capacity rather than replacing it. Organizations and their stakeholders still need people to understand and react to complex and high-impact needs. Only now, they can spend more time doing that and less time chasing lower-order box-check tasks.

The idea that CAI offers a net positive is not limited to the organization that owns it, or to its employees. Customers and other external stakeholders can come out ahead as well, because the "I" in "CAI" delivers so much value. Understanding a question and its context may mimic human capability, but reaching instantly into deep data lakes, cross-indexing with other instances, finding solutions in the moment, and other AI-powered abilities can exceed what humans can do, and these advantages add up to faster, more accurate, more complete satisfaction of whatever need stimulated the interaction in the first place.

And, like other high-capacity data utilities, CAI contributes to continuous, aggregated learning. A human agent can notice a sentiment, a contextual cue, or a relationship between two different data elements—but a CAI system can go further by integrating that information into the knowledge base for use across the organization. Over time, CAI hones its own ability to resolve issues, predict needs, make training more effective, or whatever else the organization asks of it. The result is that, like other AI applications, it becomes more valuable and useful over time with greater use and experience.

What's happening

Because CAI takes place at the interface between humans and machines, honing the machines' capability is only half of the equation. Fortunately, the other half – people's comfort level with CAI and facility with using it—is growing. What started with the basics ("say yes or no" to a phone interface, for example) has evolved to full conversations that may leave humans on one end unaware there isn't another human on the other end. When we grow accustomed to using CAI in more complex ways, our confidence in it—and our expectations for it—grow at the same pace.

Expanding the application of CAI starts with recognizing that it can do more than gather information. It can also detect sentiment, interface in real-time with other sources of information, or guide resolution paths. Can CAI field customer inquiries? Yes, but what about using customer insight to promote products, generate leads, or even make a sales presentation? In addition to receiving complaints, CAI can field surveys. In finance and insurance, it's now possible to initiate claims or score credit requests without taking people's time. Buying a car, prospecting for a home purchase, not only booking but also suggesting travel arrangements, or guiding a rehab patient through a course of therapy—the technology can add value in almost every industry.

Deloitte and AWS are in the thick of this evolution. The AWS Contact Center Intelligence (CCI) suite of solutions allows any organization witha traditional contact center to add AI capabilities to it, without the need for in-house ML capabilities. That opens the door to improving customer experience, boosting agent productivity, and gaining conversation insights with applications such as Self-Service Virtual Agents, Real-time Call Analytics and Agent Assist, and Post-Call Analytics. Deloitte's suite of contact center solutions and accelerators, TrueServe™, offers similar value by tying AI-driven interactions to layered analytics and agent consoles that make both live and automated interactions more data-rich and effective.

Use cases

People in Need

People in Need and other non-governmental organizations (NGOs) working to support thousands of Ukrainian refugees had an overnight need to increase their capacity to respond to calls and manage resources. Built by Deloitte on Amazon Connect, the cloud- based Immediate Refugee Need Assistance solution (IRENA) contact center solution helped these organizations scale up rapidly to speed information, offer translation, secure accommodations, and provide other humanitarian services. The solution is at work across multiple channels to help overcome limited human and technology resources, and has potential to apply elsewhere in the future.

Elevance Health

Elevance Health has solved the problem of encouraging members to take part in their care management program with personalization and nudging through key behaviors, which added immense value to members' health profiles. Elevance Health is building a digital experience center of the future, one that transforms how it engages with its members. This transformation is based on use of AWS services like Amazon Connect, Amazon Pinpoint, and Amazon Personalize. The result is that their solution leverages multi-channel communications backed by personalization via AI/ML services and scalable backend integration services in order to provide a true 360-degree view of members.

What it takes

Every technology depends for its effectiveness on non-technology elements—the people who use it and the processes that govern it. Because the interface between people and machines is the point of CAI, that is especially true in this case. Implementing that insight starts early. Whatever business departments and roles would contribute to planning a traditional stakeholder interface should also have a say in the shape of a CAI system, not only the "technology department."

That integration may sometimes require a deliberate effort to span the organization, because CAI may have taken root in separate silos. Or different functional areas may assume the work is theirs to lead—for example, the web team and the customer service team. De-siloing CAI allows it to serve the organization as a single system that sees across the enterprise.

This should also be a bespoke undertaking. CAI planning begins not with the capabilities available, but with the business needs you seek to address. Whatever manual or legacy processes CAI is meant to replace, make sure you fully understand them. This could be as complex as a medical triage platform or as simple as preventing customers from having to repeat their ZIP codes five times. As a general proposition, low-complexity use cases may be good low-stakes places to earn CAI experience. They can also provide a quicker return on the effort and investment than implementations that take longer to mature.

Amid these details, remember two things: First, there are no absolutes: there will always be a place in the process chain for humans to step in, and a CAI system should preserve a pathway for that escalation, based on clearly defined rules and thresholds. Second, keep the end goal in mind—satisfying, and where possible delighting, the people who come to your door. Virtual or otherwise.

Computer Vision

Eyes are the windows to the… well, let science fiction authors weigh the "soul" of digital technology. Cameras and sensors are familiar in many applications. What we're less likely to see or appreciate is where their information goes and how it's used. Eyes work because they connect to brains, and Computer Vision works because it's integrated into a system of rules, analytics, and applications. That's where raw data turns into insight, context, and control.

That means there are two ways in which Computer Vision can exceed human capability. In gathering visual information, machines can "see" more, not only in detail or speed, but also in wavelengths beyond what humans perceive. That puts heat and radiation on the table along with visible light. Once gathered, that data fuels AI processes that also surpass humans in their speed, accuracy, response time, and ability to bring other data and applications into real-time use.

Harnessed to an enterprise that uses MLOps to tie technology capability to business strategy, Computer Vision offers a new dimension of knowing, deciding, and reacting. As with CAI, its potential uses have few limits beyond the imaginations of the companies that explore it.

What's possible

Wherever "seeing" has advantages, Computer Vision can enhance and automate them, in ways that feed directly into useful insight. Retailers can use it for inventory management—or to gather new customer behavior insights. Ports can monitor and direct traffic—or detect potential dangers. It's because of Computer Vision that self-driving cars are nearing a breakout into widespread use, and why so many cars already offer features such as lane detection and automatic anti-collision braking.

If you've parked in a garage where red and green lights indicate which spaces are open, you've benefitted from Computer Vision. Are people wearing required protective equipment? Does a machine need maintenance ahead of schedule? Is a room packed beyond safe capacity? Are crops infested with pests? Computer Vision never has to blink in making sure.

Don't forget what's possible when Computer Vision trains its sight on static images instead of the world at large. The same capabilities can accurately analyze X-rays, CT scans and MRIs using pattern recognition to ease the workflow burden on radiologists. Such applications may even aid in detecting cancer and other conditions more consistently than humans can. In addition, like CAI, Computer Visions can pair with other AI tools to help personalize interactions, or example through sentiment detection.

What's happening

The value of Computer Vision extends beyond the immediate ability to gather information from the environment. What does that information make possible? For example, an airline might use it across different operational areas; to count passengers in a boarding area, to streamline baggage handling, and to manage tasks like fueling and maintenance. All of which is useful—but what makes it valuable might be the ability to schedule one more flight per day, or to bring more certainty to preflight safety checklists.

In part because sensing technology is becoming smaller and more affordable, and in part because the connectivity and analytics make better use of more data, Computer Vision is also moving toward the edge of computing. What once worked only in a well-equipped plant may now be possible in a field environment, for example.

Another avenue for the growth of Computer Vision has to do with the aims it advances. Process and efficiency aren't everything: Computer Vision can also motivate and inspire. Sentiment detection can be the key to protecting people from online toxicity through better-informed content moderation. Its use to ease identify verification may open access to financial resources to more people, especially in emerging economies. In "hard" and "soft" uses alike, Computer Vision is finding its way fast.

"I've been surprised that this has been much more rewarding and professionally fulfilling than I ever expected. We are watching clients position the next evolution in Computer Vision through use cases that inspire our customers to enable and deliver speed and accuracy. Things that are impacting societal needs—fair access to education, the global economy, and more—are not just a mere device or service!"

—AWS Managing Director

Use cases

The Department of Transport Victoria

Rapid expansion had placed strain on Melbourne, Australia's road network before new infrastructure plans could add capacity. As part of the Smarter Roads Program, digital and data-driven solutions now help make more efficient use of existing assets and promote alternate transport modes. Deloitte's Optimal Reality digital twin platform, hosted on AWS, helps the Department establish scalable, secure, extensible, AI-enabled, real-time transport analytics that inform a decision-making platform. By consolidating more than 20 real-time data sources and 15 million updates per hour into a common operating picture of real-time situational awareness, this platform will help Victoria's transport operations move from a reactive management approach a predictive and proactive one.

AI4Animals

AI4Animals is a custom-built visual surveillance system Deloitte created for a coalition of European animal welfare organizations to provide accountability for humane practices in slaughterhouses. "AI for Animals" uses computer vision at the edge, a web application, and model lifecycle management in one highly secured, managed service. It helps existing camera systems to be more effective by replacing time-limited human monitoring with AI-powered detection of anomalies in the ways people, animals and objects move and interact. A bespoke algorithm presents potential issues on a dashboard so employees can review and address them in real time. The result is more consistent animal welfare and continuous process improvement, at a lower cost than less-effective manual solutions.

"The topic and technologies related to Computer Vision are one of the closest bridges enterprises can take to be a part of predictions described in science fiction. **That can be invigorating to some and entirely frightening to others,** especially since CV will, at some point, change the core of most businesses. Being a part of those conversations is more prevalent than ever before in my experience."

—Deloitte Managing Director

What it takes

Computer Vision is a prime candidate for the breakout from proof-of-concept to operational workhorse. There's too much potential in this technology for it to remain a specialty use case. The key to that breakout is to see beyond seeing—to remember that Computer Vision is more than a camera you plug into a USB port. To drive value into the enterprise, it needs to integrate with the enterprise. For example, this tool can open the door to frictionless retail checkout, but only if it connects with pricing, inventory, and credit card handling systems.

The familiar mantra applies here: Build to needs instead of finding uses for capabilities. Ask yourself: How does this technology fit my current operating model? Should the operating model change to open up this potential? What can I achieve that's worth the cost and effort, and how will I recognize and measure my return? And before we start, can I be sure my architecture and skill sets are ready to support it?

That makes Computer Vision an enterprise decision the COO should weigh, not just a technology implementation for the CTO to oversee. Think of it like any other method of getting things done: It's easy to use, but harder to operationalize in a way that matters.

What lies out of reach?

Little, if anything. AI and ML represent the turning point to a new generation of information technology. The before time—from the first room-sized computers to the present day—was about making machines do machine things in machine-like ways, sometimes with an overlay that looked or sounded human if everything went right.

We're now embarking on a new course of progress with machines that do human-like things in human-like ways and interact with humans on our terms. That is a far greater change than adding or amplifying distinct capabilities within the old paradigm. It's an entirely new playing field, as if navigators had a new dimension to map that wasn't there before. The idea that potential AI- and ML-based innovation knows practically no bounds may be the kind of statement you've heard before in other settings. This time it may actually be true.

Seizing the moment

The next several generations will live with AI/ML all around them. We are the one generation that will shape its growth and define its potential. For each individual organization, today's opportunities extend beyond technology, because the means and the mission are evolving in parallel—you cannot only power up your business, but redefine its purpose and capabilities. Anyplace your organizational vision has been limited by what's possible, AI/ML holds the promise of removing those barriers. What can you do then?

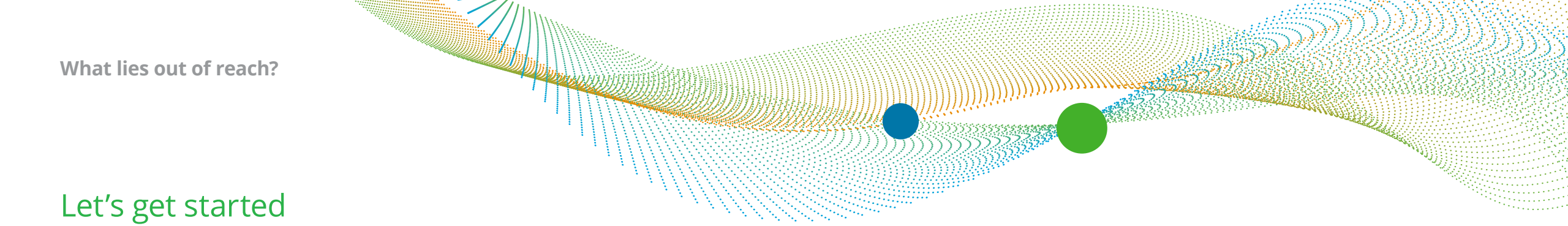
What Deloitte and AWS can do

Answering questions like these, and putting those answers into practice, likely takes you beyond the core mission you got into business to accomplish. You open the doors every day to make and do the things you're known for. So unless AI/ML vision, strategy, and implementation is what you're known for, this is a good place to look for experienced outside help.

Deloitte and AWS have the experience and capabilities to provide exactly that support. You may use the cloud and AI/ML tools, but AWS is the leading provider of those resources.

You may not know our line of business—but as the world's leading professional services organization, Deloitte has deep knowledge of yours. We've combined forces to act as one because our offerings are natural complements to one another. What that can mean for you is an opportunity to work with professionals who have faced before what you're facing now—to knit vision, strategy, business acumen, implementation, governance, and results into a seamless whole whose components complement and inform each other.

Deloitte is the "Undisputed worldwide leader in Industry Cloud Professional Services" and "Leader in worldwide managed cloud security services in the multicloud era" according to IDC, and Gartner's pick as the **"Worldwide leader for public cloud infrastructure managed and professional services."** AWS is IDC's Worldwide IoT applications platform leader and Gartner's "Undisputed leader in cloud services."



Let’s get started

MLOps is foundational to any enterprise AI/ML strategy. Conversational AI and Computer Vision are among the most compelling uses of AI/ML today, but far from the only ones. This is a complex landscape to navigate, but staying home is not an option for most organizations.

That doesn’t mean this technology will make a difference all on its own. To turn its potential into progress, you need a strategy that combines leading-edge technology with a deep understanding of your industry and organization. Not as side-by-side disciplines, but as a single, coherent approach. Together, Deloitte and AWS bring that holistic view to your AI/ML journey.

Deloitte is the world’s leading professional services organization. AWS is the world leader in cloud infrastructure and services. The combined strength of these two leading organizations is to knit vision, strategy, business acumen, implementation, governance, and results into a seamless whole whose components complement and inform each other.

Hundreds of major public- and private-sector organizations have relied on our deep relationship to understand their needs and deliver on them. When the vision for a system and the ability to put it into action flow from one seamless place and inform one another, there are no gaps for anything to fall through.

Your organization can realize the same benefits by making the same call. Whether or not you already work with Deloitte and AWS, we’re ready to bring our combined strengths to your AI/ML journey.

Some of the improvements you’ll see are incremental—faster, better, more. Some of them break entirely new ground to help you answer questions that weren’t even questions until now. Wherever you aim your AI/ML journey, Deloitte and AWS bring AI/ML out of the test lab and into the crucible of everyday accomplishment.

Additional reading

AI4Animals: Improving animal welfare through AI technology
Deloitte Netherlands

How AWS and Deloitte are helping the Port of Vancouver improve supply chain visibilitywith computer vision-based container tracking
AWS/Deloitte Joint Case Study

How NatWest Group built a scalable, secure, and sustainable MLOps platform
AWS Machine Learning Blog

NGOs Help Ukrainian Refugees with Deloitte's Contact Center Solution
AWS/Deloitte Joint Case Study

Public Health Department Tracks COVID-19 Spread with Deloitte and Amazon Connect Solution
AWS/Deloitte Joint Case Study

Reimagining clinical engagement using Amazon Connect
AWS re:Invent 2022 session

State of AI in the Enterprise, 5th edition, 2022
Deloitte

Victoria State Department of Transportation: Smarter Roads Program
smarterroads.vic.gov.au

Western Union: Moving to a Serverless or No Ops Environment
AWS Partner Network TV

Contacts

AWS

Maria Wald
Global Strategic Initiatives Team Principal and Data Analytics AI ML
AWS

Larry Stamm
Head of AI/ML Partner Development
AWS

Deloitte

Diego Saenz
AI Chief Commercial Officer
Deloitte

Frank Farrall
Strategy & Analytics Ecosystems and Alliances Leader
Deloitte

Manoj Suvarna
Managing Director AI Ecosystems
Deloitte

Learn more

Visit

AI/ML with AWS: Are you deriving business value from your investments in artificial intelligence?

As used in this document, “Deloitte” means Deloitte Consulting LLP, a subsidiary of Deloitte LLP. Please see www.deloitte.com/us/about for a detailed description of our legal structure. Certain services may not be available to attest clients under the rules and regulations of public accounting.

This publication contains general information only and Deloitte is not, by means of this publication, rendering accounting, business, financial, investment, legal, tax, or other professional advice or services.

This publication is not a substitute for such professional advice or services, nor should it be used as a basis for any decision or action that may affect your business. Before making any decision or taking any action that may affect your business, you should consult a qualified professional advisor. Deloitte shall not be responsible for any loss sustained by any person who relies on this publication.