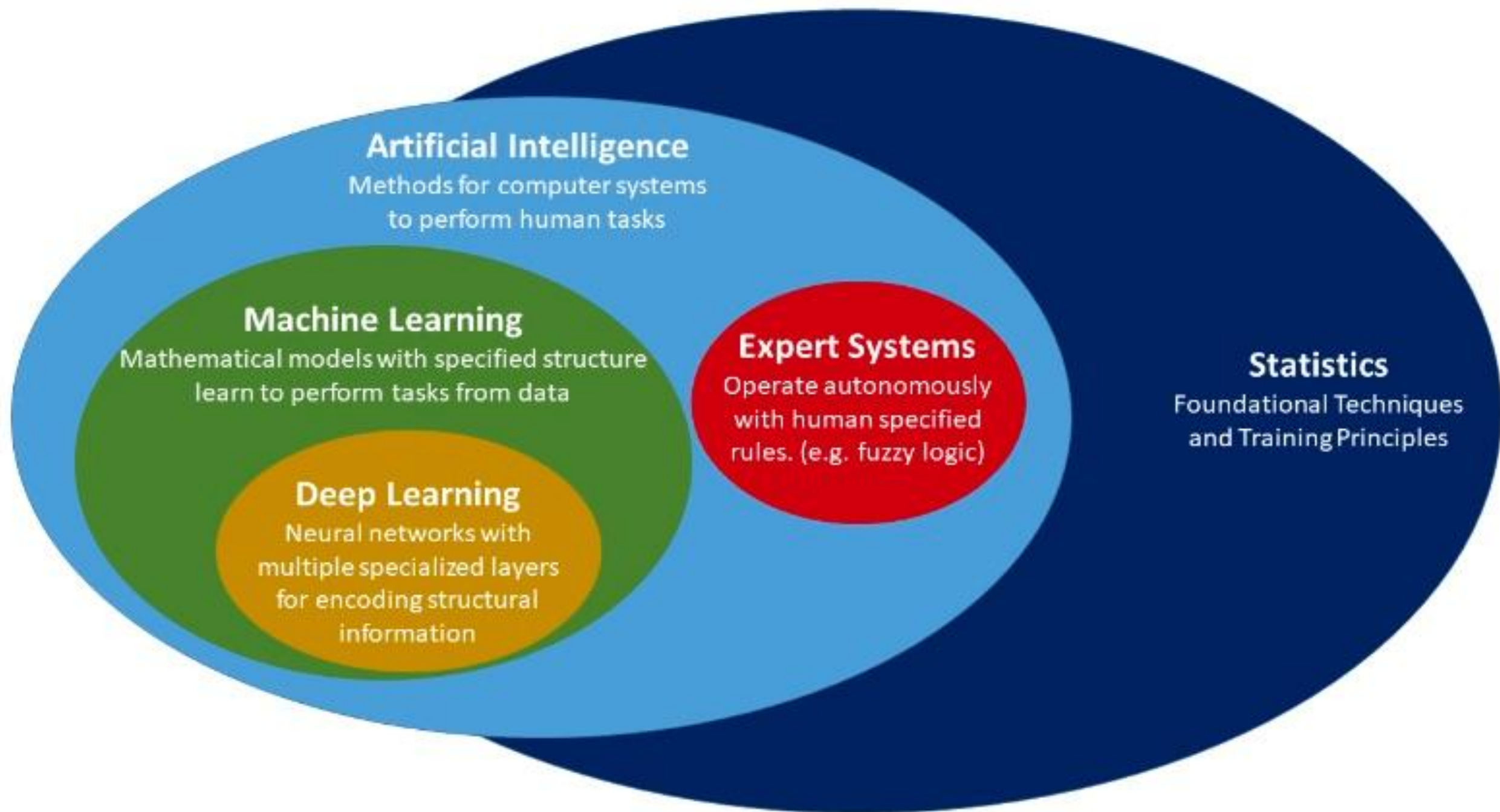


# Foundations and History of AI

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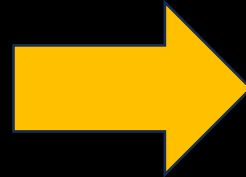


Fascination about the future!



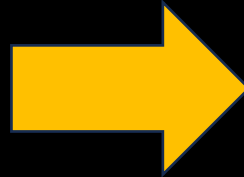
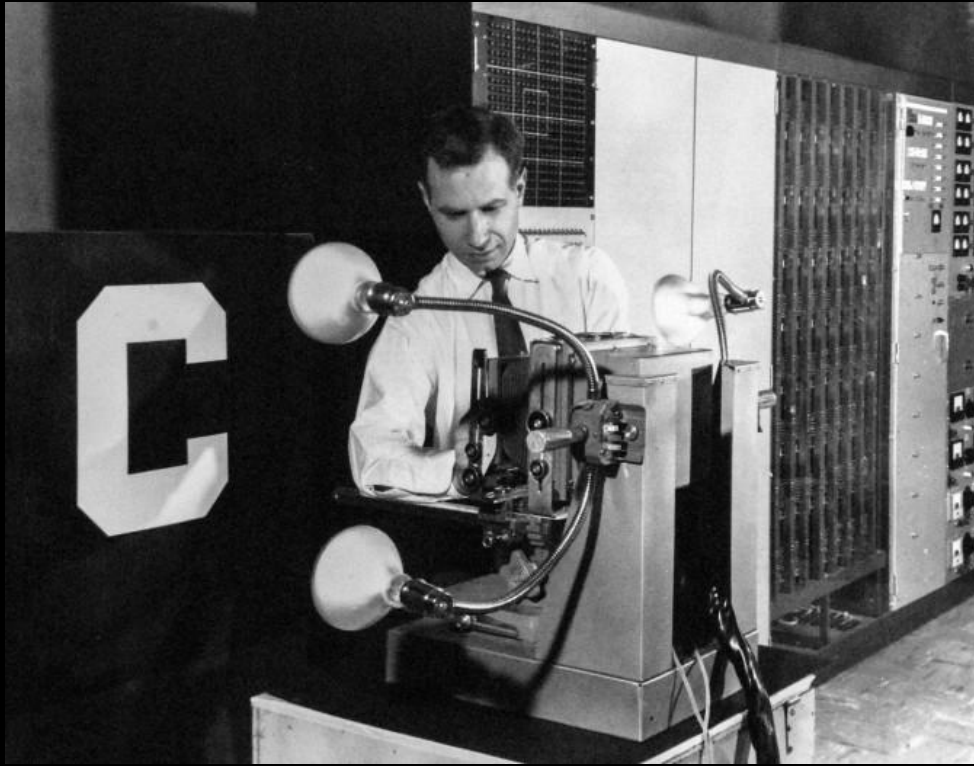


# Journey of AI is mesmerizing



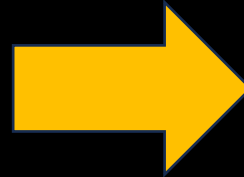
MAARS reads heart-scar “fingerprints” that doctors miss, predicting fatal arrhythmias with nearly 90% accuracy and revolutionizing care for hypertrophic cardiomyopathy patients. Credit: Shutterstock

# Perceptron to Image Generation





# Teleoperator to AI Interviews



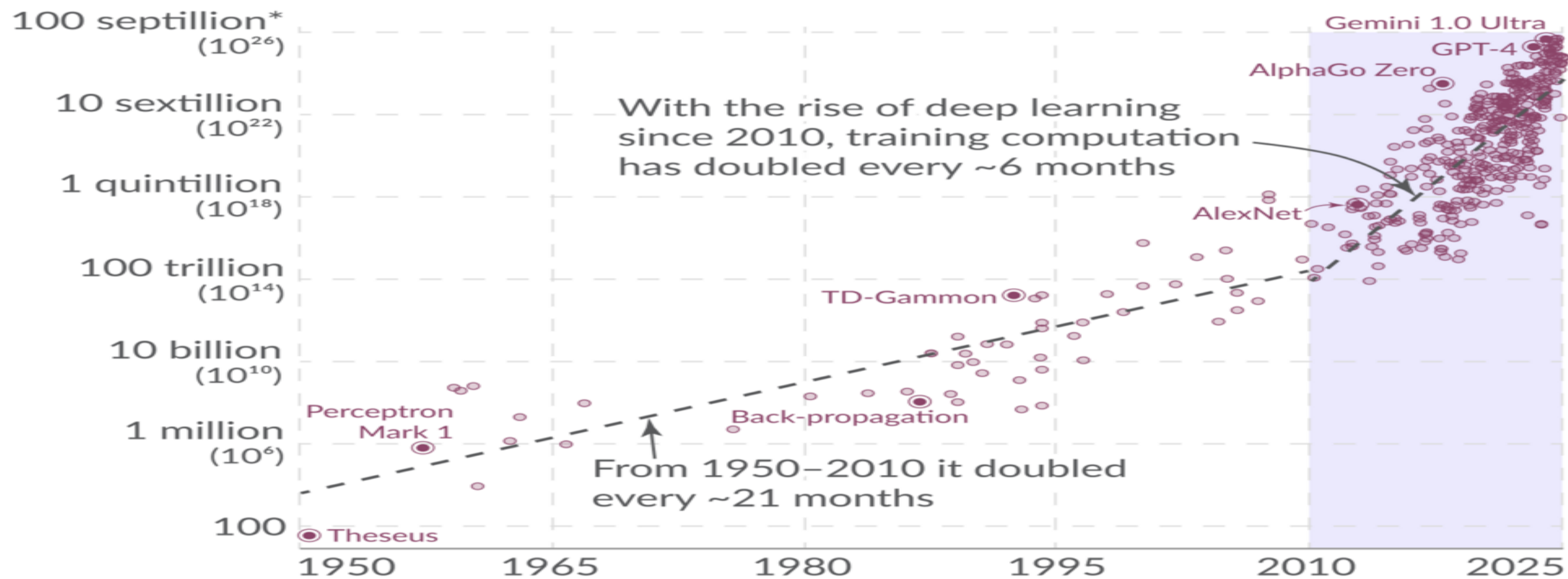
<https://youtu.be/rgD2gmwCS10>





# The computation used to train notable AI systems has doubled every ~6 months since 2010

Training computation is measured in total floating-point operations (FLOP). Each FLOP represents a single arithmetic calculation, such as multiplication. Shown on a logarithmic scale.



\*For comparison, 1 septillion (1,000,000,000,000,000,000,000,000) is the estimated number of stars in the universe.

Data source: Epoch (2024)

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# Pivotal moments of AI History

# 1900 – 1950

- **1900 – Triode Vacuum Tube**  
Enabled amplification and switching — a precursor to modern computing electronics.
- **1920 – First Ever Robot**  
Early mechanical automatons; the word "robot" first appeared in Karel Čapek's play *R.U.R.* (1921).
- **1938 – Digital Logic**  
Claude Shannon formalized the use of Boolean algebra to design digital circuits.
- **1948 – Cybernetics**  
Norbert Wiener's work on control theory and feedback systems laid groundwork for automation.
- **1950 – Turing Test**  
Alan Turing proposed a test to judge a machine's intelligence based on human-like conversation.

# 1950 – 1973

- **1956 – AI Term Born**  
Dartmouth Conference: John McCarthy coins “Artificial Intelligence”.
- **1957 – First Perceptron**  
Frank Rosenblatt’s simple neural network for pattern recognition.
- **1957 – First AI Program**  
Logic Theorist by Newell & Simon could prove mathematical theorems.
- **1965 – First Ind. Robot**  
*Industrial* robot “Unimate” used in manufacturing automation.
- **1965 – ELIZA ChatBot**  
Joseph Weizenbaum’s text-based chatbot that mimicked human conversation.
- **1973 – 1st AI Winter Begins**  
Funding and interest declined due to unmet expectations.



# 1980 – 1987

- **1980 – WABOT-2**

A humanoid robot from Japan that could read sheet music and play piano.

- **1982 – Hopfield ANN**

Recurrent neural network model by John Hopfield for associative memory.

- **1986 – Backpropagation**

Breakthrough training algorithm for multi-layer neural networks.

- **1989 – Convolutional NN**

Yann LeCun used CNNs for handwritten digit recognition (basis of modern CV).

- **2nd AI Winter Starts (1987)**

Expert systems failed commercially; AI hype cooled.

# 1993 – 2000

- **1994 – RoboCup**  
Robot soccer competition to advance robotics and AI research.
- **1997 – Deep Blue**  
IBM chess computer defeated world champion Garry Kasparov.
- **1997 – LSTM ANN**  
Long Short-Term Memory networks by Hochreiter & Schmidhuber solved vanishing gradient issues.
- **1999 – Sony AIBO**  
Robotic pet dog with vision, voice, and learning capabilities.
- **2000 – Kismet Robot**  
Social robot capable of human-like facial expressions.

# 2000 – 2012

- **2003–2005 – DARPA Challenges**

Self-driving car competitions accelerated autonomous vehicle research.

- **2006 – Deep Belief ANN**

Geoffrey Hinton introduced deep belief networks, sparking deep learning interest.

- **2008 – IBM Blue Brain**

Simulation of a rat brain's neocortical column — step toward brain emulation.

- **2010 – Apple Siri**

Voice assistant integrating natural language processing.

- **2012 – AlexNet**

CNN that won ImageNet competition, triggering deep learning revolution.



# 2012 – 2017

- **2013 – DeepMind**  
UK company working on deep reinforcement learning; later acquired by Google.
- **2014 – Generative AN**  
Ian Goodfellow's GANs generated realistic synthetic images.
- **2015 – TensorFlow**  
Google's open-source machine learning framework.
- **2016 – AlphaGo**  
DeepMind's AI defeated Go champion Lee Sedol.
- **2017 – Transformers**  
"Attention Is All You Need" architecture transformed NLP and later vision.

# 2017 – 2020

- **2017 – WaveNet**

DeepMind's audio model generating realistic speech.

- **2019 – GPT-1**

First large transformer-based language model from OpenAI.

- **2020 – BERT LM**

Pre-trained language model from Google for NLP tasks.

- **2020 – GPT-3**

175B parameter language model, powering advanced conversational AI.

- **2020 – DALL·E**

OpenAI's text-to-image generative model.

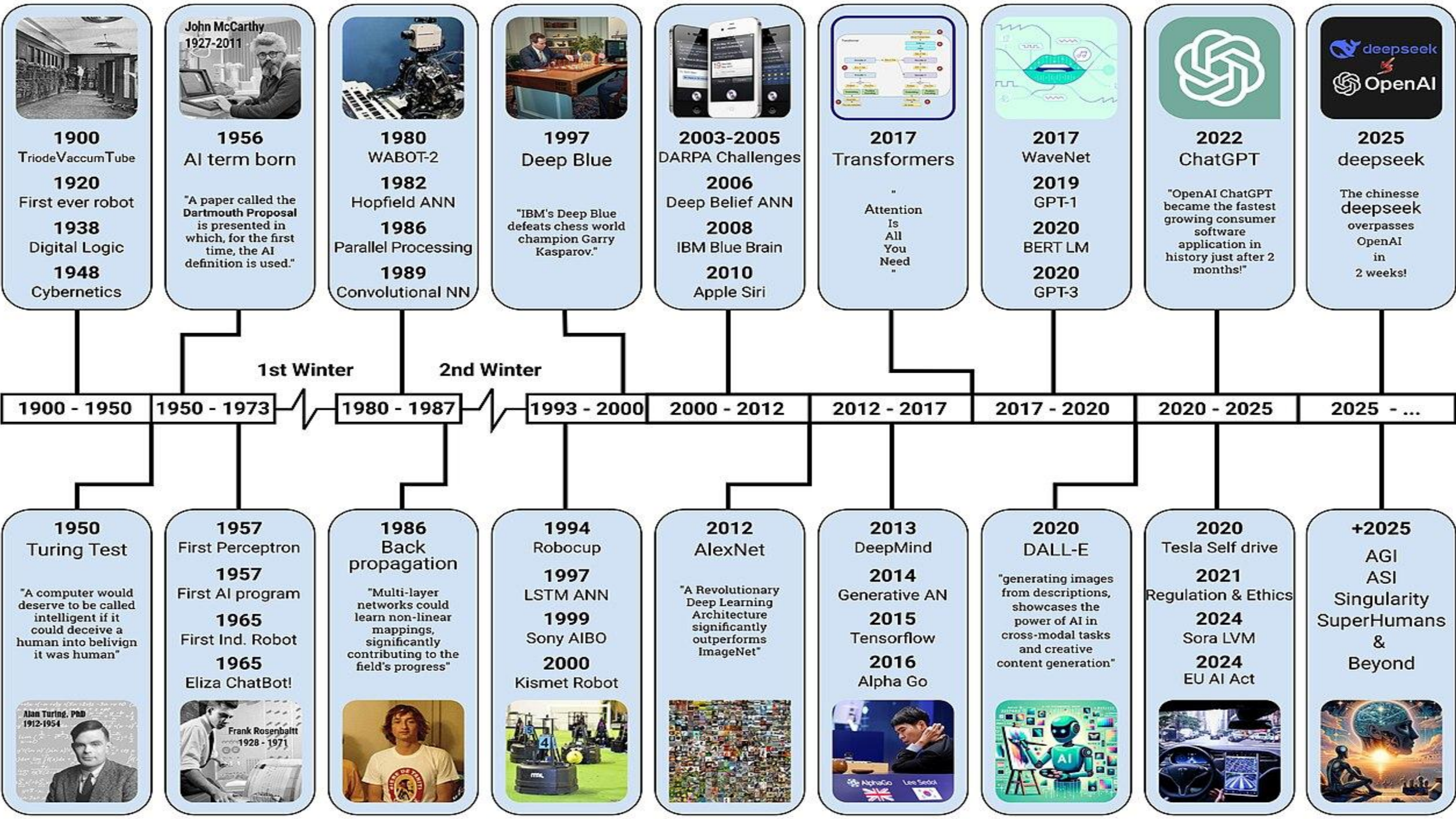
# 2020 – 2025

- **2020 – Tesla Self Drive**  
Commercial rollout of advanced driver assistance and FSD beta.
- **2021 – Regulation & Ethics**  
Increasing policy focus on responsible AI deployment.
- **2022 – ChatGPT**  
OpenAI's conversational AI became fastest-growing consumer app in history.
- **2024 – Sora LVM**  
Large video model by OpenAI for high-quality text-to-video generation.
- **2024 – EU AI Act**  
First comprehensive AI regulation in the European Union.
- **2025 – DeepSeek**  
Chinese AI model reportedly surpasses OpenAI in performance within 2 weeks.



# What could follow beyond 2025?

- **AGI** – Artificial General Intelligence: human-level capability across domains.
- **ASI** – Artificial Superintelligence: vastly surpassing human intelligence.
- **Singularity** – Hypothetical point of irreversible AI-driven change.
- **Superhumans & Beyond** – Speculative post-human future enabled by AI.

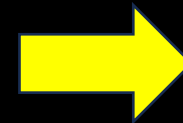
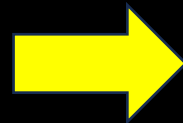


# Natural vs Artificial intelligence



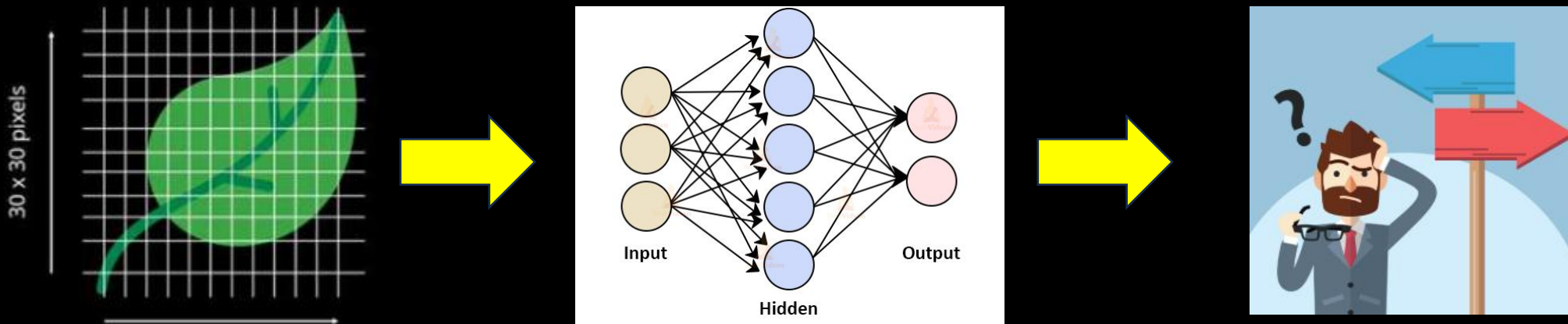
# Natural Intelligence (NI)

- Biological form of intelligence found in humans and animals.
- Enables learning from experience, adapting to new situations.
- Capable of emotions, creativity, and abstract reasoning.
- Developed over millions of years through evolution.
- Relies on a complex network of neurons in the brain.



# Artificial Intelligence (AI)

- Machine-based systems designed to mimic aspects of human intelligence.
- Learns from data and algorithms instead of biological evolution.
- Specialized in pattern recognition, problem-solving, and automation.
- Lacks consciousness, emotions, and true self-awareness.
- Can outperform humans in speed, scale, and certain specialized tasks.



# Weak AI vs Strong AI

Feature	Weak AI (Narrow AI)	Strong AI (General AI)
Scope	Single, specific task	Any intellectual task a human can do
Adaptability	Limited to trained data & rules	Learns and adapts to completely new tasks
Understanding	No real comprehension—just simulation	True understanding & reasoning
Existence Today	Already exists (e.g., Siri, ChatGPT, Tesla)	Does not exist yet
Consciousness	None	Would require consciousness or self-awareness
Examples	Chess AI, image recognition, chatbots	Hypothetical AI like in sci-fi movies



Questions ?