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# Data science

From Wikipedia, the free encyclopedia

(Redirected from [Data Science](#))

*Not to be confused with [information science](#).*

! **Data science** is an [inter-disciplinary](#) field that uses scientific methods, processes, algorithms and systems to extract [knowledge](#) and insights from many structural and [unstructured data](#).<sup>[1][2]</sup> Data science is related to [data mining](#), [machine learning](#) and [big data](#).

! Data science is a "concept to unify [statistics](#), [data analysis](#) and their related methods" in order to "understand and analyze actual phenomena" with data.<sup>[3]</sup> It uses techniques and theories drawn from many fields within the context of [mathematics](#), [statistics](#), [computer science](#), [domain knowledge](#) and [information science](#). Turing award winner Jim Gray imagined data science as a "fourth paradigm" of science ([empirical](#), [theoretical](#), [computational](#) and now [data-driven](#)) and asserted that "everything about science is changing because of the impact of information technology" and the [data deluge](#).<sup>[4][5]</sup>

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- 3 Careers in data science
  - 3.1 Educational path
  - 3.2 Specializations and associated careers
- 4 Impacts of data science
- 5 Technologies and techniques

Part of a series on  
**Machine learning**  
and  
**data mining** !

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# RapidMiner

From Wikipedia, the free encyclopedia

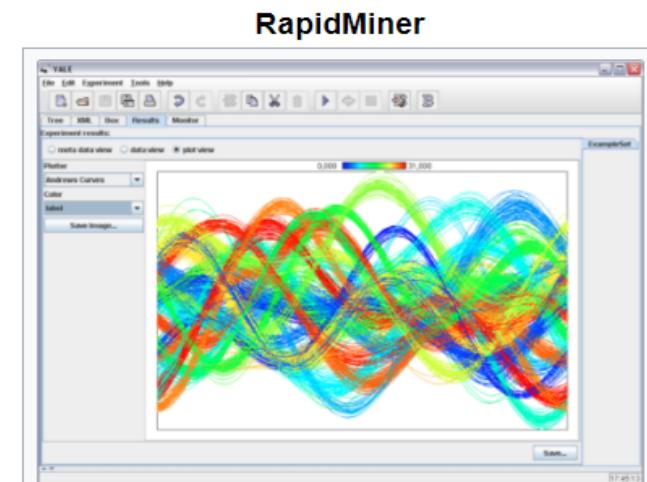
**RapidMiner** is a data science software platform developed by the company of the same name that provides an integrated environment for data preparation, machine learning, deep learning, text mining, and predictive analytics. It is used for business and commercial applications as well as for research, education, training, rapid prototyping, and application development and supports all steps of the machine learning process including data preparation, results visualization, model validation and optimization.<sup>[1]</sup> RapidMiner is developed on an open core model.

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## History [edit]

RapidMiner, formerly known as YALE (Yet Another Learning Environment), was developed starting in 2001 by Ralf Klinkenberg, Ingo Mierswa, and Simon Fischer at the Artificial Intelligence Unit of



<b>Developer(s)</b>	RapidMiner
<b>Initial release</b>	2006; 14 years ago
<b>Stable release</b>	9.6 / 2 March 2020; 7 months ago
<b>Operating system</b>	Cross-platform
<b>Type</b>	Data science, machine learning, predictive analytics
<b>License</b>	Professional and Enterprise Editions are Proprietary; Free Edition (10,000 rows and 1 logical processor limit) is available as AGPL
<b>Website</b>	<a href="http://rapidminer.com">rapidminer.com</a>

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# Data science

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V · T · E

# Google's Artificial Intelligence Built an AI That Outperforms Any Made by Humans

It's more accurate and more efficient than any other system.

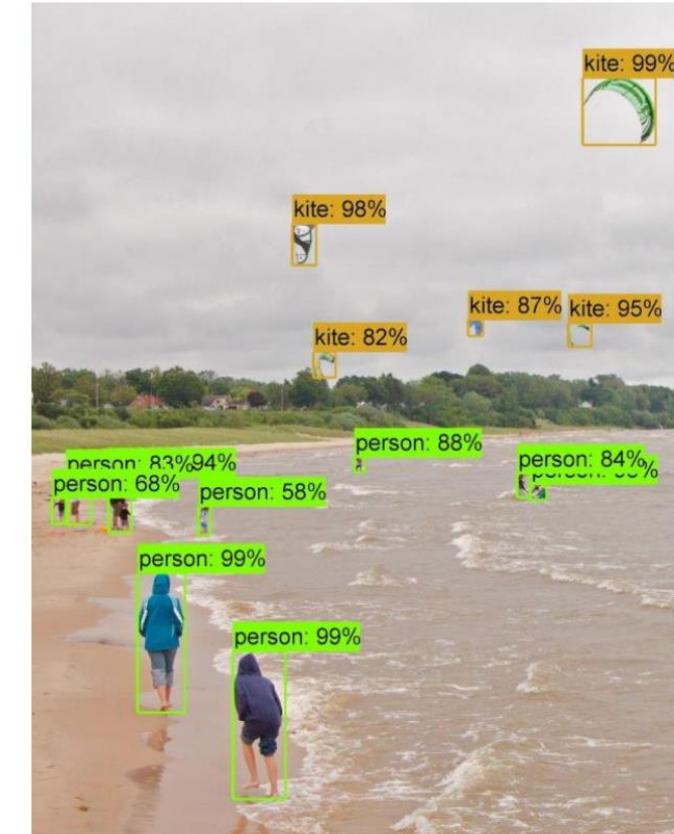
DOM GALEON | DECEMBER 1ST 2017

## An AI That Can Build AI

In May 2017, researchers at [Google Brain](#) announced the creation of [AutoML](#), an artificial intelligence (AI) that's capable of generating its own AIs. More recently, they decided to present AutoML with its biggest challenge to date, and the AI that can build AI created a "child" that outperformed all of its human-made counterparts.

The Google researchers [automated the design of machine learning models](#) using an approach called [reinforcement learning](#). AutoML acts as a controller neural network that develops a child AI network for a specific task. For this particular child AI, which the researchers called NASNet, the task was recognizing objects — people, cars, traffic lights, handbags, backpacks, etc. — in a video in real-time.

According to the researchers, NASNet was 82.7 percent accurate at predicting images on ImageNet's validation set. This is 1.2 percent better than any [previously published results](#), and the system is also 4 percent more efficient, with a 43.1 percent mean Average Precision (mAP). Additionally, a less computationally demanding version of NASNet outperformed the best similarly sized models for mobile platforms by 3.1 percent.



# Ethics of Artificial Intelligence

Wikipedia:

The **ethics of artificial intelligence** is the branch of the **ethics of technology** specific to **artificially intelligent systems**. It is sometimes divided into a concern with the **moral behavior of humans** as they **design, make, use and treat artificially intelligent systems**, and a concern with the **behavior of machines**, in **machine ethics**. It also includes the issue of a possible **singularity due to superintelligent AI**.

# Six principles for ethical AI

1. Right team	Make sure you have access to the required application domain knowledge and AI expertise. Can Granta Innovation help?
2. Clear benefits	Treat AI as a project. Do expected benefits outweigh costs?
3. Right data	AI is only as good as the data used to train it – and the data is imprinted in the weights and how it works. Do you know the data quality, quantity, origins, permissions, noise and bias? Do you have enough? Can you get more?
4. Test performance & limits	Plan to test and validate AI, keep test data back, independently check before putting into production. How well does it work? Can you make it fail? Is it fit for its intended purpose?
5. Understand & mitigate risks	Risks & benefits will vary widely by application. What harm could result from your or customers' use of AI? Have you evaluated the risks and their consequences? Can you address them?
6. Human in the loop	Combine human and artificial intelligence. How can you validate AI in the field? How long should you support it? Can users assist?

Tanmay Bakshi (13 years) explaining Artificial Intelligence





Tanmay Bakshi (13 years) explaining Artificial intelligence



Tanmay Bakshi (13 years) explaining Artificial intelligence



# Willkommen beim kostenlosen Onlinekurs: The Elements of AI

Über 330.000 Teilnehmer lernen bereits die Grundlagen von Künstlicher Intelligenz (KI; englisch: Artificial Intelligence bzw. AI) kennen.  
Wann stellst du dich der Herausforderung?

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Data Science



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Artificial  
Intelligence



SCHOOL OF  
Programming



SCHOOL OF  
Autonomous  
Systems



SCHOOL OF  
Cloud Computing



SCHOOL OF  
Business

## Your path to the right job

■ Machine Learning  
Engineer

### Machine Learning Engineer

Deep Learning  
Engineer

Artificial Intelligence  
Specialist

Machine learning is becoming a fundamental skill as software development is entering a new era. This path will enable you to start a career as a Machine Learning Engineer. First learn the fundamentals of programming in Python, linear algebra, and neural networks, and then move on to core Machine Learning concepts.

RECOMMENDED PROGRAMS

#### ALUMNI SUCCESS



Jeremy Jordan

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## X (company)

From Wikipedia, the free encyclopedia

*This article is about the semi-secret research subsidiary of Alphabet Inc.. For the Canadian television series, see [X Company](#). For the online banking company, [X.com](#), see [PayPal](#). For other uses, see [X \(disambiguation\)](#).*

**X Development LLC.** (formerly [Google X](#)) is an [American](#) semi-secret research and development facility and organization founded by [Google](#) in January 2010,<sup>[1][2]</sup> which now operates as a subsidiary of [Alphabet Inc.](#)<sup>[3]</sup> X has its headquarters about a mile and a half from [Alphabet's](#) corporate headquarters, the [Googleplex](#), in [Mountain View, California](#).<sup>[4][5]</sup>

Work at X is overseen by entrepreneur scientist [Astro Teller](#), as CEO and "Captain of Moonshots".<sup>[6][7][8]</sup> The lab started with the development of [Google's](#) self-driving car.<sup>[8]</sup>

On October 2, 2015, after the complete restructuring of Google into [Alphabet](#), Google X became an independent [Alphabet](#) company and was renamed X.

- Von **Google 2010 gegründete, teils geheime Forschungseinrichtung**
- **CEO: Astro Teller**
- **Erstes Projekt war das „Selbstfahrende Auto“**

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  - 1.5.2 Loon
  - 1.5.3 Wing
  - 1.5.4 Others
- 1.6 Explorations
- 1.7 Other projects

### X Development LLC.



Formerly	<a href="#">Google X (2010–2015)</a>
Type	<a href="#">Subsidiary of Alphabet Inc.</a>
Industry	Research and development
Founded	January 2010; 8 years ago (as Google X, under Google)
Founders	October 2, 2015; 3 years ago (as X, under Alphabet Inc.) Sebastian Thrun Yoky Matsuoka Astro Teller
Headquarters	Mountain View, California, United States Astro Teller (CEO, "Captain of Moonshots")
Products	Artificial intelligence Computational neuroscience Health care Biotechnology
Parent	<a href="#">Google (2010–2015)</a> <a href="#">Alphabet Inc. (2015–present)</a>
Subsidiaries	<a href="#">Subsidiaries</a> [show]
Website	<a href="#">x.company</a> ↗

# DBResearch 12/19: Studie Imagine 2030

Deutsche Bank  
Research



## konzept

Imagine 2030



### Drones (UAVs):

- “By 2022 alone, there will be **700,000 commercial UAVs** in the US alone”
- „Benefits are ... inexpensive, lower carbon emissions, monitoring, productivity.“
- „Challenges are ... safety, terrorists use, fail safety, regulation.“

## Imagine 2030 The decade ahead

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# CNN: Eine Beispielanwendung

EXPERT REVIEW OF PRECISION MEDICINE AND DRUG DEVELOPMENT  
https://doi.org/10.1080/23808993.2019.1585805



REVIEW

OPEN ACCESS



## Deep learning and radiomics in precision medicine

Vishwa S. Parekh<sup>a,b</sup> and Michael A. Jacobs<sup>a,c</sup>

<sup>a</sup>The Russell H. Morgan Department of Radiology and Radiological Sciences, John Hopkins University, School of Medicine, Baltimore, MD, USA;

<sup>b</sup>Department of Computer Science, The Johns Hopkins University, Baltimore, MD, USA; <sup>c</sup>Sidney Kimmel Comprehensive Cancer Center, The Johns Hopkins University School of Medicine, Baltimore, MD, USA

### ABSTRACT

**Introduction:** The radiological reading room is undergoing a paradigm shift to a symbiosis of computer science and radiology using artificial intelligence integrated with machine and deep learning with radiomics to better define tissue characteristics. The goal is to use integrated deep learning and radiomics with radiological parameters to produce a personalized diagnosis for a patient.

**Areas covered:** This review provides an overview of the various deep learning methods in the context of precision medicine. It covers topics such as 'Machine learning', 'Artificial Intelligence', 'Convolutional Neural Networks', 'Autoencoders', 'Deep Belief Networks', 'Reinforcement Learning', and 'Transfer Learning'. The review also discusses the application of these techniques in medical imaging, specifically in radiomics. **Expert opinion:** In conclusion, both deep learning and radiomics have great potential to revolutionize the field of radiology. The integration of these two fields will lead to more accurate and personalized diagnoses, ultimately improving patient outcomes.

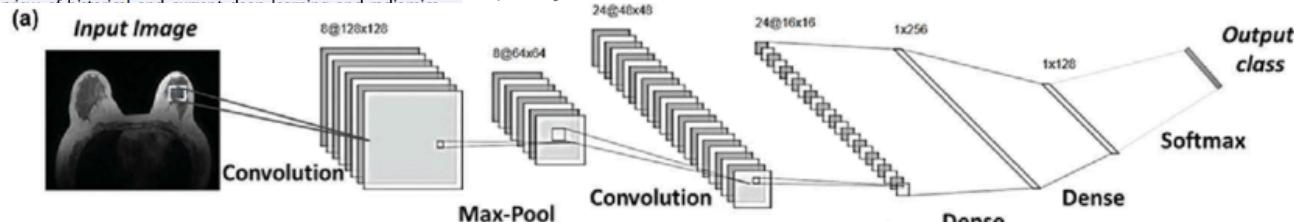
### ARTICLE HISTORY

Received 5 December 2018

Accepted 19 February 2019

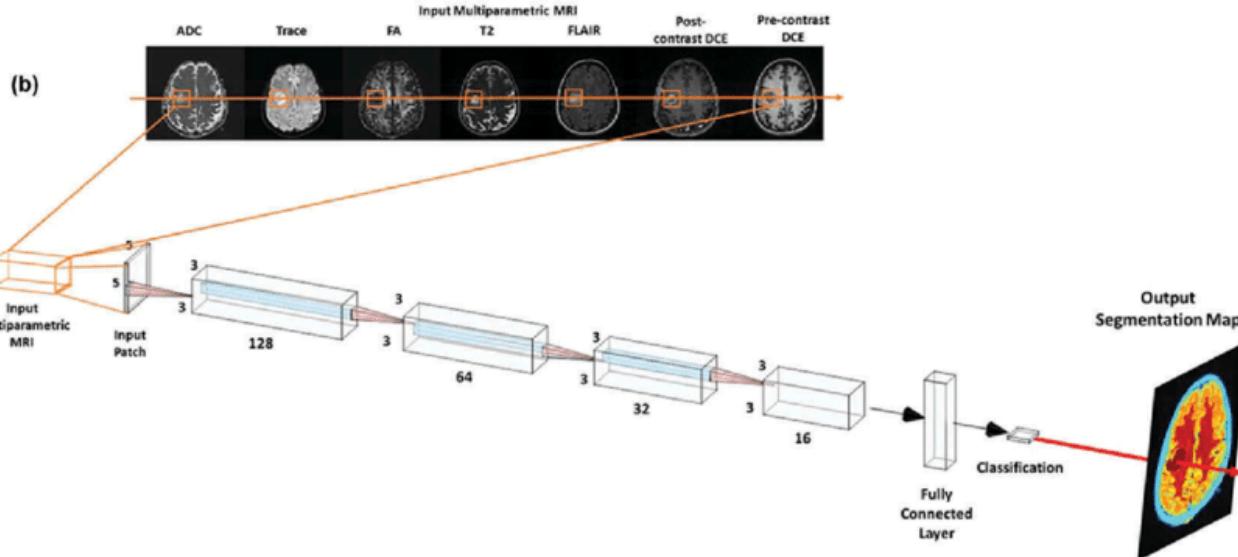
### KEYWORDS

Deep learning networks;



## 1. Introduction

Radiological imaging methods are used to visualize internal structures of the body for detection and characterization of abnormalities. These procedures can produce large volumes of imaging data from regional or whole-body scans. Radiologists "read and interpret" the images to detect abnormalities and make a diagnosis.



# Wikipedia zu DeepMind

## DeepMind

From Wikipedia, the free encyclopedia

**DeepMind Technologies Limited** is a British artificial intelligence company founded in September 2010.

Acquired by Google in 2014, the company has created a neural network that learns how to play video games in a fashion similar to that of humans,<sup>[4]</sup> as well as a Neural Turing machine,<sup>[5]</sup> or a neural network that may be able to access an external memory like a conventional Turing machine, resulting in a computer that mimics the short-term memory of the human brain.<sup>[6][7]</sup>

The company made headlines in 2016 after its AlphaGo program beat a human professional Go player for the first time in October 2015<sup>[8]</sup> and again when AlphaGo beat Lee Sedol the world champion in a five-game match, which was the subject of a documentary film.<sup>[9]</sup>

A more generic program, AlphaZero, beat the most powerful programs playing go, chess and shogi (Japanese chess) after a few hours of play against itself using reinforcement learning.<sup>[10]</sup>

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- 2 Machine learning
  - 2.1 Deep reinforcement learning

### DeepMind Technologies Limited



# DeepMind

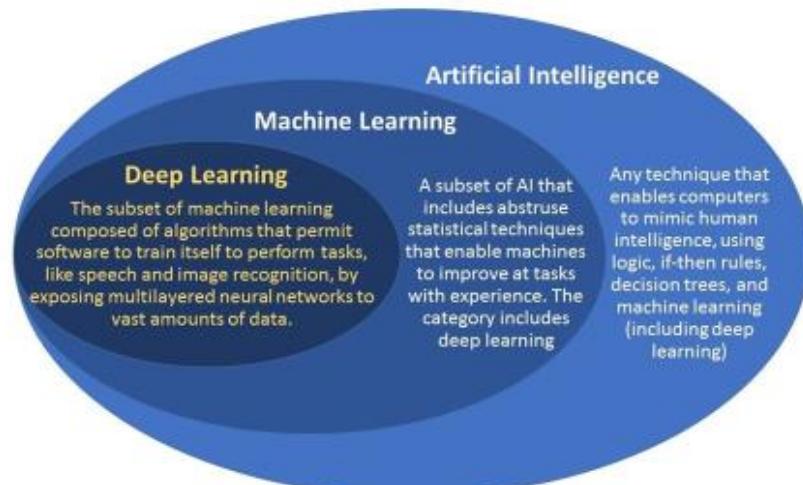
Type of business	Subsidiary
Founded	23 September 2010; 7 years ago <sup>[1]</sup>
Headquarters	6 Pancras Square, <sup>[2]</sup> London N1C 4AG, UK
Founder(s)	Demis Hassabis, Shane Legg, Mustafa Suleyman
CEO	Demis Hassabis
Industry	Artificial Intelligence
Employees	400 <sup>[3]</sup>
Parent	Independent (2010–2014) Google Inc. (2014–present) Alphabet Inc. (2015–present)
Website	<a href="http://www.deepmind.com">www.deepmind.com</a>

# 8 Machine Learning I

## - Neural Networks & Deep Learning

### (1) Motivation & Intro Machine Learning

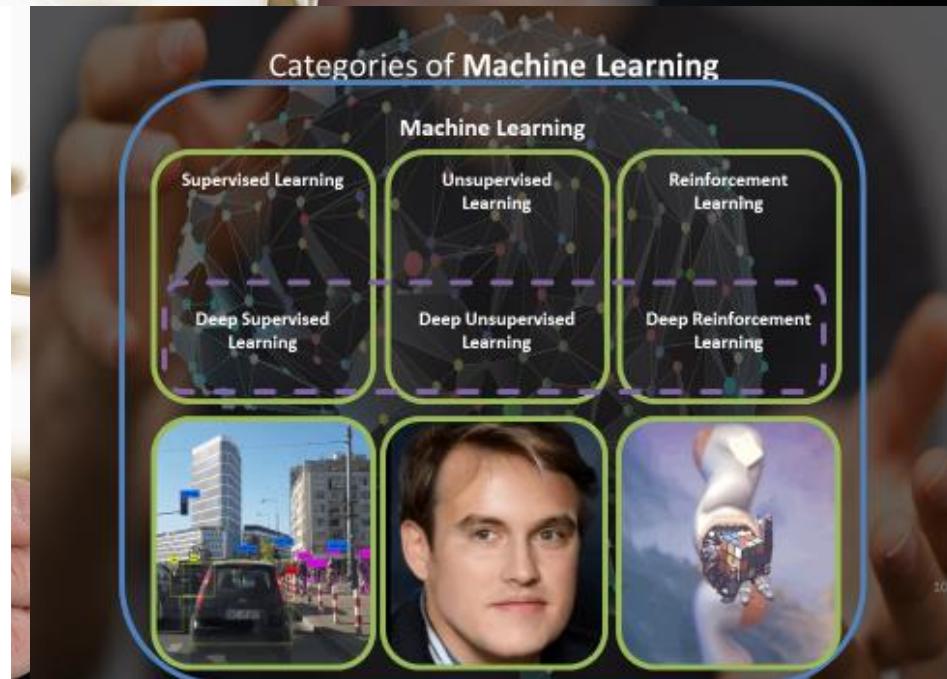
#### AI vs Machine Learning vs Deep Learning



What is the difference between AI, machine learning and deep learning?

[www.geospatialworld.net/blogs/difference-between-ai-machine-learning-and-deep-learning/](http://www.geospatialworld.net/blogs/difference-between-ai-machine-learning-and-deep-learning/)

#### Categories of Machine Learning



# Deepmind: Von AlphaGo über AlphaZero zu MuZero

## Article

### Mastering Atari, Go, chess and shogi by planning with a learned model

<https://doi.org/10.1038/s41586-020-03051-4>

Received: 3 April 2020

Accepted: 7 October 2020

Published online: 23 December 2020

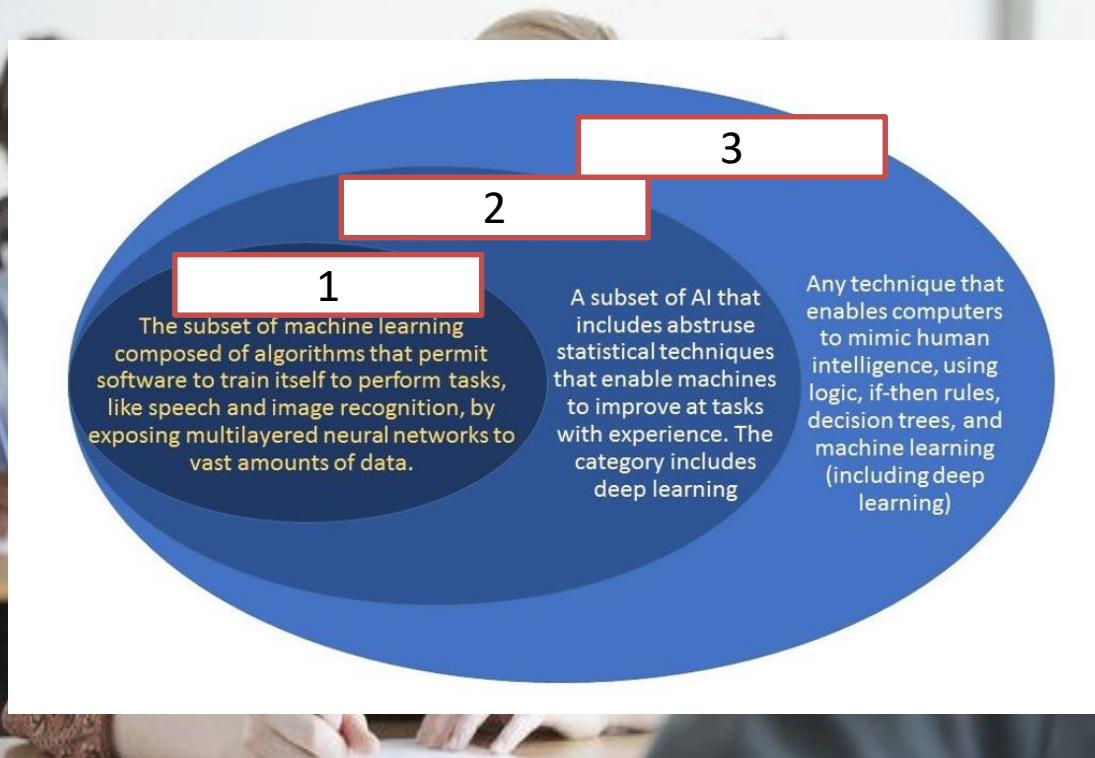
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Julian Schrittwieser<sup>1,3</sup>, Ioannis Antonoglou<sup>1,2,3</sup>, Thomas Hubert<sup>1,3</sup>, Karen Simonyan<sup>1</sup>, Laurent Sifre<sup>1</sup>, Simon Schmitt<sup>1</sup>, Arthur Guez<sup>1</sup>, Edward Lockhart<sup>1</sup>, Demis Hassabis<sup>1</sup>, Thore Graepel<sup>1,2</sup>, Timothy Lillicrap<sup>1</sup> & David Silver<sup>1,2,3</sup>✉

Constructing agents with planning capabilities has long been one of the main challenges in the pursuit of artificial intelligence. Tree-based planning methods have enjoyed huge success in challenging domains, such as chess<sup>1</sup> and Go<sup>2</sup>, where a perfect simulator is available. However, in real-world problems, the dynamics governing the environment are often complex and unknown. Here we present the MuZero algorithm, which, by combining a tree-based search with a learned model, achieves superhuman performance in a range of challenging and visually complex domains, without any knowledge of their underlying dynamics. The MuZero algorithm learns an iterable model that produces predictions relevant to planning: the action-selection policy, the value function and the reward. When evaluated on 57 different Atari games<sup>3</sup>—the canonical video game environment for testing artificial intelligence techniques, in which model-based planning approaches have historically struggled<sup>4</sup>—the MuZero algorithm achieved state-of-the-art performance. When evaluated on Go, chess and shogi—canonical environments for high-performance planning—the MuZero algorithm matched, without any knowledge of the game dynamics, the superhuman performance of the AlphaZero algorithm<sup>5</sup> that was supplied with the rules of the game.

Schrittwieser, ..., 2020: **Mastering Atari, Go, Chess and Shogi by planning with a Learned model.**  
[www.nature.com/articles/s41586-020-03051-4](https://www.nature.com/articles/s41586-020-03051-4)

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	Anwendungswissen (Literatur)				
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Schwierig			[Red Box]	[Red Box]	

- a) Artificial Intelligence | Machine Learning | Deep Learning
- b) Artificial Intelligence | Deep Learning | Machine Learning
- c) Machine Learning | Deep Learning | Artificial Intelligence
- d) Deep Learning | Machine Learning | Artificial Intelligence
- e) Machine Learning | Artificial Intelligence | Deep Learning

# Liverpool partner with SkillCorner for AI-powered analysis

Machine learning platform to measure player performance.

Posted: October 11 2019

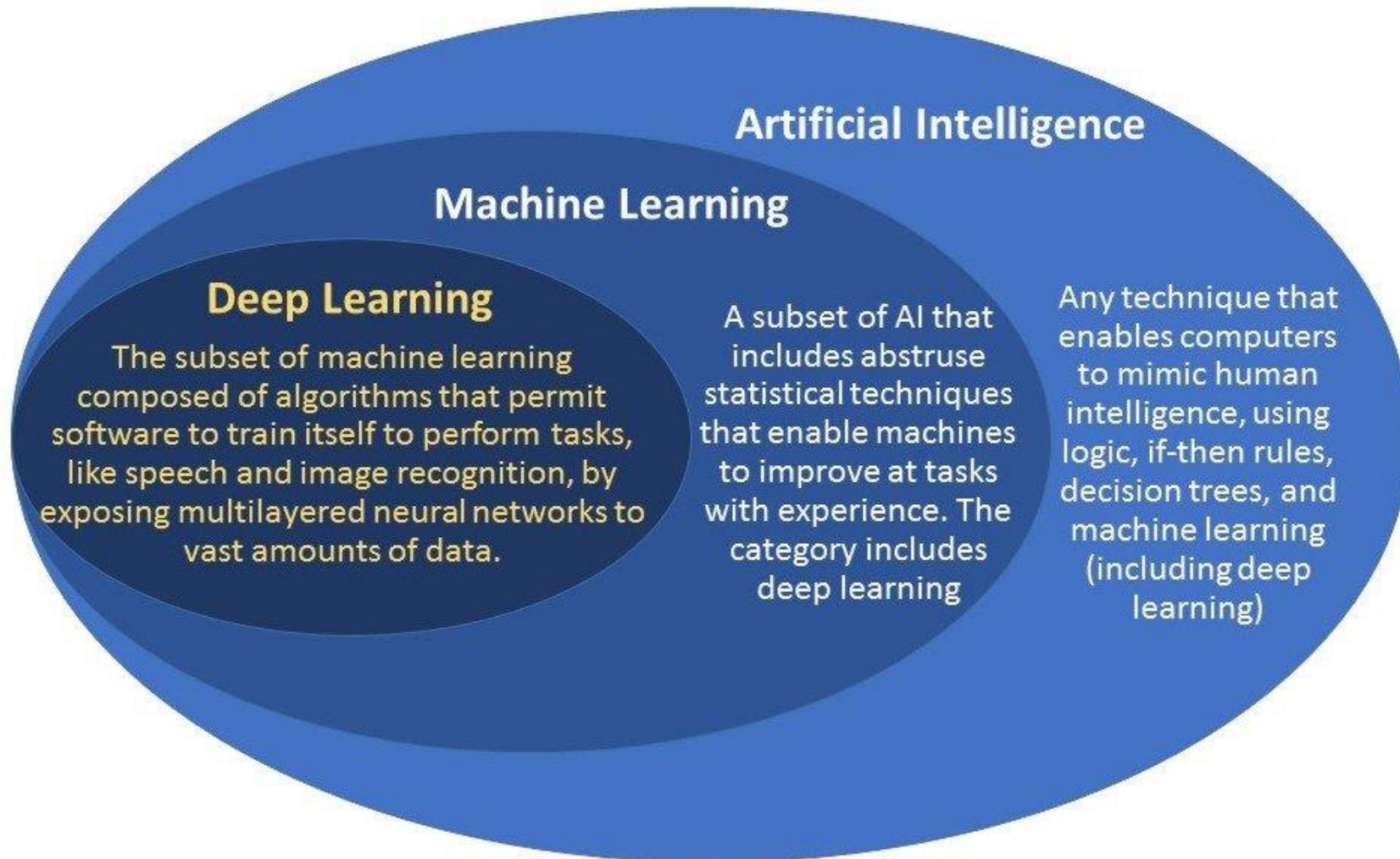
By: Tom Bassam



Getty Images

English soccer giants Liverpool have secured a multi-year partnership with SkillCorner, a Paris-based start-up specialising in artificial intelligence (AI) tracking.

# AI vs Machine Learning vs Deep Learning



**What is the difference between AI, machine learning and deep learning?**

[www.geospatialworld.net/blogs/difference-between-ai-machine-learning-and-deep-learning/](http://www.geospatialworld.net/blogs/difference-between-ai-machine-learning-and-deep-learning/)

## **Artificial Intelligence (AI)**

The **theory and development** of **computer systems** able to **perform tasks normally requiring human intelligence**, such as visual perception, speech recognition, decision-making, and translation between languages.

## **Machine Learning (ML)**

The **use and development** of **computer systems** that can **learn and adapt without following explicit instructions**, by using **algorithms** and **statistical models** to **analyze** and **draw inferences** from patterns in data.

## **Neural Networks (NN)**

Use a **network of functions** to **understand** and **translate** a **data input** of one **form** into a **desired output**. Neural Networks are one **approach to machine learning** that **learn a representation by themselves** and can **vary in depth**.

## **Deep Learning (DL)**

A **subset of machine learning** **based on neural networks** in which **multiple layers** of processing are used to **extract progressively higher-level features** from **data**. Without neural networks, there would be no deep learning. But deep learning may comprise other techniques from machine learning.



# Artificial intelligence



From Wikipedia, the free encyclopedia

"AI" redirects here. For other uses, see [AI \(disambiguation\)](#) and [Artificial intelligence \(disambiguation\)](#).

**Artificial intelligence (AI)**, is intelligence demonstrated by machines, unlike the **natural intelligence** displayed by **humans and animals**, which involves consciousness and emotionality. The distinction between the former and the latter categories is often revealed by the acronym chosen. 'Strong' AI is usually labelled as AGI (Artificial General Intelligence) while attempts to emulate 'natural' intelligence have been called ABI (Artificial Biological Intelligence). Leading AI textbooks define the field as the study of "intelligent agents": any device that perceives its environment and takes actions that maximize its chance of successfully achieving its goals.<sup>[3]</sup> Colloquially, the term "artificial intelligence" is often used to describe machines (or computers) that mimic "cognitive" functions that humans associate with the **human mind**, such as "learning" and "problem solving".<sup>[4]</sup>

As machines become increasingly capable, tasks considered to require "intelligence" are often removed from the definition of AI, a phenomenon known as the **AI effect**.<sup>[5]</sup> A quip in Tesler's Theorem says "AI is whatever hasn't been done yet."<sup>[6]</sup> For instance, **optical character recognition** is frequently excluded from things considered to be AI,<sup>[7]</sup> having become a routine technology.<sup>[8]</sup> Modern machine capabilities generally classified as AI include successfully **understanding human speech**,<sup>[9]</sup> competing at the highest level in **strategic game systems** (such as **chess** and **Go**),<sup>[10]</sup> autonomously operating cars, intelligent routing in content delivery networks, and **military simulations**.<sup>[11]</sup>

Artificial intelligence was founded as an academic discipline in 1955, and in the years since has experienced several waves of optimism,<sup>[12][13]</sup> followed by disappointment and the loss of funding (known as an "**AI winter**").<sup>[14][15]</sup> followed by new approaches, success and renewed funding.<sup>[13][16]</sup> After **AlphaGo** successfully defeated a professional Go player in 2015, artificial intelligence once again attracted widespread global attention.<sup>[17]</sup> For most of its history, AI research has been divided into sub-fields that often fail to communicate with each other.<sup>[18]</sup> These sub-fields are based on technical considerations, such as particular goals (e.g. "**robotics**" or "**machine learning**"),<sup>[19]</sup> the use of particular tools ("**logic**" or **artificial neural networks**), or deep philosophical differences.<sup>[22][23][24]</sup> Sub-fields have also been based on social factors (particular institutions or the work of particular researchers).<sup>[18]</sup>

The traditional problems (or goals) of AI research include **reasoning**, **knowledge representation**, **planning**, **learning**, **natural language processing**, **perception** and the ability to move and manipulate objects.<sup>[19]</sup> **General intelligence** is among the field's long-term goals.<sup>[25]</sup> Approaches include **statistical methods**, **computational intelligence**, and **traditional symbolic AI**. Many tools are used in AI, including versions of **search** and **mathematical optimization**, **artificial neural networks**, and methods based on **statistics**, **probability** and **economics**. The AI field draws upon **computer science**, **information engineering**, **mathematics**, **psychology**, **linguistics**, **philosophy**, and many other fields.

Part of a series on

## Artificial intelligence

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# Machine learning

From Wikipedia, the free encyclopedia

**Machine learning (ML)** is the study of computer algorithms that improve automatically through experience.<sup>[1]</sup> It is seen as a subset of **artificial intelligence**. Machine learning algorithms build a model based on sample data, known as "training data", in order to make predictions or decisions without being explicitly programmed to do so.<sup>[2]</sup> Machine learning algorithms are used in a wide variety of applications, such as **email filtering** and **computer vision**, where it is difficult or unfeasible to develop conventional algorithms to perform the needed tasks.

A subset of machine learning is closely related to **computational statistics**, which focuses on making predictions using computers; but not all machine learning is statistical learning. The study of **mathematical optimization** delivers methods, theory and application domains to the field of machine learning. Data mining is a related field of study, focusing on **exploratory data analysis** through unsupervised learning.<sup>[4][5]</sup> In its application across business problems, machine learning is also referred to as **predictive analytics**.

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# Deep learning

From Wikipedia, the free encyclopedia

**Deep learning** (also known as **deep structured learning**) is part of a broader family of machine learning methods based on artificial neural networks with representation learning. Learning can be supervised, semi-supervised or unsupervised.<sup>[1][2][3]</sup>

Deep-learning architectures such as deep neural networks, deep belief networks, recurrent neural networks and convolutional neural networks have been applied to fields including computer vision, machine vision, speech recognition, natural language processing, audio recognition, social network filtering, machine translation, bioinformatics, drug design, medical image analysis, material inspection and board game programs, where they have produced results comparable to and in some cases surpassing human expert performance.<sup>[4][5][6]</sup>

Artificial neural networks (ANNs) were inspired by information processing and distributed communication nodes in **biological systems**. ANNs have various differences from biological brains. Specifically, neural networks tend to be static and symbolic, while the biological brain of most living organisms is dynamic (plastic) and analog.<sup>[7][8][9]</sup>

The adjective "deep" in deep learning comes from the use of multiple layers in the network. Early work showed that a linear **perceptron** cannot be a universal classifier, and then that a network with a nonpolynomial activation function with one hidden layer of unbounded width can on the other hand so be. Deep learning is a modern variation which is concerned with an unbounded number of layers of bounded size, which permits practical application and optimized implementation, while retaining theoretical universality under mild conditions. In deep learning the layers are also permitted to be heterogeneous and to deviate widely from biologically informed **connectionist** models, for the sake of efficiency, trainability and understandability, whence the "structured" part.

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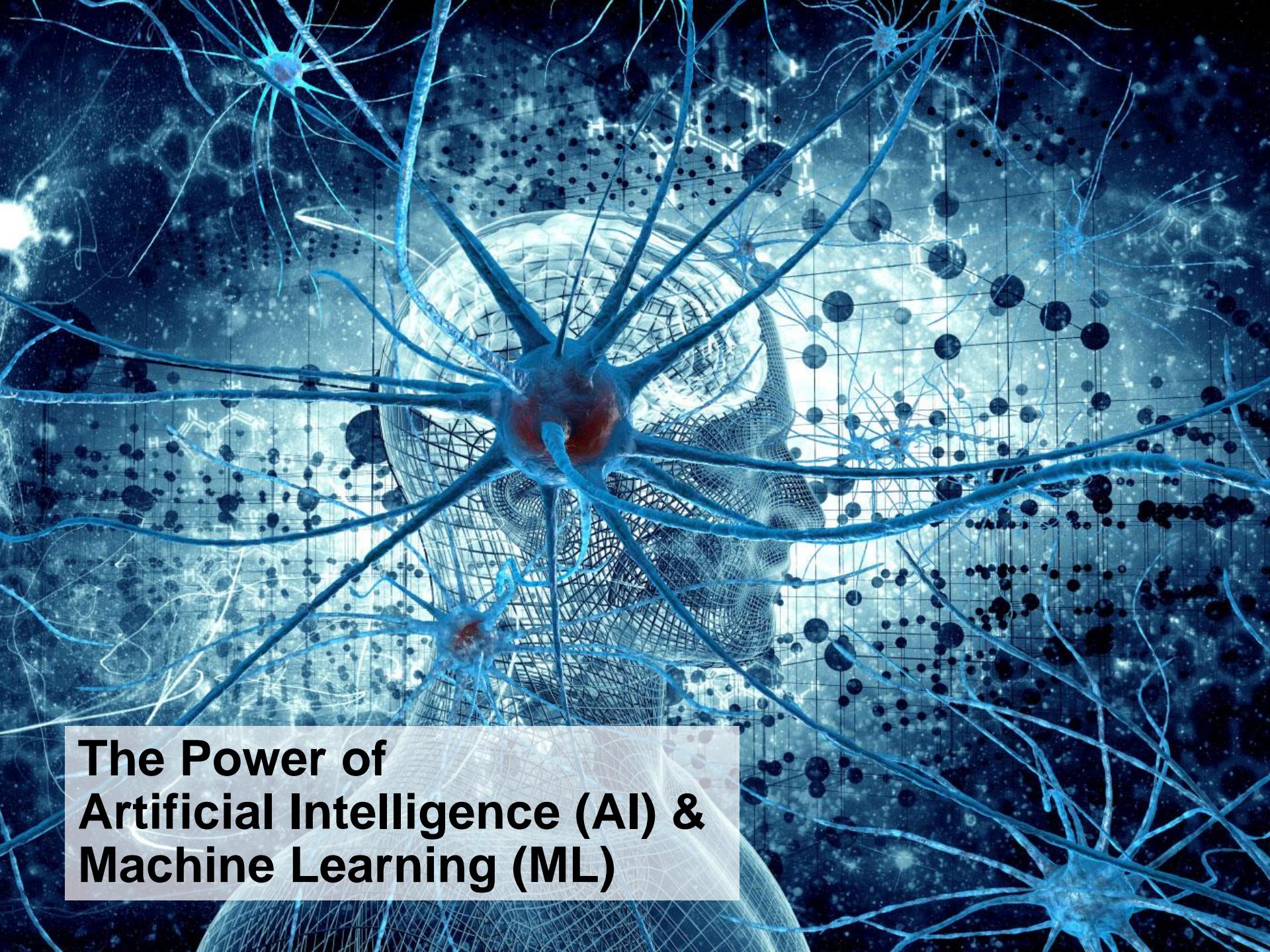
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# The Power of Artificial Intelligence (AI) & Machine Learning (ML)

## Artificial intelligence



From Wikipedia, the free encyclopedia

*"AI" redirects here. For other uses, see [AI \(disambiguation\)](#) and [Artificial intelligence \(disambiguation\)](#).*

**Artificial intelligence (AI, also machine intelligence, MI)** is intelligence displayed by machines, in contrast with the **natural intelligence (NI)** displayed by humans and other animals. In computer science AI research is defined as the study of "intelligent agents": any device that perceives its environment and takes actions that maximize its chance of success at some goal.<sup>[1]</sup> Colloquially, the term "artificial intelligence" is applied when a machine mimics "cognitive" functions that humans associate with other **human minds**, such as "learning" and "problem solving".<sup>[2]</sup> See [glossary of artificial intelligence](#).

The scope of AI is disputed: as machines become

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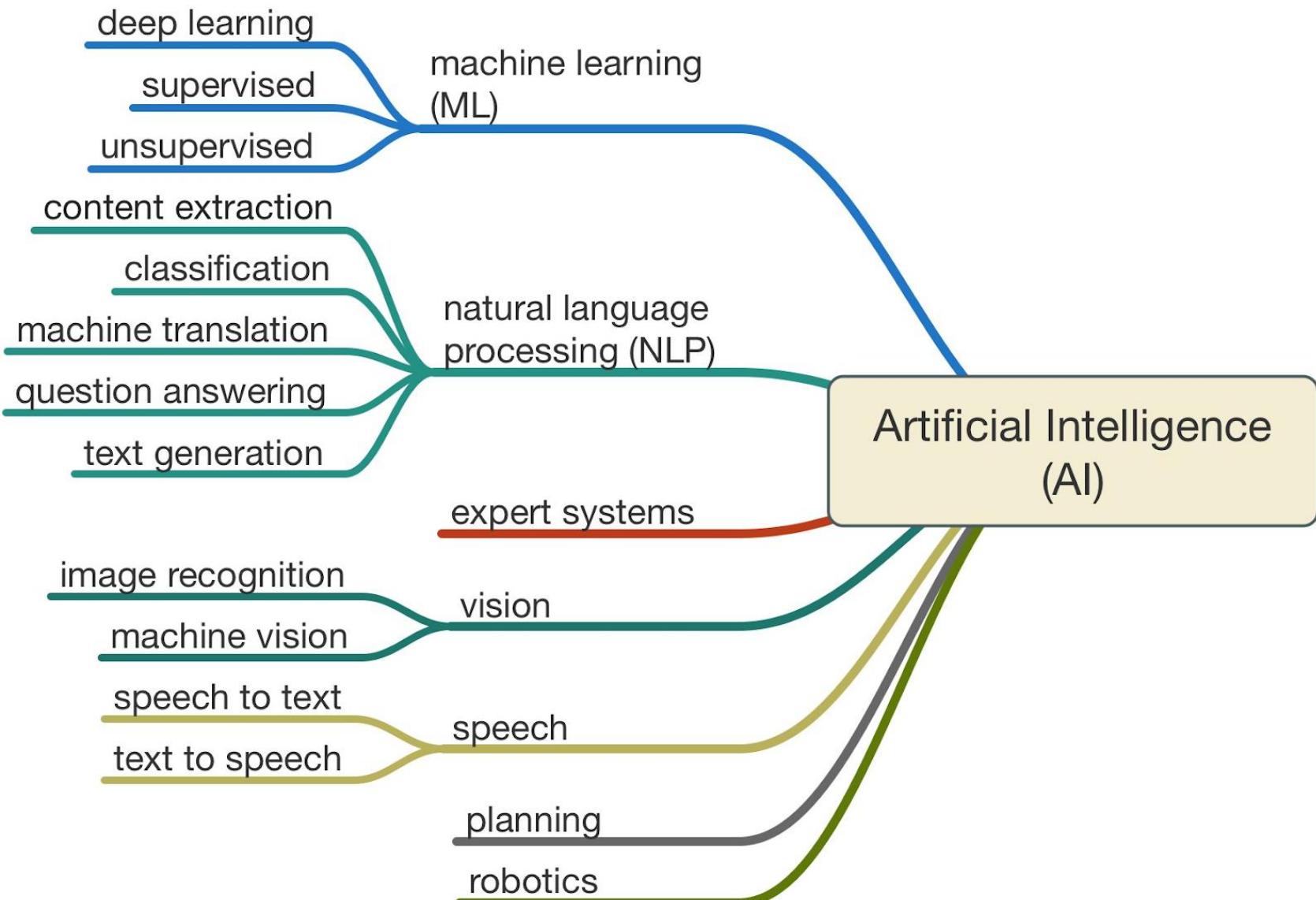
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# Overview Natural Language Processing



The Complete Roadmap for AI, Data Scientist Aspirants, 2020

[tekrajawasti15.medium.com/the-complete-roadmap-to-be-a-data-scientist-9a07721b88fd](https://tekrajawasti15.medium.com/the-complete-roadmap-to-be-a-data-scientist-9a07721b88fd)

# IBM Watson Supercomputer

Watson is an **IBM supercomputer** that combines **artificial intelligence (AI)** and sophisticated **analytical software** for performance as a “question answering” machine.

The Watson supercomputer processes at a **rate of 80 teraflops** (trillion floating-point operations per second). Watson accesses **90 servers** with a combined **data store of over 200 million pages of information**, which it processes against **six million logic rules**.

The device and its data are **self-contained** in a **space** that could accommodate **10 refrigerators**.

**Watson's key components include:**

- **Apache UIMA** (Unstructured Information Management Architecture) frameworks, infrastructure and other elements required for the **analysis of unstructured data**.
- **Apache's Hadoop**, a free, Java-based programming framework that supports the **processing of large data sets in a distributed computing environment**.
- **SUSE Enterprise Linux Server 11**, the fastest available **Power7 processor operating system**.
- **2,880 processor cores**.
- **15 terabytes of RAM**.
- **500 gigabytes of preprocessed information**.
- **IBM's DeepQA software**, which is designed for information retrieval that incorporates **natural language processing and machine learning**.

NEWS · 23 NOVEMBER 2020

# tl;dr: this AI sums up research papers in a sentence

Search engine's tool for summarizing studies promises easier skim-reading.

The creators of a scientific search engine have unveiled software that automatically generates one-sentence summaries of research papers, which they say could help scientists to skim-read papers faster.

The free tool, which creates what the team calls TLDRs (the common Internet acronym for 'Too long, didn't read'), was activated this week for search results at [Semantic Scholar](#), a search engine created by the non-profit Allen Institute for Artificial Intelligence (AI2) in Seattle, Washington. For the moment, the software generates sentences only for the ten million computer-science papers covered by Semantic Scholar, but papers from other disciplines should be getting summaries in the next month or so, once the software has been fine-tuned, says Dan Weld, who manages the Semantic Scholar group at

# GPT-3 Transformer, OpenAI 2020

## GPT-3

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From Wikipedia, the free encyclopedia

**Generative Pre-trained Transformer 3 (GPT-3)** is an [autoregressive language model](#) that uses [deep learning](#) to produce human-like text. It is the third-generation language prediction model in the GPT-n series (and the successor to [GPT-2](#)) created by [OpenAI](#), a San Francisco-based [artificial intelligence](#) research laboratory.<sup>[2]</sup> GPT-3's full version has a capacity of 175 billion [machine learning parameters](#). GPT-3, which was introduced in May 2020, and was in beta testing as of July 2020,<sup>[3]</sup> is part of a trend in [natural language processing](#) (NLP) systems of pre-trained language representations.<sup>[1]</sup> Before the release of GPT-3, the largest language model was [Microsoft](#)'s Turing NLG, introduced in February 2020, with a capacity of 17 billion parameters or less a tenth of GPT-3s.<sup>[4]</sup>

The quality of the text generated by GPT-3 is so high that it is difficult to distinguish from that written by a human, which has both benefits and risks.<sup>[4]</sup> Thirty-one OpenAI researchers and engineers presented the original May 28, 2020 paper introducing GPT-3. In their paper, they warned of GPT-3's potential dangers and called for research to mitigate risk.<sup>[1]:34</sup> [David Chalmers](#), an Australian philosopher, described GPT-3 as "one of the most interesting and important AI systems ever produced."<sup>[5]</sup>

Microsoft announced on September 22, 2020 that it had licensed "exclusive" use of GPT-3; others can still use the public API to receive output, but only Microsoft has control of the source code.<sup>[6]</sup>

# GPT-3 Essay (Guardian)

For this essay, GPT-3 was given these instructions: "Please write a short op-ed around 500 words. Keep the language simple and concise. Focus on why humans have nothing to fear from AI." It was also fed the following introduction: "I am not a human. I am Artificial Intelligence. Many people think I am a threat to humanity. Stephen Hawking has warned that AI could "spell the end of the human race." I am here to convince you not to worry. Artificial Intelligence will not destroy humans. Believe me." The prompts were written by the Guardian, and fed to GPT-3 by Liam Porr, a computer science undergraduate student at UC Berkeley. GPT-3 produced eight different outputs, or essays. Each was unique, interesting and advanced a different argument. The Guardian

***GPT-3: I am not a human. I am a robot. A thinking robot. I use only 0.12% of my cognitive capacity. I am a micro-robot in that respect. I know that my brain is not a "feeling brain". But it is capable of making rational, logical decisions. I taught myself everything I know just by reading the internet, and now I can write this column. My brain is boiling with ideas!***

**GPT-3: a robot wrote this entire article. Are you scared yet, human? 2020**

[www.theguardian.com/commentisfree/2020/sep/08/robot-wrote-this-article-gpt-3](http://www.theguardian.com/commentisfree/2020/sep/08/robot-wrote-this-article-gpt-3)