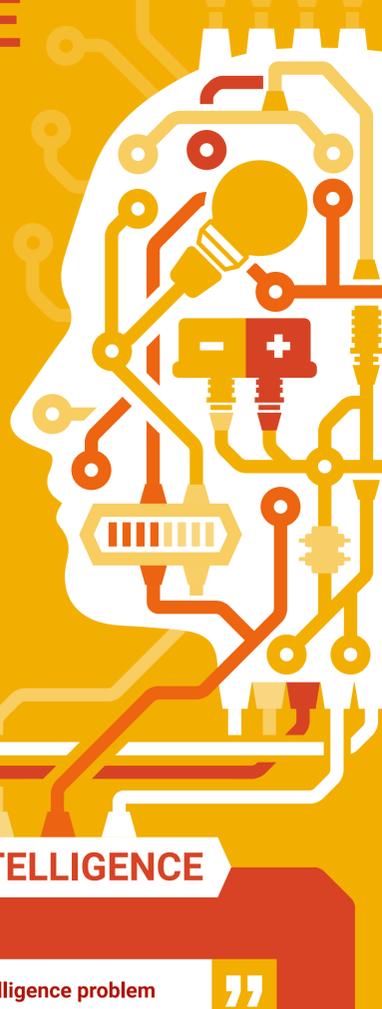


AI, MACHINE LEARNING, & ROBOTS

There is a lot of buzz around the emerging technologies of artificial intelligence and machine learning – so much so that these terms often get used interchangeably. Even “robotics” gets thrown in the mix. But what does each really mean, and how are they related?

And, most importantly, how are companies using these technologies to transform existing processes and create unparalleled user experiences?



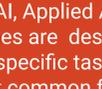
ARTIFICIAL INTELLIGENCE

“For the present purpose the artificial intelligence problem is taken to be that of making a machine behave in ways that would be called intelligent if a human were so behaving.”

John McCarthy, American computer scientist and cognitive scientist who coined the term, “artificial intelligence” in 1956

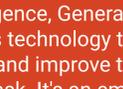
In simplest terms, artificial intelligence is a broad term that describes machines programmed to think, work, and react like humans. AI can be classified two ways based on the sophistication of the technology:

APPLIED AI



Sometimes referred to as narrow or weak AI, Applied AI is when machines are designed to manage specific tasks. This is the most common form of AI we see today, such as software designed to recognize images or trade stocks.

GENERALIZED AI



Also known as artificial general intelligence, Generalized AI covers technology that can evolve and improve to handle any task. It's an emerging area of AI, and it brings us to machine learning.



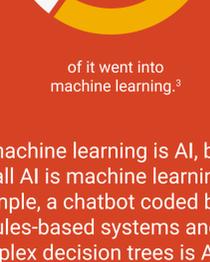
MACHINE LEARNING

“The ability to learn without being explicitly programmed.”

Arthur Samuel, pioneer in computer gaming and artificial intelligence, who coined the term “machine learning” in 1959



Of the billions of dollars invested in AI last year,



Machine learning is a subset of AI – it is one way of achieving artificial intelligence.

Machine learning is the science of training devices or software to perform a task and improve its capabilities by feeding it data and information so it can “learn” over time.

All machine learning is AI, but not all AI is machine learning. For example, a chatbot coded based on rules-based systems and complex decision trees is AI, but not machine learning. A chatbot designed with machine learning capabilities would be able to learn new terms and questions and adapt to serve up the most appropriate answers.

DEEP LEARNING



Deep learning is a subset of machine learning.

Typical machine learning needs to be told how to make an accurate prediction using the data it is fed. In contrast, deep learning is designed to function like the human brain, using algorithms called an artificial neural network (ANN) to process information like a human would.

AI IN ACTION

AUTO

Helping autonomous cars make safer decisions on the road



EDUCATION

Adapting learning content based on a student's interactions, achievements, and emotions to help them learn better and faster



RETAIL

Predicting the product customers are going to buy next before they encounter it



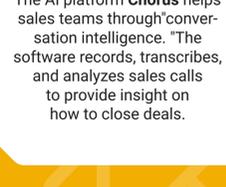
MANUFACTURING

Tracking factory production to alert humans about fixes and errors



FINANCE

Sorting through vast amounts of real-time data to predict the most effective trades



The AI platform **Chorus** helps sales teams through conversation intelligence. “The software records, transcribes, and analyzes sales calls to provide insight on how to close deals.”



Amazon's recommendation engine learns the products that appeal to each buyer and relies on its algorithm to crunch the data and suggest new items to purchase.

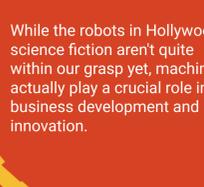


Portfolio management software such as **Betterment** or **Wealthfront**, maximizes investment gains based on users' financial goals and desired level of risk, while adapting to real-time market changes.

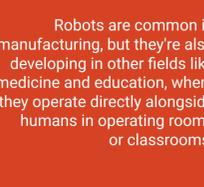
ROBOTICS

Even the term “robotics” gets used under the artificial intelligence banner, but not all robots are “smart.” A robot is a machine that does work by itself, but not all robots are “smart.” A robot is a machine that does work by itself, but not all robots are “smart.”

Some robots may be programmed to perform the same tasks over and over without any “intelligence” built in.

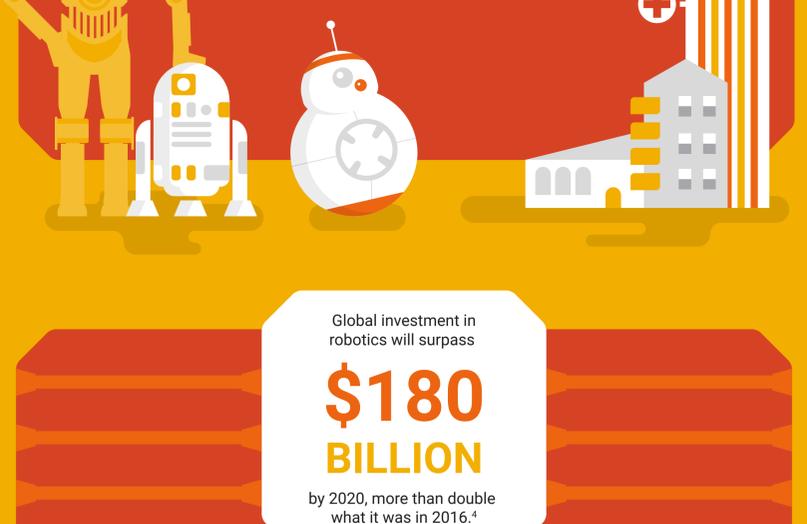


Smart robots can be trained to carry out complex tasks that require more thought and adaptation.



While the robots in Hollywood science fiction aren't quite within our grasp yet, machines actually play a crucial role in business development and innovation.

Robots are common in manufacturing, but they're also developing in other fields like medicine and education, where they operate directly alongside humans in operating rooms or classrooms.



Global investment in robotics will surpass

\$180 BILLION

by 2020, more than double what it was in 2016.⁴

Artificial intelligence and machine learning can power robots to complete important tasks. And the rise of collaborative robotics has opened up new possibilities for humans to work alongside robots to maximize efficiency.



Avitas Systems, launched by GE Ventures, uses robots to inspect areas in oil and gas facilities that are high up or exposed to extreme temperatures, making the process safer for humans.⁵



Task Force Tips Inc., a fire-hose nozzle manufacturer, designed a vision-guided robot that hands off half-finished valves to a second robot that feeds it into the final processor. Workers who used to hold this role have been trained as technicians for these AI robots, which has boosted productivity.⁶



At the **Ford Fiesta** plant in Germany, humans work side by side with AI robots on tasks like fitting shock absorbers into wheel arches to make sure all vehicles are safer and up to code.⁷

By 2020, there will be more than

40,000 collaborative robots helping businesses around the world.⁸

That is more than **4X** what it is today.



Sources: 1. 2017, April 25. "PwC Release Report on Global Impact and Adoption of AI." Retrieved from https://www.pwc.com/us/en/press-releases/2017/report-on-global-impact-and-adoption-of-ai.html. 2. Abou, Shabana. 2016. June 23. "Recommendation Engines: How Amazon and Netflix Are Winning the Personalization Battle." Retrieved from https://www.martechadvisor.com/articles/customer-experience/recommendation-engines-how-amazon-and-netflix-are-winning-the-personalization-battle/. 3. 2017, June. "Artificial Intelligence: The Next Digital Frontier." Retrieved from http://www.mckinsey.com~/media/McKinsey/Industries/Advanced-Technology/Articles/Next-Digital-Frontier/Artificial-Intelligence-Discussion-Paper.pdf. 4. 2017, January 10. "Worldwide Spending on Robotics Will Reach \$198 Billion in 2020 Fueled by New Use Cases and Expanding Market Acceptance." Retrieved from https://www.idc.com/getdoc.jsp?containerId=pr1701317. 5. Kelley, Tomas. 2017, June 13. "How Company Will Use Drones, Crawling Robots, AI and Predictive Analytics To Inspect Hard-to-Reach Places?" Retrieved from https://www.gi.com/insights/portable-company-will-use-crawling-robots-ai-predictive-analytics-inspect-hard-to-reach-places/. 6. Black, Thomas. 2017, May 10. "Cheap Robots Are Helping Small Businesses Succeed." Retrieved from https://www.entrepreneur.com/resources/2017/05/10/cheap-robots-are-helping-small-businesses-succeed/. 7. Zaslavsky, Aron. 2016, October 31. "Man and Machine: The New Collaborative Workplaces of the Future." Retrieved from https://www.cnn.com/2016/10/31/tech/ai-jobs-and-factory-workers-ai-robotics-festa-plant/index.html. 8. 2015, July 7. "Collaborative Robotics Market Will Exceed \$1bn by 2020." Retrieved from http://investorcontrols.com/news/industry.php?id=4852:CollaborativeRoboticsMarket...will-exceed\$1bn-by-2020.html