



The Future of Machine Learning and Artificial Intelligence

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Machine Learning, Machine Intelligence

What is intelligence? The ability to acquire and apply knowledge and skills. Intelligence is the ability to adapt to change

What is machine intelligence?

Providing computers the ability to learn without being explicitly programmed:

Involves: programming, computational statistics, mathematical optimization, image processing, natural language processing, etc...

Conquests of machine learning

1952 Arthur Samuel (IBM): First machine learning program playing checkers Arthur Samuel coined the term "machine learning"

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1997 IBM Deep Blue Beats Kasparov:

First match (1996 Nov): Kasparov–Deep Blue (4–2)

Second Match (1997 May): Deep Blue–Kasparov (3½–2½)



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It's a 4-letter term for a summit; the first 3 letters mean a type of simian : Apex

4-letter word for a vantage point or a belief : View

Music fans wax rhapsodic about this Hungarian's "Transcendental Etudes" : Franz Liszt

While Maltese borrows many words from Italian, it developed from a dialect of this semitic language : Arabic



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2014 Deep face algorithm Facebook

Reached 97.35% accuracy

Human performance is around 97%

Who's in These Photos?

The photos you uploaded were grouped automatically so you can quickly label and these pictures. (Friends can always untag themselves.)



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2016 Alpha go: deep learning

Fan Hui (5-0)

Lee Sedol (4-1)

99.8% win rate against other Go programs



AI will impact employers before it impacts employment

Most people have heard that AI beat the worlds greatest grandmaster in chess. But not everyone knows what can usually beat an AI chess master: a centaur, or human and AI playing chess as a team. The human receives advice from an AI partner but is also free to override it, and its the established process between the two that is the real key to success.

This unparalleled combination will become the new normal in the workforce of the future. Consider how AI is enhancing the product design process: A human engineer defines a parts materials, desired features, and various constraints, and inputs it into an AI system, which generates a number of simulations.











AI will come down to earth and get to work

There are plenty of publications promising an AI-powered future that will look like magic: fleets of autonomous cars that never crash or encounter traffic jams, robot doctors that diagnose illness in milliseconds, and smart infrastructure that optimizes flows of people and goods and maintains itself before repairs are ever needed. All that may come but not in 2018.

AI will come down to earth and get to work

Where industries will put practical AI to work

Ranking of AI impact by its potential to free up time, enhance quality, and enhance personalization

Ranking	Industry	High-potential use cases
 1	Healthcare	<ul style="list-style-type: none">Supporting diagnosis by detecting variations in patient dataEarly identification of potential pandemicsImaging diagnostics
 1	Automotive	<ul style="list-style-type: none">Autonomous fleets for ride sharingSemi-autonomous features such as driver assistEngine monitoring and predictive, autonomous maintenance
 3	Financial services	<ul style="list-style-type: none">Personalized financial planningFraud detection and anti-money launderingAutomation of customer operations
 4	Transportation and logistics	<ul style="list-style-type: none">Autonomous trucking and deliveryTraffic control and reduced congestionEnhanced security
 5	Technology, media, and telecommunications	<ul style="list-style-type: none">Media archiving, search, and recommendationsCustomized content creationPersonalized marketing and advertising
 6	Retail and consumer	<ul style="list-style-type: none">Personalized design and productionAnticipating customer demandInventory and delivery management
 7	Energy	<ul style="list-style-type: none">Smart meteringMore efficient grid operation and storagePredictive infrastructure maintenance
 8	Manufacturing	<ul style="list-style-type: none">Enhanced monitoring and auto-correction of processesSupply chain and production optimizationOn-demand production

Source: [PwC Global AI Impact Index](#), 2017

Functional specialists, not techies, will decide the AI talent race

As AI spreads into more specific areas, it will require knowledge and skill sets that data scientists and AI specialists usually lack. Consider a team of computer scientists creating an AI application to support asset management decisions. The AI specialists probably aren't experts on the markets. They'll need economists, analysts, and traders working at their side to identify where the AI can best support the human asset manager, help design and train the AI to provide that support, and be willing and able to use the AI effectively. And since the

financial world is in constant flux, once the AI is up and running, it will need continual customizing and tweaking. For that too, functional specialists—not programmers—will have to lead the way. The same is true not just throughout financial services, but in healthcare, retail, manufacturing, and every sector that AI touches.



Cyberattacks will be more powerful because of AI but so will cyberdefense

Whats one job where AI has already shown superiority over human beings? Hacking. Machine learning, for example, can easily enable a malicious actor to follow your behavior on social media, then customize phishing tweets or emails just for you. A human hacker cant do the job nearly as well or as quickly.

The more AI advances, the more its potential for cyberattacks grows too. Techniques like advanced machine learning, deep learning, and neural networks enable computers to find and interpret patterns. They can also find and exploit vulnerabilities. Intelligent malware and ransomware that learns as it spreads, machine intelligence coordinating global cyberattacks, advanced data analytics to customize attacks unfortunately, its all on its way to your organization soon. And AI itself, if not well-protected, gives rise to new vulnerabilities. Malicious actors could for example inject biased data



Opening AI's black box will become a priority

Might AI-powered autonomous weapons become serial killers? Could an AI system told to reduce air pollution decide that the most logical way to do so is to eliminate the human race? Such fears may make for good thrillers, but the danger is manageable.

Here's the secret about AI that many of its proponents don't like to mention: It's not that smart at least not yet. AI is getting better at pattern and image recognition, automating complex tasks, and helping humans make decisions. All that offers opportunities for enterprises that could be worth trillions of dollars.

In the past, for example, to teach an AI program chess or another game, scientists had to feed it data from as many past games as they could find. Now they simply provide the AI with the game's rules. In a few hours it figures out on its own how to beat the world's greatest grandmasters.

Nations will spar over AI

AI is going to be big: \$15.7 trillion big by 2030, according to our research. The AI pie is so big that besides individual companies, countries are working on strategies to claim the biggest possible slice.

The US started off strong, with a trio of reports in 2016. They outlined a plan to make the US an AI powerhouse and thereby boost both the economy and national security.

Recommendations included increased federal funding, regulatory changes, the creation of shared public data sets and environments, the definition of standards and benchmarks, workforce development, and ways for AI to bolster cybersecurity and the military.