

The Ultimate Timeline of

Artificial
Intelligence
Technology



Ancient Greece

Greek myths explore the idea of intelligent automata and artificially created humans

Talos was a giant bronze automaton tasked with protecting Crete, circling the shores thrice daily. Creating machines that mimicked living things was a popular subject for myths and a goal for many Greek engineers.



8th century BCE

Homer's epic poems *Iliad* and *Odyssey* introduce the term "automaton"

The word automaton is derived from the Ancient Greek αὐτόματον, which means "acting of one's own will." In his epic poems, he describes Golden Maidens ("Kourai Khryseai"), automatons capable of speech and learning. There are also intelligent Phaeacian ships capable of navigating on their own.



4th century BCE

Aristotle describes syllogisms

A syllogism, or a rule of inference, is a form of logical reasoning that consists of two premises leading to a conclusion. An example of a syllogism is: "All mammals are animals. All cows are mammals. Therefore, all cows are animals."

This type of deductive reasoning is foundational for AI to mimic human decision-making.



4th century BCE

Aristotle predicts AI performing labor

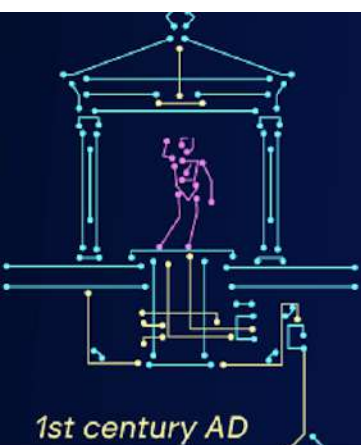
In his work *Politics*, Aristotle speculated that automata could abolish slavery and bring about equality, stating that: "There is only one condition in which we can imagine managers not needing subordinates, and masters not needing slaves. This condition would be that each instrument could do its own work, at the word of command or by intelligent anticipation, like the statues of Daedalus or the tripods made by Hephaestus."



3rd century BCE

First example of a truly automatic self-regulatory device

Greek inventor and mathematician Ctesibius invents the first artificial automatic self-regulatory system by designing an improved clepsydra ("water clock"). It required no outside intervention between the feedback and controls of the mechanism.



1st century AD

Automatic theater

Greek mathematician and engineer Hero of Alexandria (also known as Heron) creates an entirely mechanical play out of automatons, including one that could speak.



260 AD

Origin of semantic networks

Neoplatonic philosopher Porphyry writes *Isagogê*, which categorized knowledge and logic. It included a drawing of what would later be known as a "semantic net," a foundation of machine learning.



~800 AD

Alchemy of life

Arabic author Jabir ibn Hayyan develops the alchemical theory of Takwin, which is the creation of synthetic life.



9th century AD

Possible first machine with a stored program

The Banū Mūsā brothers, Persian scholars, create a programmable steam-powered flute controlled by a program of pins on a revolving cylinder.



825 AD

The origin of the algorithm

Persian polymath Al-Khwarizmi wrote textbooks with step-by-step algebra and arithmetic methods used in Islam, India, and Europe until the 16th century. The word "algorithm" stems from his name.



1206

Programmable orchestra

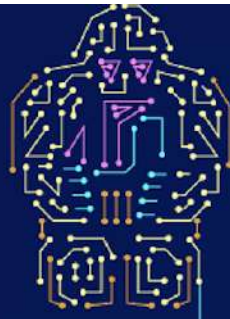
Muslim polymath Ismail al-Jazari creates a musical robot band that moved with hydraulics. Different rhythms could be achieved by adjusting pegs and levers.



1275

Ars Magna

Mallorcan theologian Ramon Llull invents the *Ars Magna*, a tool for combining concepts mechanically. He described these machines as entities that could unite basic truths into advanced knowledge.



~1580

Golem

Rabbi Judah Loew ben Bezalel of Prague claims to have invented a Golem, a clay creature brought to life.



1620

Inductive reasoning

English philosopher Francis Bacon introduces inductive reasoning in his work *Novum Organum*. Inductive reasoning is vital for AI systems as it allows machines to fill in gaps of information, adapt to situations based on observed patterns, and make educated guesses.



1637

Discourse on the Method

French philosopher René Descartes argues that for human-like automata to acquire intelligence, they would need the capability to respond to any unknown situation that it may encounter and to be able to arrange words in response to anything said in its presence. This was one of the first philosophical explorations of artificial intelligence.



1642

Mechanical calculator

French mathematician and philosopher Blaise Pascal invents the mechanical calculator.



1651

Leviathan

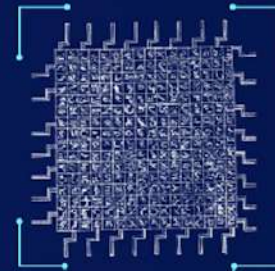
English philosopher Thomas Hobbes is considered by some historians as one of the first “prophets” of AI. *Leviathan* envisions a world ruled by an absolute sovereign and explores the notion of cognition being a mechanical process.

$$\int_a^b f'(t) dt = f(b) - f(a)$$

1676

Chain rule

German polymath Gottfried Wilhelm Leibniz derives the chain rule, a mathematical formula used by AI to train neural networks.



1726

Gulliver's Travels

Anglo-Irish author Jonathan Swift writes *Gulliver's Travels*, which features The Engine, a machine that generates permutations of word sets. It is one of the earliest known references to a device resembling the modern computer.



1750

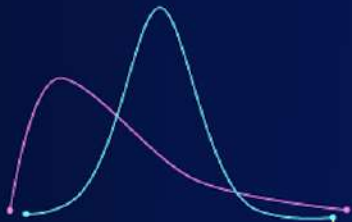
L'Homme Machine

French physician and philosopher Julien Offray de La Mettrie publishes *L'Homme Machine*, which argues that human thought is strictly mechanical and that the body and mind are one.

1763

Bayes' theorem

English statistician Thomas Bayes' work "An Essay Towards Solving a Problem in the Doctrine of Chances" is published, which laid the foundations for Bayes' theorem, a mathematical rule for finding the probability of a cause given its effect. This is used for modern AI in Bayesian networks.



1800

First industrial software

French weaver and merchant Joseph Marie Jacquard invents the earliest programmable loom, which operated with replaceable punched cards that produced different textile weaving sequences. This may have been the first industrial software for commercial use.



1818

Frankenstein

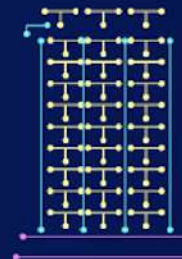
English novelist Mary Shelley publishes *Frankenstein*, a story that explores the creation and ethics of sentient beings.



1820s

First mechanical computer

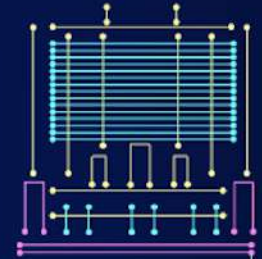
English polymath Charles Babbage invents the first mechanical computer, the Difference Engine.



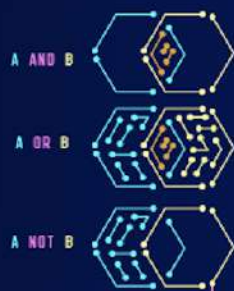
1837

First Turing-complete computer

Charles Babbage and Ada Lovelace propose the Analytical Engine, the first design for a general-purpose computer which could be described in modern terms as Turing-complete (a system that can handle any computation).



modern computer.



1854

Boolean logic

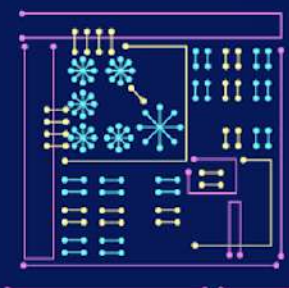
English mathematician George Boole invents Boolean logic, which became essential in computer programming (the origin of 1 and 0 as truth values) and laying the foundations of the Information Age.



1863

Evolution of machines

English novelist Samuel Butler proposes that Darwinian evolution also applies to machines, predicting that they will one day surpass humans: "In the course of ages we shall find ourselves the inferior race."



1912

El Ajedrecista

Spanish inventor Leonardo Torres Quevedo builds El Ajedrecista, a pioneering automaton capable of playing chess. This may be the world's first computer game.



1923

Rossum's Universal Robots

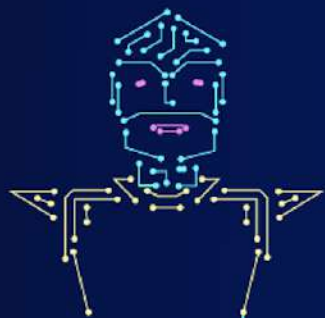
Czech playwright Karel Čapek opens *Rossum's Universal Robots* (R.U.R.) in London, a play about artificial workers in a factory. It was the first use of the word "robot" in the English language.



1925

Ising model

German physicists Wilhelm Lenz and Ernst Ising create the Ising model, a mathematical model which can be viewed as the first artificial recurrent neural network.



1928

First humanoid robot

Captain William Richards and aircraft engineer Alan Reffell build Eric, the first humanoid robot. It was able to stand, bow, and deliver a speech.



1929

First robot of the East

Concerned by the depiction of robots as slaves in *R.U.R.*, biologist Makoto Nishimura builds Gakutensoku, the first robot of the East. His intention was to create a robot that would celebrate nature and humanity and be a friend to people.



1931

Incompleteness Theorem

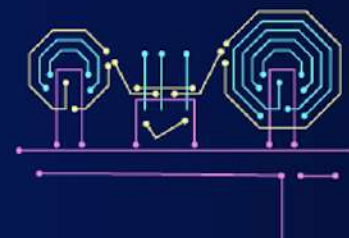
Logician Kurt Gödel proposes the Incompleteness Theorem which identified the fundamental limitations on what a computer could prove or disprove. This laid the foundations for theoretical computer science and AI theory.



1936

Lambda calculus

American mathematician Alonzo Church develops Lambda calculus, a system in mathematical logic that would become important to the theory of programming languages.



1936

Turing machine

Alan Turing, widely considered the father of theoretical computer science, introduces the Turing machine, an abstract device capable of implementing any computer algorithm.



1940

First gaming computer

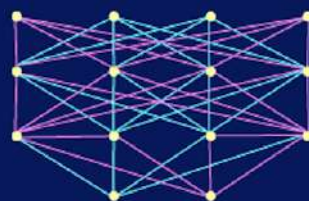
Nuclear scientist Edward Condon creates the Nimatron, one of the earliest examples of artificial intelligence in video games. Over 50,000 played against it – few won.



1941

First programmable computer

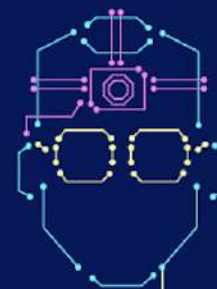
Computer scientist Konrad Zuse invents Z3, the world's first programmable computer.



1943

First mathematical model of an artificial neural network/perceptron

Warren McCulloch and Walter Pitts publish "A Logical Calculus of the Ideas Immanent in Nervous Activity," drawing parallels between the brain and computers for the first time. This would become known as a perceptron.



1945

"As We May Think"

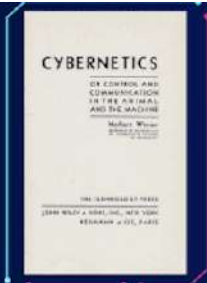
American engineer Vannevar Bush publishes a visionary essay that predicts many aspects of today's information society and the profound integration of computers in our lives.



1945

First programmable, all-electronic computer

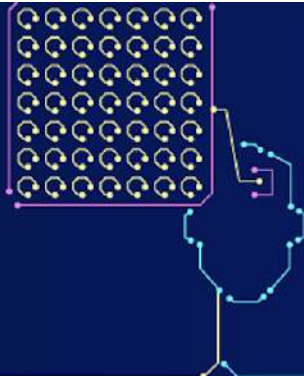
Designed by John Mauchly and J. Presper Eckert, ENIAC (Electronic Numerical Integrator and Computer) becomes the first electronic, largescale, general-purpose digital computer that could be programmed.



1948

The origin of cybernetics

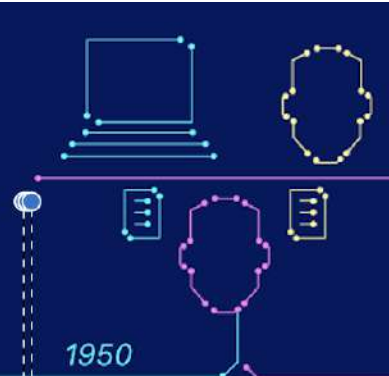
American computer scientist Norbert Wiener coins the term cybernetics as the study of "control and communication in the animal and the machine."



1949

Giant Brains, or Machines That Think

American computer scientist Edmund Berkeley publishes a groundbreaking book that stated: "These machines are similar to what a brain would be if it were made of hardware and wire instead of flesh and nerves... A machine can handle information; it can calculate, conclude, and choose; it can perform reasonable operations with information. A machine, therefore, can think."



1950

The Turing Test

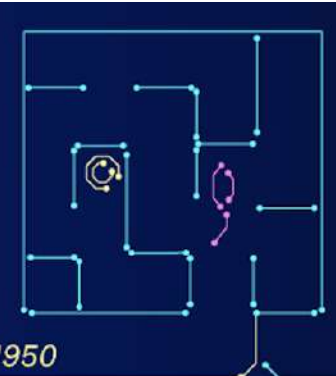
Alan Turing introduces the Turing Test, originally called the imitation game, a method of testing a machine's ability to exhibit intelligent behavior equivalent to, or indistinguishable from, a human being.



1950

"I, Robot"

Isaac Asimov publishes an anthology of stories sharing a theme of the interaction of humans, robots, and morality. It included the "Three Laws of Robotics," a code of ethics for robots.



1950

First electrical device to use trial and error

Claude Shannon, alongside his wife, designs Theseus, a device that learns the shortest path through a maze via trial and error.



1955

"Artificial Intelligence"

Professor John McCarthy coins the term "artificial intelligence" in his proposal for an upcoming research project.



1955

Checkers-playing program

IBM's Arthur Samuel creates a version of his checkers-playing program capable of learning to play.



1956

First artificial intelligence program

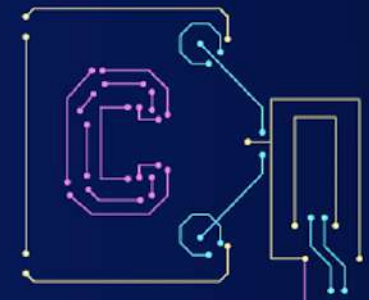
Herbert Simon and Allen Newell develop Logic Theorist, the first program that simulated how humans use reason to solve complex problems. It was able to find new and more elegant proofs for some math theorems.



1956

Dartmouth Summer Research Project on Artificial Intelligence

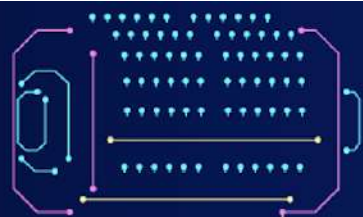
A small group of prolific scientists gather at Dartmouth College, organized by John McCarthy. He stated the goal was "to proceed on the basis of the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it." It is considered the founding event of artificial intelligence as a field.



1957

First hardware application of a machine that could "see"

Frank Rosenblatt develops the Mark I Perceptron, a machine consisting of 400 photocells that could classify images. The New York Times described it as: "The embryo of an electronic computer that [the Navy] expects will be able to walk, talk, see, write, reproduce itself and be conscious of its existence."



1957

First music composed by an electronic computer

The ILLIAC 1 computer produces the Illiac Suite, a score created for a string quartet.



1958

First AI programming language

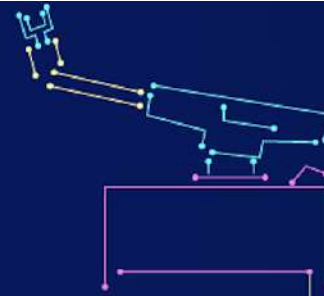
John McCarthy invents the Lisp programming language which is still widely used today.



1959

Machine learning

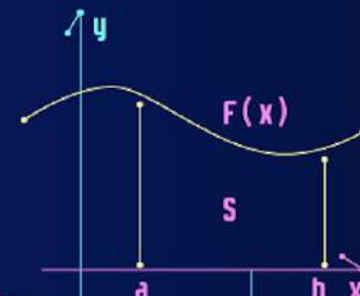
Arthur Samuel coins the term machine learning, defining it as a "field of study that gives computers the ability to learn without being explicitly programmed."



1961

First industrial robot

Unimate clocks were the first industrial robot at the General Motors plant in New Jersey.



1961

First symbolic integration program

Using Lisp, James Slagle writes SAINT, a program capable of solving calculus problems at the college freshman level.



1964

STUDENT

Using Lisp, Daniel Bobrow writes STUDENT, an artificial intelligence program capable of solving algebra word problems.

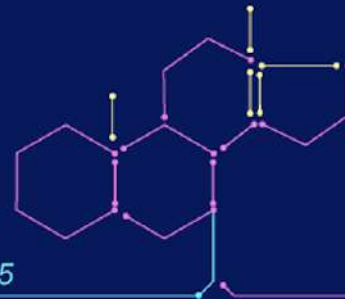
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EEEEEE LL   IIII ZZZZZZ AAAAA
EE      LL   II   ZZ   AA  AA
EEEEEE LL   II   ZZZ  AAAAAA
EE      LL   II   ZZ   AA  AA
EEEEEE LLLLLL IIII ZZZZZZ AA  AA
  
```

1965

First AI "chatbot" and first generative AI

Joseph Weizenbaum develops ELIZA, a program that could simulate conversation using a pattern matching and substitution methodology.



1965

First expert system

Edward Feigenbaum, Bruce G. Buchanan, Joshua Lederberg, and Carl Djerassi begin working on Dendral, an AI capable of helping organic chemists identify unknown organic molecules. It could emulate the decision-making ability of a human expert, making it the first "expert system."



1966

First "reasonable" robot

Shakey the Robot, developed at Stanford Research Institute, becomes the first general-purpose mobile robot able to reason about its own actions.



1968

HAL 9000

The film 2001: A Space Odyssey is released, one of the first films featuring a sentient computer.



1968

First AI program to understand natural language

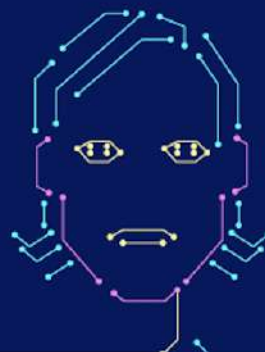
Computer scientist Terry Winograd develops SHRDLU, an AI program that could be instructed to move objects in a "blocks world" and had a basic memory to supply context.



1970

Backpropagation

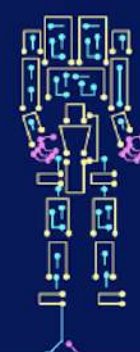
Mathematician Seppo Ilmari Linnainmaa publishes the reverse mode of automatic differentiation which would later become known as backpropagation, a crucial method for training artificial neural networks.



1970

Uncanny Valley

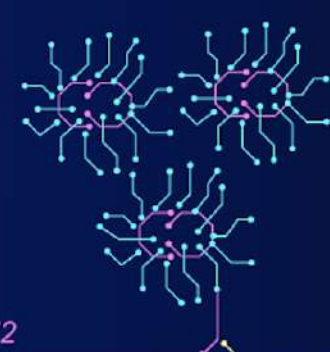
Japanese robotics professor Masahiro Mori coins the term "Uncanny Valley" to describe the eerie or unsettling feeling people experience in response to artificially created humanoids that are not quite life-like.



1972

WABOT-1

Waseda University develops the WABOT-1, the first full-scale humanoid intelligent robot. It was the first android able to walk, talk, measure distances with external receptors, and grip objects.



1972

MYCIN

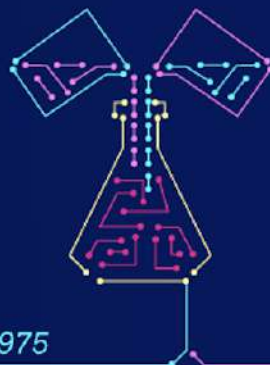
Stanford University develops MYCIN, an expert system capable of identifying the bacteria causing severe infections and recommending appropriate antibiotics.



1973

AI draws criticism – AI winter

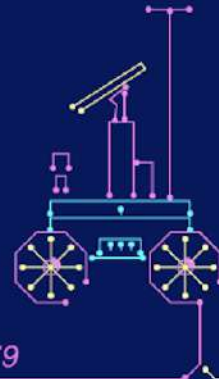
Mathematician James Lighthill publishes the Lighthill report, a disparaging analysis of the progress of AI research: "In no part of the field (of AI) have the discoveries made so far produced the major impact that was then promised." This led the U.S. and British governments to cut back funding for AI research.



1975

First scientific discoveries published by an AI program

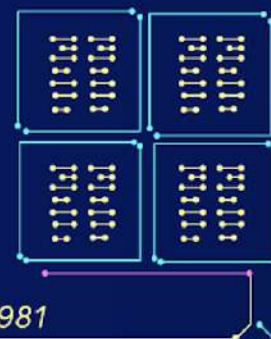
The Meta-Dendral learning program produces new results in chemistry and mass spectrometry, which are published in a peer-reviewed journal.



1979

First autonomous vehicle

Built by robotics expert Hans Moravec, the Stanford Cart becomes the first computer-controlled, autonomous vehicle, to successfully traverse a chair-filled room on its own.



1981

Dawn of parallel computing

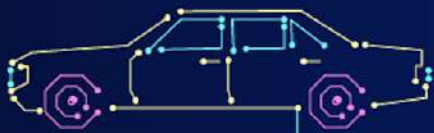
American inventor Danny Hillis creates a Connection Machine, a supercomputer that utilizes massively parallel computing. This would revolutionize AI technology and computation.



1985

First AI program for making art

Artist Harold Cohen introduces AARON, an AI capable of producing paintings and drawings autonomously.



1994

First self-driving car journey with passengers

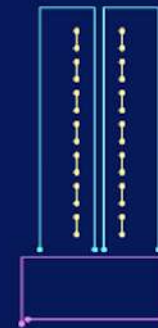
Twin robot cars VaMP and VITA-2 travel over one thousand kilometers on a Paris highway in heavy traffic reaching speeds of 130 km/h. They demonstrated self-driving in free lanes, convoy driving, and lane changes among other cars.



1995

A.L.I.C.E.

Richard Wallace launches Artificial Linguistic Internet Computer Entity, a program that engages in conversation with users by applying heuristic pattern matching rules to their input. It won the Loebner Prize three times, an award given to the most human-like computer programs.



1996

Deep Blue

Deep Blue, a chess-playing expert system, is released. After an upgrade, it defeated world champion Garry Kasparov in a six-game match.



1997

First robot sports match

First official RoboCup, a football (soccer) match featuring 40 teams of intelligent robots.



1998

Furby

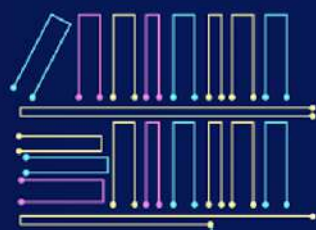
Tiger Electronics launches Furby, the first successful AI product to reach a domestic environment.



1998

Semantic Web road map

Tim Berners-Lee, inventor of the World Wide Web, introduces the Semantic Web (or Web 3.0) to make the Internet capable of machine learning.



1998

Dawn of AI advertising

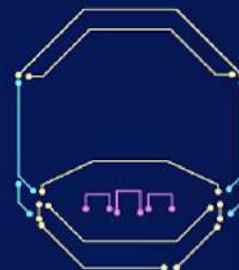
A Columbia University report on "digital bookshelves" marks the concept of clustering consumer behaviors to predict and suggest favorable products (such as books you might like) by AI.



2000

First emotion-recognizing AI

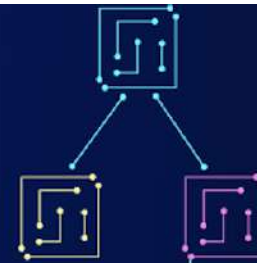
Dr. Cynthia Breazeal develops Kismet, a robot head capable of recognizing and simulating emotions. It featured a synthetic nervous system, the first of its kind.



2002

First smart vacuum

iRobot launches Roomba, an autonomous robotic vacuum cleaner.



2006

ImageNet

Computer scientist Dr. Fei-Fei Li creates ImageNet, a large database of annotated images that sparked rapid advancements in computer vision and deep learning research.



2011

AI wins Jeopardy!

IBM's Watson, a computer system capable of answering questions posed in natural language, wins against two Jeopardy champions for a grand prize of \$1 million.



2011

Siri

Apple introduces Siri, a digital assistant for iPhones. It uses a natural-language user interface to answer questions, make recommendations, and perform requests.



2012

AlexNet

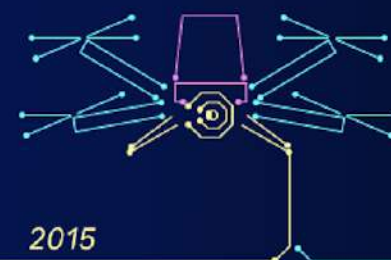
AlexNet, a deep learning model by Alex Krizhevsky, wins the ImageNet Large Scale Visual Recognition Challenge by a landslide. This was a major turning point in AI history; deep learning networks became the favorable model for training AI programs.



2014

Generative Adversarial Networks (GANs)

Computer scientist Ian Goodfellow and colleagues introduce GANs. Two neural networks engage in a "rivalry," creating and comparing outputs (images, text, etc.) against each other until they can no longer discriminate between the original and the creation. This was a major step forward in AI being able to "imagine."



2015

Letter to ban autonomous weapons

Stephen Hawking, Elon Musk, Steve Wozniak, and 3,000 other researchers sign an open letter to ban the development and use of autonomous weapons.



2016

First robot citizen

Sophia, a humanoid robot capable of learning social skills, is introduced to the world. She was granted citizenship by Saudi Arabia in 2017, making her the first robot to receive legal personhood.



2017

Transformer (deep learning architecture)

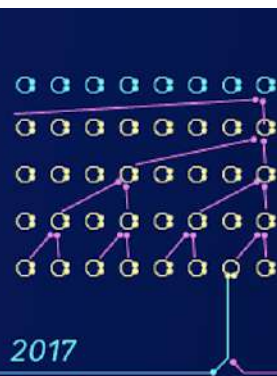
Researchers at Google publish the landmark paper "Attention Is All You Need," which introduced the deep learning architecture known as the transformer. This would become the main architecture for large learning models like GPT.



2017

AI defeats the Go champion

DeepMind's AlphaGo, a program that plays the ancient board game Go, defeats Lee Sedol, the reigning Go champion. After losing, he stated: "I could no longer enjoy the game. So I retired."



2017

WaveNet

DeepMind launches WaveNet, a generator capable of producing new, unique voices using example datasets.



2017

Google Lens

Google Lens is launched, an image analysis and comparison tool capable of associating millions of artworks, landscapes, products, and species to text descriptions.



2017

Origin of "deepfake"

The term deepfakes originated from a Reddit user named "deepfakes" who was active in the community r/deepfakes, a place to share such creations.



2019

AlphaStar achieves grandmastery

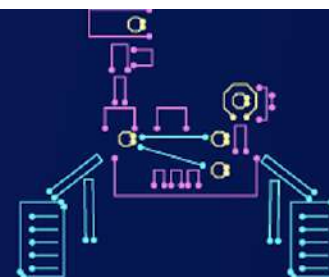
DeepMind's computer program, AlphaStar, attained grandmaster status in StarCraft II, meaning it outperformed 99.8% of players.



March 2020

Impressions

Impressions becomes the first mobile app for the creation of celebrity deepfake videos.



July 2020

First use of AI on Mars

NASA launches the Perseverance rover which uses AI to seek out minerals and make autonomous decisions based on real-time analysis of rocks.



July 2021

DNA prediction software

Google DeepMind launches AlphaFold, software that helps identify cancer and other genetic diseases by analyzing DNA.



July 2022

Midjourney

A beta version of Midjourney is released, a generative AI program that creates images from natural language descriptions.



November 2022

ChatGPT

OpenAI launches ChatGPT, a chatbot and virtual assistant based on large language models. By 2023, it became the fastest-growing consumer software application in history.



February 2023

First AI video generator

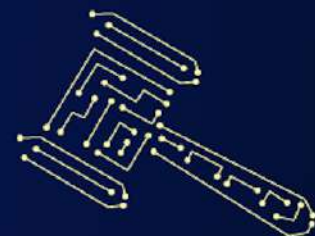
Runway AI becomes the first publicly available video-to-video and text-to-video generator.



May 2023

Statement on AI Risk

Prominent AI researchers and tech leaders state: "Mitigating the risk of extinction from AI should be a global priority alongside other societal-scale risks such as pandemics and nuclear war."



August 2023

First AI age discrimination lawsuit settled

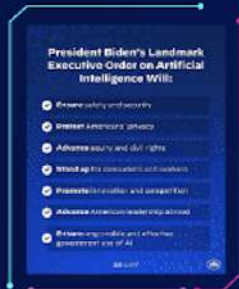
In the first legal case involving a company's use of AI for employment decisions, iTutorGroup Inc. is required to pay \$365,000 to job seekers who were disqualified for being over the age of 40.



September 2023

AI Insight Forum

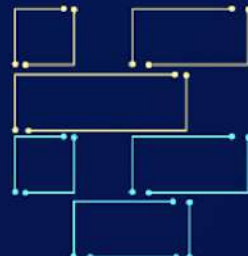
The U.S. Senate holds the inaugural bipartisan "AI Insight Forum," a gathering of politicians, CEOs, industry reps, and thought leaders to discuss growing anxieties about the dangers of AI.



October 2023

Executive order on AI

U.S. President Biden signs the Executive Order on the Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence to outline the administration's policies on the rapid rise of AI.



November 2023

First AI Safety Summit

Representatives from 28 countries gather at Bletchley Park in the U.K. to discuss the safety and regulation of artificial intelligence.



December 2023

Gemini

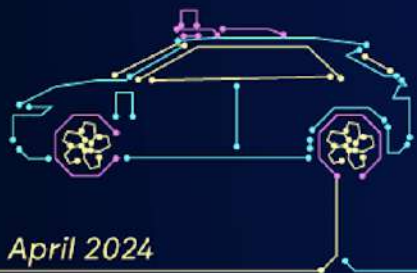
Google DeepMind launches Gemini, a generative artificial intelligence chatbot that can respond to queries with text, code, or images.



March 2024

First federal lawsuit drafted by AI

Doucet Co., LPA, using AI.Law's drafting technology, files the first federal lawsuit drafted entirely by artificial intelligence.



April 2024

First self-driving car to “earn” a driver’s license

Hyundai’s IONIQ5 robotaxi becomes the first car to pass a standard driving license test by a real-life driving examiner. It achieved a perfect score.



May 2024

First AI regulatory framework in the U.S.

Colorado becomes the first U.S. state to enact a regulatory framework to govern the use and development of AI.



June 2024

Apple Intelligence

Apple announces new iPhones will incorporate ChatGPT.



August 2024

First Chief Artificial Intelligence Officer

Lisa Einstein becomes the first Chief Artificial Intelligence Officer for America’s Cybersecurity and Infrastructure Security Agency.