

Whitepaper

Business Applications of Artificial Intelligence and Machine Learning

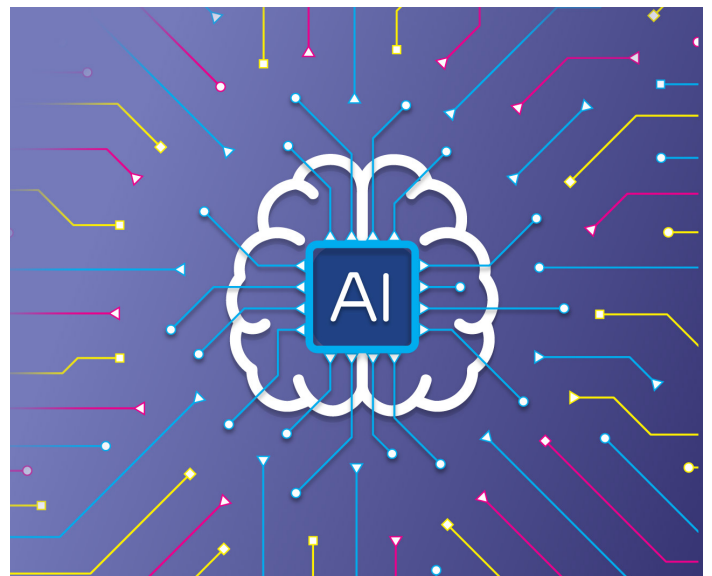
And How to Get Started

Why AI is Booming Right Now

Even though artificial intelligence (AI) isn't a new technology, it may feel new to many consumers because of how much it's popped up in the popular sphere. ChatGPT, Bard, Dall-E, Midjourney, and Stable Diffusion all can create text, images, and even code in various programming languages. As the average user gets more acquainted with AI, businesses that haven't yet climbed on board may also want to jump on the trend.

However, it's important to remember that AI is not just trendy. This technology can make a long-lasting impact on business processes, allowing for greater efficiency, improved product development timelines, better customer experience, and more.

We'll cover what artificial intelligence is (really), how it can evolve your business, and how to choose the right partner to help you implement and manage AI projects.



What is Artificial Intelligence?

Artificial intelligence is a computer science field that is closely associated by the average user with large language models (LLM), but the goals of AI are much broader and long-ranging. Much like the name suggests, AI wants to create intelligent systems that can learn, make decisions, and act autonomously based on the information collected. AI has been applied in many fields, including medical diagnosis, playing games, iterative business processes, and large language models (LLMs).

Machine Learning

Machine learning (ML), while a counterpart of AI, has a distinct meaning. ML focuses on developing algorithms that learn from data without being explicitly programmed. This nuanced understanding sets the stage for exploring the interplay between AI and ML and their collective impact on reshaping business processes.

Large Language Models

Large language models are a popular type of AI system that can write content, answer questions, generate text, and translate languages for end users. LLMs are considered deep learning models and have been trained on massive sets of text and data to respond to prompts.

The History of Artificial Intelligence

The roots of AI can be traced back to antiquity and mythology, where the concept of automation fascinated societies. However, the modern conception of artificial intelligence emerged from science fiction and the fundamental inquiry into whether machines could emulate human thinking. Alan Turing notably proposed tests to assess machine intelligence, laying a foundational framework.

The realization of these theories awaited the advancement of computing technology—specifically, the increased storage capacity and cost-effectiveness of computers. From 1957 to 1974, machine learning algorithms began gaining prominence, unveiling the problem-solving capabilities of computers. Yet, more advanced functionalities, such as language processing and abstract reasoning, remained distant aspirations, requiring further technological progress and exploration.

In the 1980s, more algorithmic tools, increased funds, and the expansion of deep learning techniques allowed AI to develop expert decision-making systems and learn with experience. By 1997, IBM's Deep Blue defeated chess grandmaster Gary Kasparov, a crowning achievement for the technology. Speech recognition via Dragon Systems was also created in the same year.

One of the biggest impediments to AI advancements has been storage and performance. According to Moore's Law, computers will double in speed and memory each year. This will likely mean that progress will step up alongside this incremental increase in power.

Why Are Businesses Adopting AI at a Rapid Rate?

The rapid AI adoption has become a strategic imperative. These are the top reasons why businesses are embracing AI and the opportunities it creates.

Innovation

Time is a precious commodity. AI enables businesses to solve complex problems in a fraction of the time, even uncovering patterns via ML that humans may not notice (or might notice later). Because of this, AI can improve efficiency, enhance decision-making, and create entirely new possibilities across sectors. To innovate well, businesses should think about which problems may be best solved with AI that can learn and respond to a scenario.

ROI

Decreasing the time it takes people to solve complex problems or change course when key patterns are identified is the first way AI can improve return on investment (ROI). Making processes more efficient and cutting out repetitive, manual tasks can lower a business's bottom line, but AI can also identify new growth opportunities. Advanced technology solutions such as AI applications and tools can help businesses serve their customers more effectively, design a better user experience for the internal team, and give birth to new service and product lines.

Increased Employee Productivity

Some employees may feel like AI automation will take over their roles. However, to truly keep up with the pace of technology and innovate most effectively, business leaders should be using AI to reduce repetitive tasks that allow employees to focus on more high-value activities. AI provides a great opportunity for organizations to upskill their employees and allow them to develop the more strategic, creative sides of their work.

Reputation

Customer expectations have transformed dramatically in the last decade. User experience on food service and E-Commerce platforms has shaped expectations in almost every other industry. Industries slower to adapt, such as healthcare, finance, and manufacturing, are feeling increased pressure to innovate. Incorporating AI can help businesses position themselves for digital transformation. This can also boost company growth, improving their reputation to prospective hires and new customers alike.



Better Performance for Internal IT and External Products

AI can bring about performance boosts that benefit the internal and external teams equally. Internally, the IT team can use AI to optimize systems, enhance performance, and streamline operations. They can also use AI to develop external products to meet growing expectations and improve customer experiences.

While all these benefits can drive growth and opportunity for a business, they're not without their challenges. Organizations feeling the pressure to adopt and implement advanced technology solutions may not know where to turn first, or where to find support to develop internal programs.

New technology also brings about new security concerns: How do we know that AI is safe and not exposing our company to unnecessary risks? There may have even been a pilot program in the past that failed, making key stakeholders tentative about starting a new AI attempt. In most cases, the benefits far outweigh the drawbacks, but it's important to understand the use cases and how to start your journey to AI to make the endeavor as successful as possible.

How Does AI Benefit Businesses?

Insights from Data

Predictive analytics, machine learning, and other AI methods are used to identify trends, clusters, and other patterns in data. While humans can process data and identify trends, unearthing patterns can take hours of manual coding and months or even years

of observation. AI can augment or, in certain instances, automate the decision-making process, cutting down on significant chunks of time.

Other insight areas can also benefit from AI, including optimization models, forecasting, personalization, or even fraud detection.

User Experience Improvements

Conversational bots have been around for decades but today, businesses should think about how to use natural language processing (NLP) techniques to build conversational platforms that can significantly assist in customer service. Chatbots can help customers get to where they need to go by accessing a large repository of data and learning from interactions over time. NLP can also be used to measure sentiment and sympathetically respond to unhappy customers. User experience can also be improved by collecting visual and biometric information. For example, smartphones can collect information about browsing history and location to deliver more relevant results. Sensors in stores can track customer movement and provide customized recommendations. This multisensor input can improve internal controls and boost the experience for the user.

Process Improvements

Process improvements use a combination of techniques to improve or automate a task or application in the process of a business, either based in software or physical processes. AI embedded in business applications can optimize the supply chain, reduce redundancies on the production line, or predict when equipment needs to be maintained before a more urgent repair is necessary.

Artifact Creation

LLMs have exploded the capabilities of AI. Foundational models in general have allowed AI techniques to reach new scales across wide varieties of content. Large language models have allowed for the creation of artifacts in text, audio/visual, programming, data assets, designs, and learning methods. As we see Moore's Law continue, the capabilities for artifacts will also grow.

Top Use Cases for AI (General)

- **Chatbots:** Chatbots can answer questions for customers, deliver personalized topic results, answer empathetically to customer concerns, and proactively suggest directions based on past customer behavior.
- **Virtual assistants:** Virtual assistants can organize calendars, schedule meetings, create templates, field common tasks, and more.
- **Predictive maintenance:** Before a machine has a chance to break down, predictive maintenance can suggest ameliorative measures to keep operations running smoothly.
- **Marketing content generation:** AI can learn from past created content and generate new pieces on-demand. Outlines, full drafts, and marketing plans can be generated from a few prompts.
- **Product development:** Market trends, customer feedback, and competitor products can all tell businesses a lot about what new products can sell. AI can analyze these trends and compile recommendations to speed up the product development process.
- **Security/fraud detection:** Bad actors can have patterns that take a while for humans to recognize, if at all. Security and fraud detection can pick up on subtle clues that someone is trying to infiltrate, deterring cybercrime before it proliferates.



- **Customer segmentation:** Unless your business sells one type of product or service, chances are, your customers belong to different segments and have different interests and motivations for coming to your business. Segmenting your customers and delivering personalized experiences can cut down on irrelevant content, improve their experience, and grow your sales.
- **Demand forecasting:** Data coming from social media, surveys, and product reviews can help predict what customers will like next and what they prefer from your current offerings.
- **Big data analytics:** AI can speed up the data preparation and visualization process, employing predictive modeling and taking on other complex analytical processes automatically to help companies reach the insights phase much faster.

Specific AI Use Cases by Industry

Healthcare

- Diagnostics and medical imaging analysis: Achieving faster and more accurate diagnoses.
- Drug discovery and development: Accelerating development for new drugs based on previous data.
- Personalized medicine and treatment plans: Customizing doses, medication types, and treatment approaches based on patient history.
- Health monitoring and predictive analytics: Identifying potential problems earlier in the disease process.

Finance

- Fraud detection and prevention: Reducing the likelihood customers need to file claims.
- Algorithmic trading and portfolio management: Analyzing past performance without human bias to make trading suggestions.
- Credit scoring and risk assessment: Cutting down the time between application and approval.
- Customer service and chatbots for banking: Routing customers to the right departments without being put on hold.



Retail

- Demand forecasting and inventory management: Reducing the likelihood of over- or under-ordering.
- Personalized shopping: Giving customers a concierge shopping experience.
- Price optimization: Targeting the exact amount that will result in "Add to Cart."
- Customer service through chatbots: Resolving issues in a quicker amount of time, freeing up people for more complex cases.
- Behavioral analysis: Understand the "why" behind the buy.

Manufacturing

- Predictive maintenance to reduce downtime: Make small fixes to save time on larger repairs later.
- Quality control and defect detection: Spot small issues that can be missed by the human eye.
- Supply chain optimization: Improve routes to save on time, money, and resources.
- Process automation and optimization: Find efficiencies in every step of the production and delivery process.

Automotive

- Autonomous vehicles and self-driving technology: Huge processing power is required to operate on the road safely.
- Predictive maintenance for vehicles: Prevent exorbitant bills from vehicle breakdowns by spotting problems on the horizon.
- Traffic management and route optimization: Cut down on traffic jams through smart routes.
- Driver assistance systems: Enhance safety and driver comfort using computer vision and algorithms.

Education

- Personalized learning paths: Learn at your pace with topics tied to your interests and goals.
- Intelligent tutoring systems: Employ effective teaching styles to reach students.
- Automated grading and assessment: Use language processing tools to cut down on grading and assessment times.
- Educational content recommendation: Based on previous educational content, receive targeted recommendations for future learning.

Telecommunications

- Network optimization and predictive maintenance: Prevent outages and spot problems early.
- Fraud detection and security: Identify bad actors and shut down strange behavior.
- Customer service and support: Use AI-powered chatbots and virtual assistants for inquiry resolutions.
- Predictive analytics for service quality: Proactively identify and resolve service issues.

Marketing

- Customer segmentation and targeting: Gear your messages to more specific audiences to speak directly to them.
- Content recommendation and generation: Give users more of what they're looking for based on their reading and viewing history.
- Sentiment analysis and social media monitoring: Discover how people really feel about your business without manual coding.
- Ad campaign optimization: Improve and iterate on what's already working, and shift gears more quickly for what isn't.

Human Resources

- Recruitment process automation: Find your ideal candidates and line up interviews before sending a single manual email.
- Employee engagement and retention: Improve employee morale and reduce turnover by performing sentiment analysis and automating the feedback process.
- Performance analysis and feedback: Use collected data to share insights on past performance and growth opportunities.
- Predictive analytics for workforce planning: Know exactly who you need and what shoes they need to fill.

Cybersecurity

- Threat detection and prevention: Stop cybercriminals in their tracks with predictive analytics.
- Anomaly detection in network behavior: Flag behaviors that are atypical to prevent potential infiltrations.
- User authentication and access control: Use rulesets to provide dynamic access to your workforce.
- Security incident response and investigation: Uncover activities and patterns of behavior tied to security events for prevention, mitigation, and action.

Energy

- Smart grid management and optimization: Run power grids based on more accurate demand numbers, optimizing based on expected behaviors.
- Predictive maintenance for equipment: Prevent critical failures by pinpointing opportunities for preventative repair.
- Energy consumption optimization: Starting with usage patterns in buildings, leverage algorithms to recommend personalized strategies that help save on energy costs.
- Renewable energy forecasting: Efficiently integrate renewable energy into the grid by predicting the availability of renewable resources.

Real Estate

- Property valuation and price prediction: Automate the valuation process based on a large set of sales history and other location-based data.
- Predictive maintenance for buildings: Use sensors to find potential infrastructural issues.
- Chatbots for customer inquiries: Answer tenant and buyer questions 24/7, escalating where needed.
- Automated document analysis: Streamline tasks by identifying key information in documents and using it for administrative purposes and business strategy.

Where to Start Your Journey to Adopting the Right AI Solution

As evidence, there are countless opportunities to incorporate AI into any industry. To continue focusing on innovation and maturation in the world of AI, businesses don't just need a partner in place, they need the right partners.

It's all too easy to say "We need AI!" without thinking about specific use cases. Like any new technology or process, AI can have pragmatic use cases and impractical ones. Organizations need to spend time thinking about how AI can improve their current operations and customer experiences, only then selecting the platform to implement it. Adding AI to your current structure needs to answer this question: How does this effort relate to the other workloads within our environment?



Using Professional Services to Build Out an AI Solution

Having experts in your corner can mean people who are ready to help your team address your evolving AI needs. Expertise can look like consulting, solution design, and migration services, among other things. Depending on which gaps you're looking to fill, a good partner can offer one or several of the following:

Certifications in Data/AI

As the AI landscape changes, certifications are emerging and will continue to take shape. Some popular certifications in data science and big data include:

- Certified Analytics Professional (CAP)
- IBM Certified Data Science Professional Certification
- Google Data Analytics Certification
- Microsoft Azure Data Scientist Associate
- Data Science Council of America (DASCA) Principal Data Scientist (PDS)

Machine learning certifications can include:

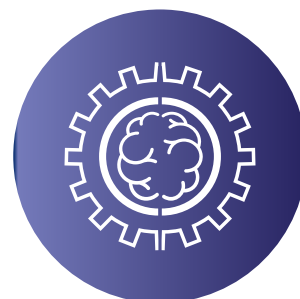
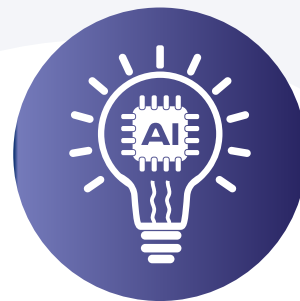
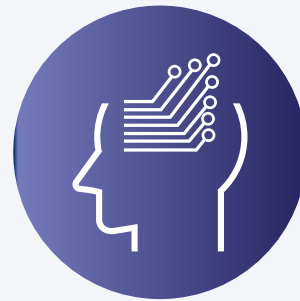
- TensorFlow Developer Certificate
- AWS Certified Machine Learning
- Microsoft Azure Data Engineer Associate
- Google Cloud Certified - Professional Machine Learning Engineer

Emerging AI certifications include:

- Certified Artificial Intelligence Engineer (CAIE)
- Microsoft AI Azure Associate
- Google AI Certification
- IBM AI Foundations

AI experts of all kinds have access to specialized knowledge and experience that can offer valuable insights and advice to companies on how they can best leverage AI technology to advance their business goals.

Partners with these capabilities can help you advance your project-based AI initiatives.



Leverage the Public Cloud to Implement AI

Maybe you want to work with a partner to help you integrate AI into your cloud infrastructure. If you're not sure where to start, identify a partner who has the following skills:

- Deep cloud experience with AWS certifications and Azure certifications: These are two major public cloud platforms. Official certification paired with professional experience can help you understand what different partners can do in terms of public cloud migration and AI integration.
- A blend of multiple types of cloud to achieve better agility and business results: Most organizations will be best served through multicloud or hybrid cloud. Multicloud includes a mix of public and private cloud solutions, and hybrid goes one step beyond that to include on-premises infrastructure. Cloud experts can help you understand the best venue for each workload requirement, whether that's public or private, and how you can get your workloads operating together seamlessly. Pros who have deep hybrid experience and expertise are going to prove the most valuable.

Paving the Path to AI-Driven Success with TierPoint

Navigating the complex landscape of AI adoption and steering toward digital transformation can be a daunting task, often

leaving companies uncertain about the right starting point. TierPoint can guide your company from AI contemplation to a reality where AI resides at the heart of your business processes.

Cloud-Enabled Innovation: At TierPoint, we empower companies to soar with cloud-enabled innovation, leveraging cloud technologies to cultivate new ideas, products, and services. Partnering with TierPoint brings you a host of professional services benefits:

- Certifications in Data and AI: Investing in a commitment to stay at the forefront of industry standards.
- Specialized Knowledge and Expertise: Derived from decades of industry experience, guiding you to harness AI technology effectively.

Managed Cloud Services: TierPoint's Managed Cloud Services deliver a suite of benefits designed to enhance your cloud experience:

- Deep Cloud Expertise: Over 80 AWS Certifications and 160+ Azure Certifications, ensuring success in your cloud migration and integration projects.
- Optimal Cloud Venue Selection: Expertise in determining the best cloud venue for each workload requirement.
- Hybrid Flexibility: The ability to seamlessly integrate multiple cloud types for enhanced agility and business results.



Embark on the Journey of Cloud-Enabled Innovation

Partner with TierPoint's Professional Services and Managed Cloud Services to embark on a journey of Cloud-Enabled Innovation. Discover the transformative power of AI as our experts leverage specialized knowledge to identify pragmatic use cases, select the right platform, and implement solutions tailored to your unique business challenges. Stay competitive, drive growth, and refine your approach to unlock the full potential of AI in generating new ideas, products, and services for your organization.

Contact us today to learn more about how TierPoint can be your catalyst for AI-driven success.

Call: **877.859.TIER (8437)**
E-mail: **sales@tierpoint.com**
Visit: **[tierpoint.com](https://www.tierpoint.com)**