

# ARTIFICIAL INTELLIGENCE IN EVERY SECTOR

Artificial intelligence is a powerful tool we use every day to solve complex problems. Although most people are familiar with the term “AI,” they might not realize it’s already affecting industries across the globe, transforming people’s lives in incredible ways. From helping farmers protect their crops, to supporting the development of safer cities and enabling researchers to find the next medical breakthrough, AI is contributing to a better world, today.

## Improving Healthcare and Quality of Life

The rapid digitalization of health information has created tremendous opportunities for AI to transform how clinicians care for patients, how consumers manage their health, and how researchers find breakthroughs in the treatment and prevention of diseases.

### Discovering Rare Disease Breakthroughs

Powerful software is enabling researchers to discover treatments for rare diseases for which no current treatments exist. The complexity of biological data related to uncommon diseases requires the ability to analyze massive sets of information to discover and develop treatments. Companies like Recursion Pharmaceuticals combine advances in machine learning to run experiments and perform analysis on hundreds of samples, looking at existing drugs and known compounds for potential treatments. Using machine learning software from Splunk, Recursion aims to discover treatments for 100 genetic diseases by 2025.

### Supporting Healthcare Professionals

AI extends clinician capabilities, helping doctors sift through massive amounts of data and cross-reference with their patients’ medical records. Providers can then generate detailed reports tailored to specific patients with suggested treatment plans, supporting rationales, survival rates, and possible side effects. This greatly

reduces physician workloads and improves patient communications by providing the data and case studies needed to make informed decisions.

### Advancing Accessibility

For people with visual impairments, AI is turning the visual world into an audible experience. Microsoft’s Seeing AI app helps people who are blind or visually impaired recognize objects, people, and text via a phone or tablet’s camera and describes what it recognizes to the user. With this new layer of information, users can experience increased independence in their lives.

## Bolstering Security

While data security has become core to the management of most organizations, cyber threats continue to evolve at a breakneck pace. AI helps organizations stay a step ahead of hackers by predicting potential attacks, mitigating attacks in real-time, managing access to resources, and encrypting sensitive data.

### Combatting Online Fraud

AI is helping businesses protect against online or card-not-present credit card fraud. With CA Technologies’ Risk Analytics Network, which combines machine learning, neural network models, and behavioral analytics, businesses can detect and block online fraud attempts in five seconds, on average. The solution can help reduce the losses attributed to online fraud by 25 percent.



AI could contribute up to **\$15.7 trillion** to the global economy in 2030, according to a recent PricewaterhouseCoopers report.

### Benefiting Cybersecurity Teams

According to IBM, security analysts would need to read 60,000 blogs per day just to stay current. What's more, enterprises can be hit with up to 200,000 security events each day. IBM QRadar Advisor correlates large volumes of data with network activity to identify malicious files and suspicious IP addresses easily missed by humans due to the sheer volume. It adapts based on 15,000 new documents a day, so security professionals can confidently identify and eliminate threats faster than ever before.

### Enabling Fast Action Against Threats

Oracle software uses machine learning to forecast, detect, prevent, and respond to threats automatically, as well as correlate and distill vast amounts of security event data into actionable intelligence. This enables enterprises to take swift action to resolve cybersecurity threats.

### Protecting Against Mobile Attacks

Skycure, a Symantec company, has built an intelligence engine that analyzes millions of apps, networks, and devices to identify advanced exploits and predict mobile attacks before they can have an effect.

### Building a 21st Century Infrastructure

Whether it's creating smarter and safer cities by integrating sensors in bridges and highways to monitor their safety or increasing efficiency by cutting travel time and fuel expenses, AI has an instrumental role to play in creating an infrastructure designed for the 21st century.

### Assessing Construction Sites

Autodesk's Project IQ uses machine learning to automatically identify construction quality and safety issues that pose the biggest risk to a project at any given time. This enables teams to act quickly, prevent catastrophes, and avoid downstream problems that create cost issues and schedule delays.

### Identifying Maintenance Needs

Building information modelling, or BIM, technology companies are using AI to identify maintenance issues before it's too late. Bentley Systems uses deep learning

technology to automatically detect and quantify cracks in infrastructure projects, making it much quicker and easier to pinpoint problems earlier and prioritize maintenance tasks.

### Advancing Power Grid Reliability

Power grid infrastructure is becoming increasingly complex. Power producers, grid operators, utilities, industrial companies, and municipalities all need to manage tasks efficiently while delivering power safely and reliably — despite increasing technological complexity. AI is helping make power grids smarter. Siemens' automation and smart grid technology is helping us control and monitor electrical networks so that it's easier to classify and localize disruptions in the grid.

### Accelerating Education

AI applications are enabling personalized resources, adaptive learning programs, digital tutoring, curriculum recommendations, and more. There are more digital resources available to instructors and students than ever before, and AI is affording them the ability to quickly and easily access relevant tools. What's more, software streamlines burdensome administrative processes.

### Enriching Math Education

Educators are using IBM's Teacher Advisor With Watson AI to access the math resources they need in seconds, including proven lesson plans, activities, standards information, and teaching strategies for students with varying degrees of preparation and ability. This can save valuable time for teachers throughout the school year.

### Tailoring Workplace Learning

Employers are using Workday Learning, an application that uses machine learning to personalize workplace learning for individuals, to recommend professional development content and courses based on employee position, tenure at the company, interactions with the content, and other factors. This helps companies adjust learning strategies and programming to ensure employees learn new skills, continue to grow in their roles, and prepare for new challenges.

## Boosting Efficiency of Public Services

Citizens rely upon government services for safety and protection. To make these services as efficient and effective as possible, the public sector needs intelligent applications that improve its ability to respond to and anticipate the needs of constituents.

## Identifying Callers in Cardiac Arrest

When a person experiences cardiac arrest outside of the hospital environment, time is critical. In Copenhagen, emergency dispatchers can identify cardiac events with an AI assistant called Corti. This new tool uses machine learning to analyze the caller's words and other background sounds that may signal a heart attack, enabling dispatchers to talk to someone on the phone through CPR or prepare first responders before their arrival.

## Preventing Car Accidents

India has one of the highest road accident rates in the world. To make the country's roads safer, India's Institute of Driving and Traffic Research is using an AI solution from Microsoft, Harnessing AutoMobiles for Safety (HAMS), in its driver instruction courses. HAMS uses a smartphone mounted on the car's dashboard to record both the driver and a view of the road. After every session, instructors use a detailed analysis from HAMS to provide actionable feedback, improving driver discipline and boosting road safety.

## Improving Agricultural Practices

Increases in air temperatures, changes in precipitation levels, pests, and crop diseases are all factors that can greatly affect the agricultural community and expose farmers to significant risks. AI can help many farmers across the globe gain greater control over the growing process, from planting times and crop monitoring to more advanced applications such as price forecasting.

## Improving Land Management

Precision agriculture firms are using MathWorks to analyze images captured by drones, airplanes, and satellites, and develop algorithms that provide farmers with insights into their crops. For example, spotting weed outbreaks in the field is difficult, since the undesirable plants often look like the actual crop. AI can detect and diagnose the onset of weed infestations from aerial imagery using computer vision and signal processing algorithms. This not only

saves the farmers time locating and diagnosing the type of weed, but also enables the farmers to treat only the affected location rather than broadly spraying the entire field.

## Enhancing the Customer Experience

For businesses with large customer bases that are processing a high volume of purchases — such as banks, restaurant chains, and large retailers — analyzing the massive amount of data collected every day is impossible without the computing and predictive power of AI. By using machine learning tools, businesses across a wide range of industries can analyze customer preferences and their own business performance to improve end-user experiences and increase efficiencies. Software also helps businesses generate optimal product designs by using data to produce and analyze far more iterations than humans alone could create.

### What is AI?

**Artificial Intelligence:** Any technique that enables computers to mimic human behavior using logic, if-then rules, or machine learning.

**Machine Learning:** A subset of AI that uses statistical methods to enable machines to improve outcomes with experience.

**Deep Learning:** A subset of machine learning that enables software to train itself to recognize patterns by exposing multi-layered neural networks to vast datasets.

**Algorithm:** A set of sequential steps and directions that turn data inputs into desired outputs. Learning algorithms learn from datasets and instructions to recognize patterns, allowing them to optimize results and delivery.

More at [software.org/AI](https://software.org/AI)

## Creating Better Product Designs

AI can help designers create hundreds of design options from a single idea, enabling unexpected product designs. For example, Airbus used Autodesk's design software to generate a bionic airplane partition that saves fuel and reduces carbon emissions. The Airbus engineering team produced more than 10,000 design options for the partition, used big data analytics to narrow the number of iterations, and decided on a final, best-performing design for production.

## Delivering the Best Tax Return

Preparing taxes involves massive amounts of data that affect tax returns, from thousands of pages of federal tax code to yearly law changes. H&R Block teamed with IBM Watson to analyze and interpret that data, thereby helping tax professionals find every deduction and credit for their customers and ensuring the best possible return.

## Highlighting Favorite Products

Salesforce Einstein, a layer of AI built into the Salesforce customer relationship management (CRM) platform, provides predictions and recommendations based on businesses' unique processes and customer data. For example, e-retailers can also use Einstein to determine what products and deals to offer, as well as help shoppers find what they're looking for faster, boosting revenue.

## Bringing Fans to the Front Row

AI is helping enhance the fan experience. Dutch sports analytics startup SciSports uses deep learning technology from SAS for real-time tracking of passing precision, player speed, and jumping strength. Fourteen cameras placed around a stadium record every movement on the field, providing 3D data that is used to deliver a more complete game view. Fans can experience the game from any angle using virtual reality, and coaches can better determine in-game strategy.

## Touching Up Photo Editing

Adobe incorporates AI into its photo editing software, helping photographers and graphic designers save time and deliver products faster. By analyzing thousands of professionally edited shots, AI can suggest edits to improve toning and lighting — an extra boost for newcomers still developing their skills. Adobe Photoshop also uses AI to select the subject of a photo with just one click, saving designers from having to carefully cut around the object manually.

## Assisting in Times of Crisis

What if we could stop the next epidemic before it happens? Or completely assess the damage from a hurricane within 30 minutes of it ending? In times of humanitarian crises, fast response is essential. Researchers are developing ways to use AI to help first responders in the critical hours and days after a natural disaster, and to track pathogens that could lead to outbreaks of disease and mitigate the spread.

## Stopping Infectious Diseases

Researchers at Microsoft are working to develop algorithms that can analyze DNA collected from mosquitoes to detect all pathogens that could lead to infectious diseases. This information would help public health organizations predict outbreaks earlier, and plan and target their responses sooner, saving precious time and manpower.

## Speeding Up Disaster Response

Researchers have also started to integrate deep learning into disaster simulations to create optimal disaster response strategies. For example, The World Bank, in collaboration with WeRobotics and OpenAerialMap, rapidly processed real-time aerial imagery of a disaster area to provide first responders and aid agencies with critical information to support relief efforts.

→ We live in a remarkable time in which rapid technological advancements are changing our perception of what is possible. Yesterday's far flung ideas are quickly becoming today's realities, thanks to AI. With so many accomplishments already, AI is actively powering new discoveries, spurring innovations, and transforming the way we work and live today.