

# **MIST 5400**

## **Foundations of Artificial Intelligence in Business**

- History of Artificial  
Intelligence

**Pearl Yu**



# Artificial Intelligence

# Artificial Intelligence

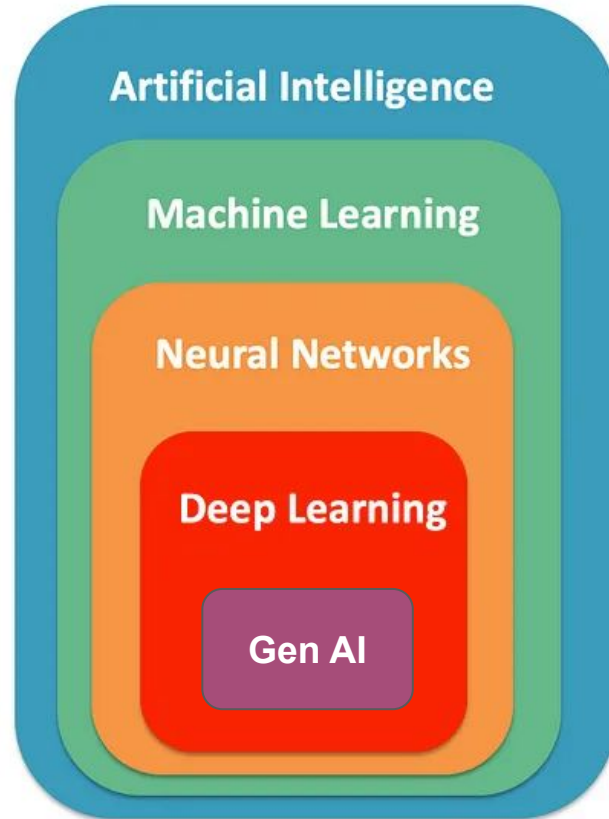
The capability of computational systems to perform tasks typically associated with human intelligence, such as learning, reasoning, problem-solving, perception, and decision-making.

# Artificial Intelligence

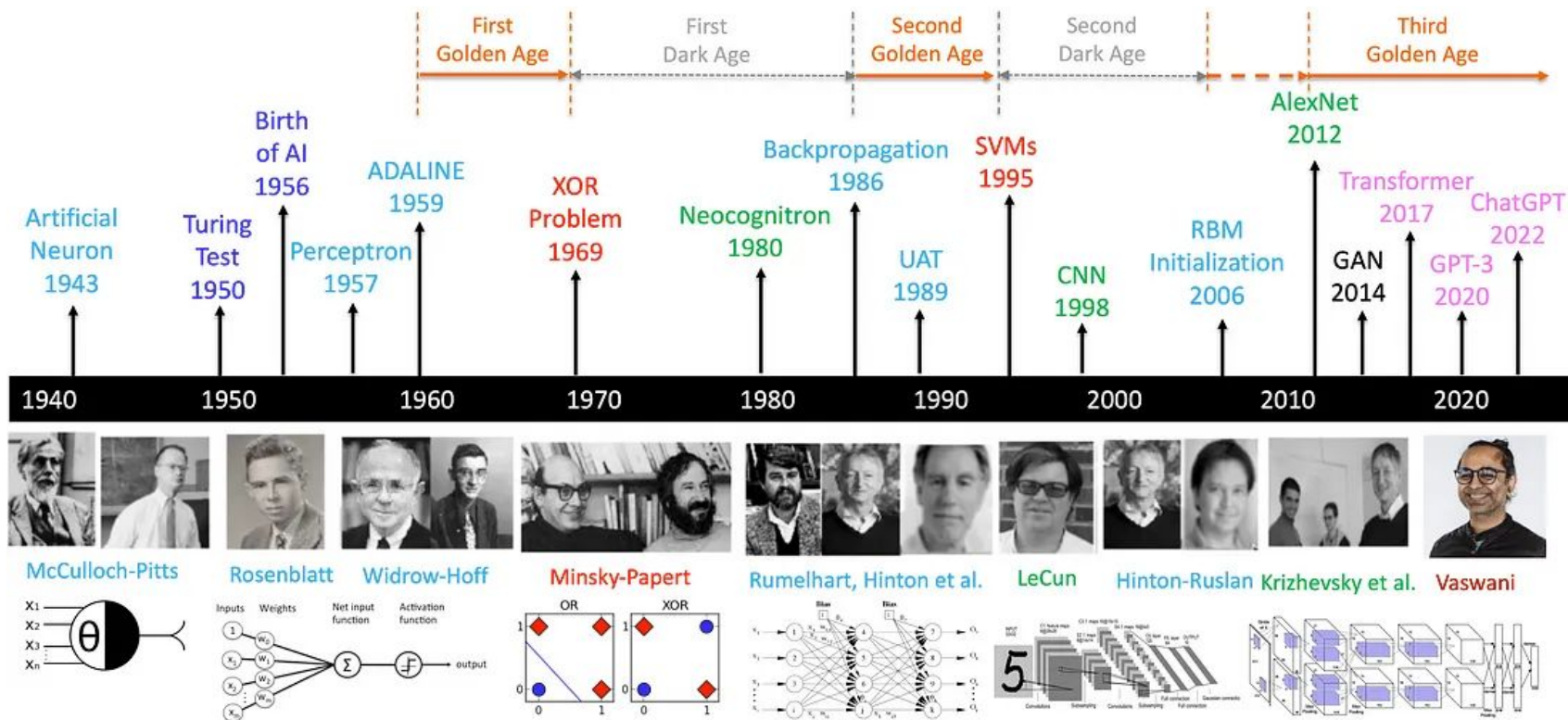
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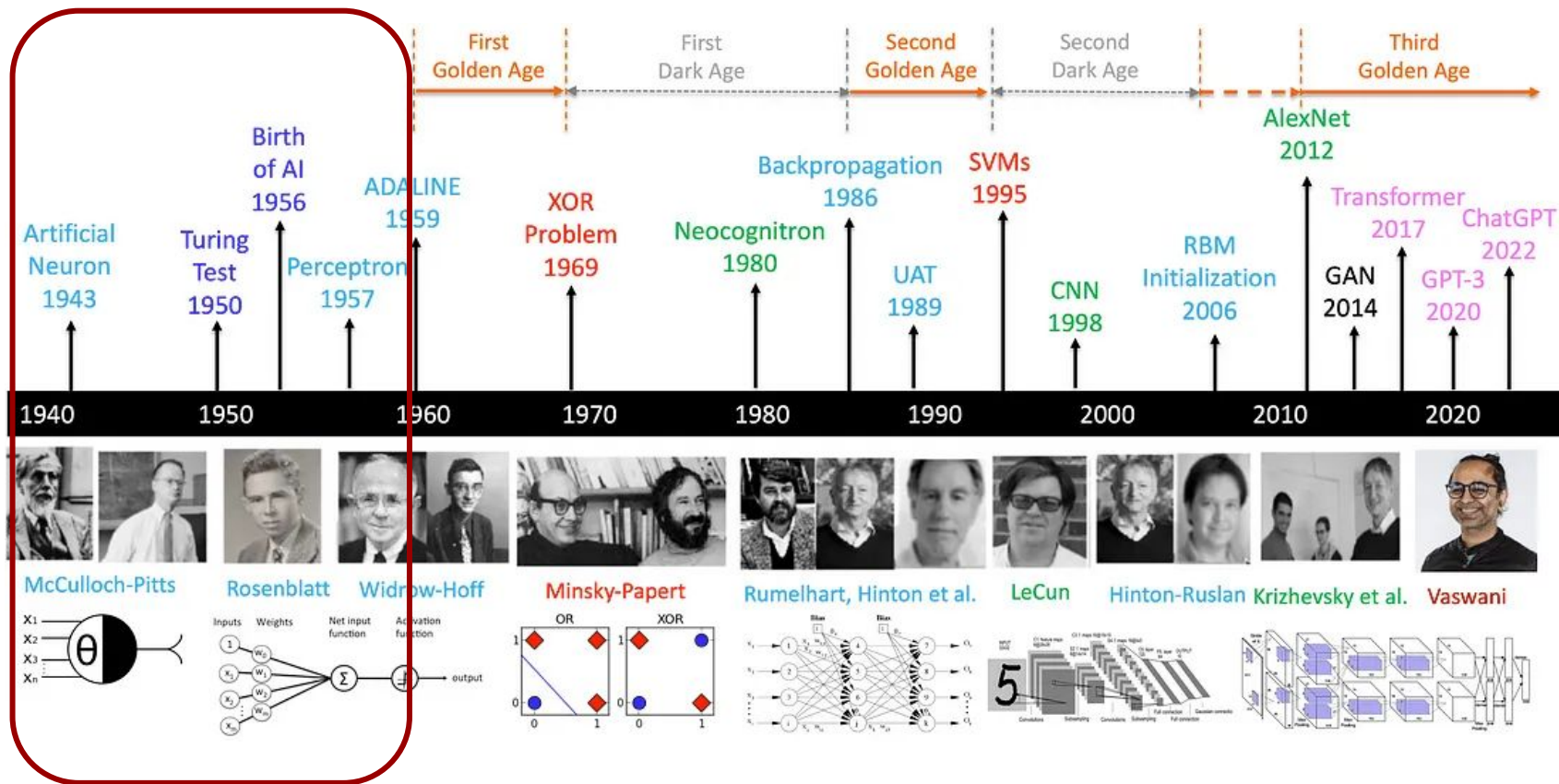


# A brief history of Artificial Intelligence





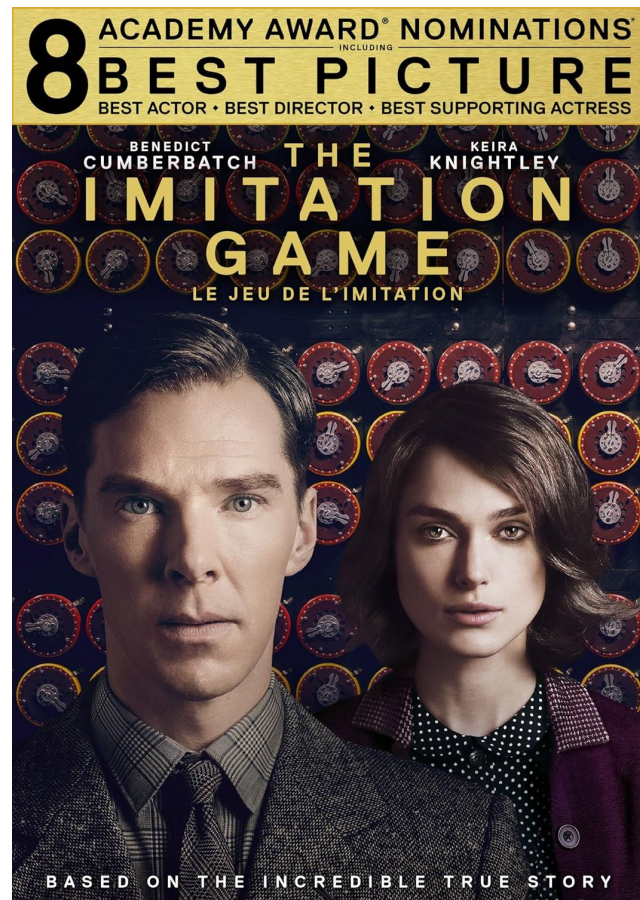
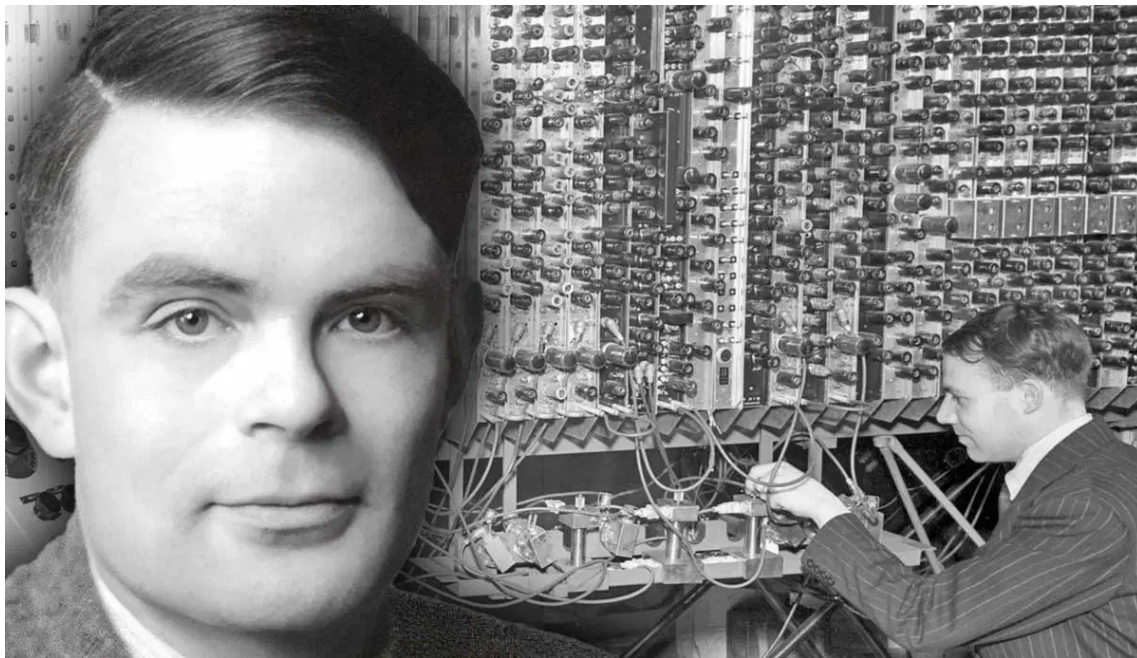
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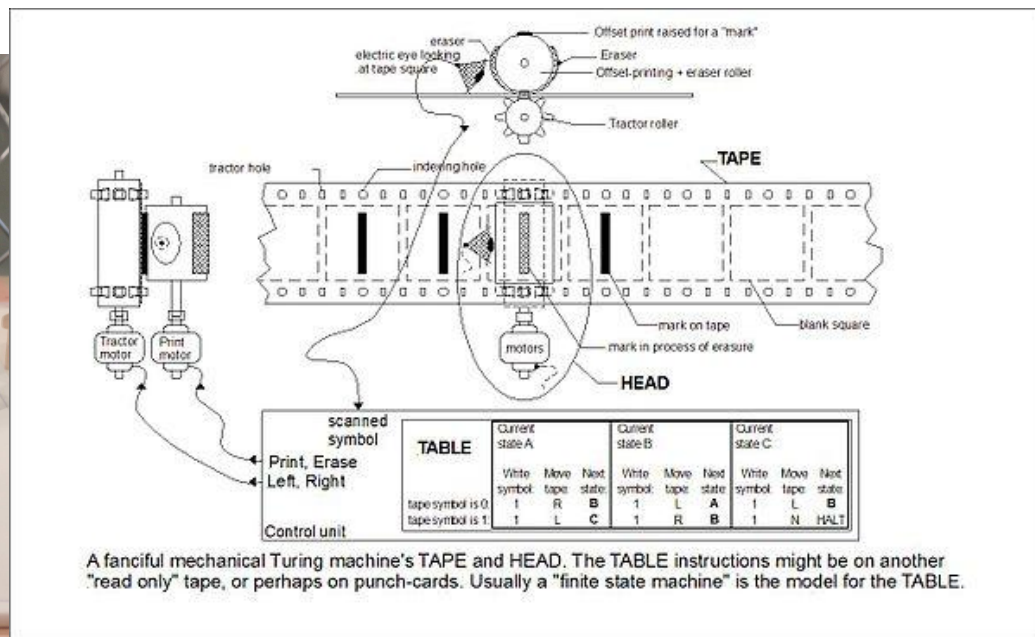
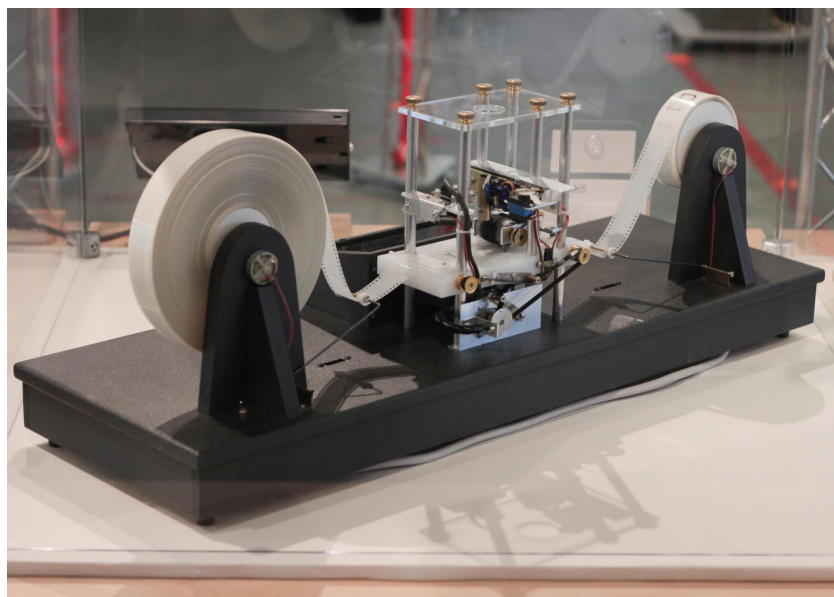
# Early Computing

- Alan Turing defines the universal computer, 1936



# Early Computing

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  - Turing Machine



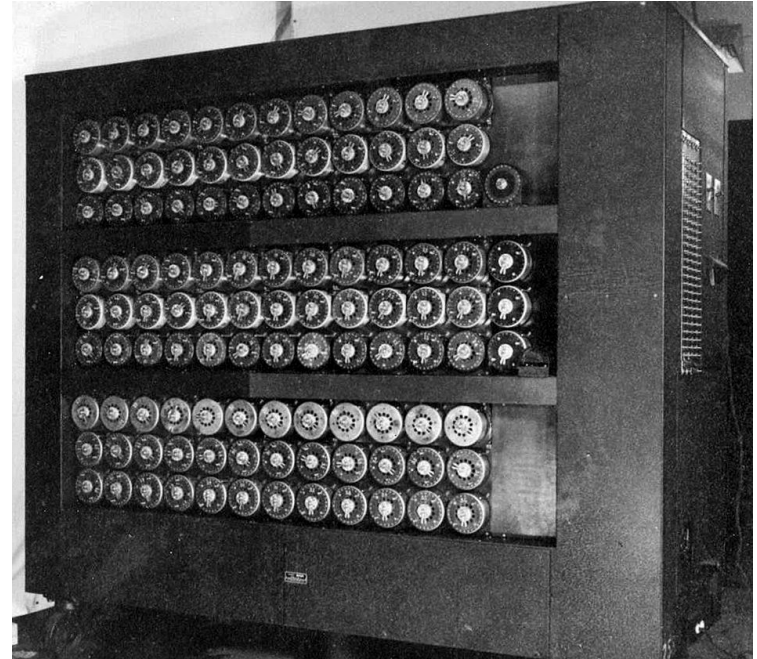
A fanciful mechanical Turing machine's TAPE and HEAD. The TABLE instructions might be on another "read only" tape, or perhaps on punch-cards. Usually a "finite state machine" is the model for the TABLE.



# Early Computing

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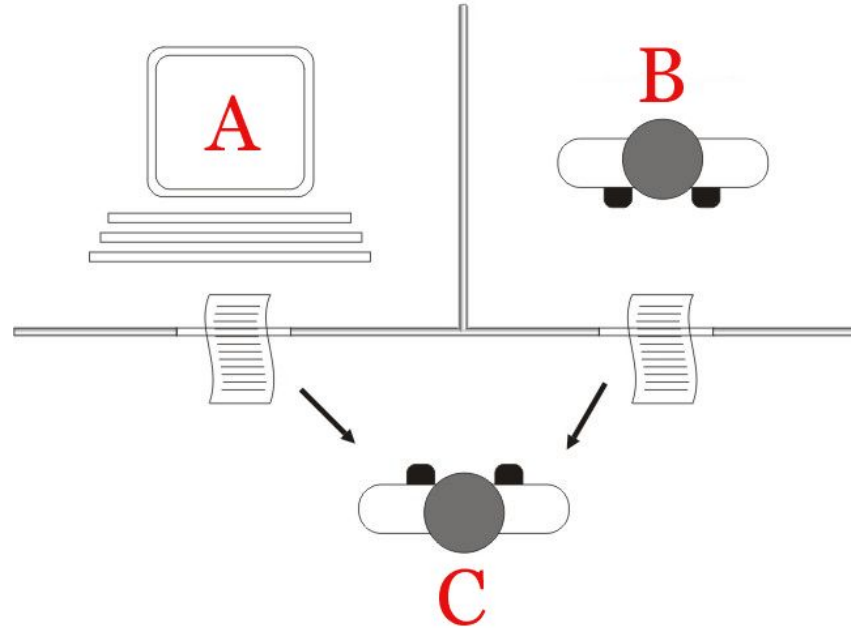
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# Early Computing

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- Alan Turing defines the universal computer, 1936
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  - Turing test: Can a machine behave indistinguishably from a human?



# Today

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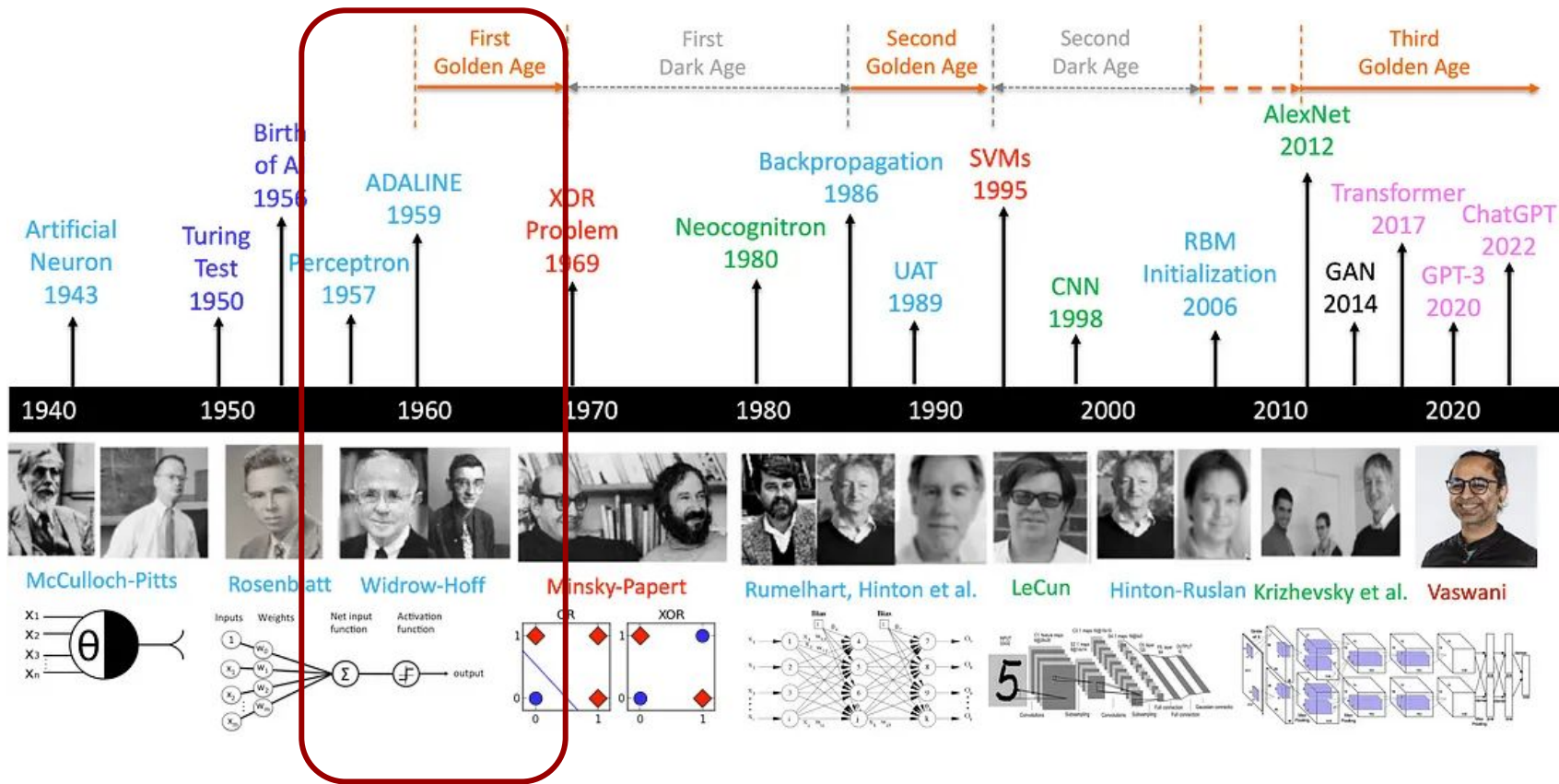
## First half:

- **Some logistics**
- **Finishing up history of AI**

## Second half:

- **Data Science tools (conceptual tools today, technical ones next week)**
- **Example: Customer churn problem**
- **Group Project**

# A brief history of Artificial Intelligence



# First Golden Age

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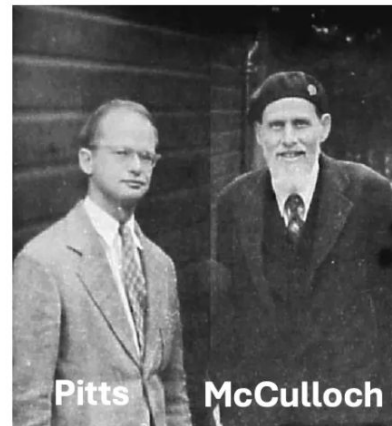
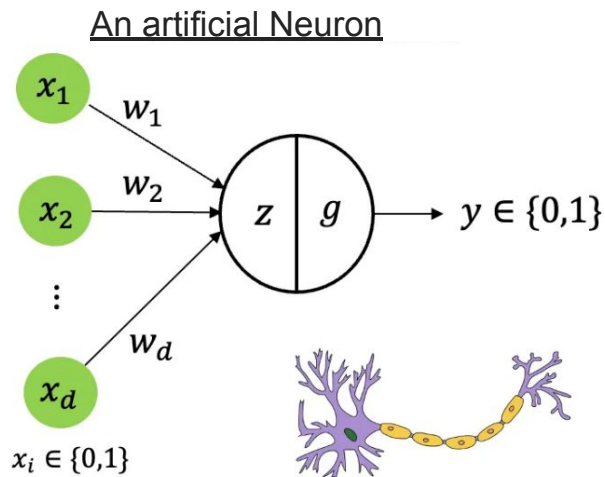
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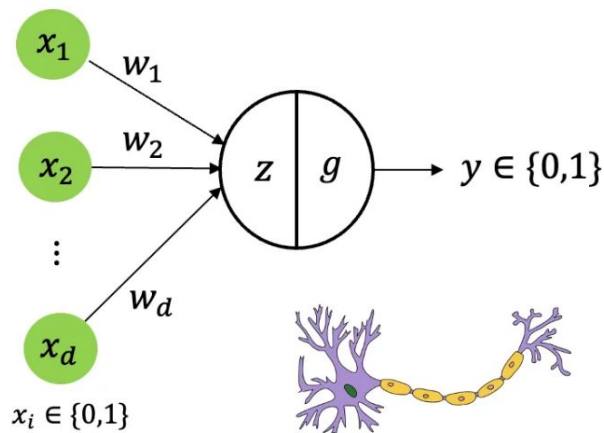
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An artificial Neuron



Both inputs and output are binary

- $x_i \in \{0,1\}$  and  $y \in \{0,1\}$

$$z(x_1, x_2, \dots, x_d) = z(\mathbf{x}) = \sum_{j=1}^d w_j \cdot x_j$$

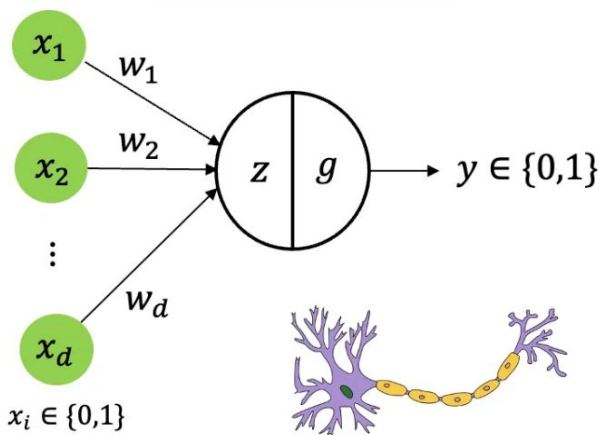
$$y = g(z(\mathbf{x})) = \begin{cases} 1 & \text{if } z(\mathbf{x}) \geq T \\ 0 & \text{if } z(\mathbf{x}) < T \end{cases}$$

Threshold Activation  
function

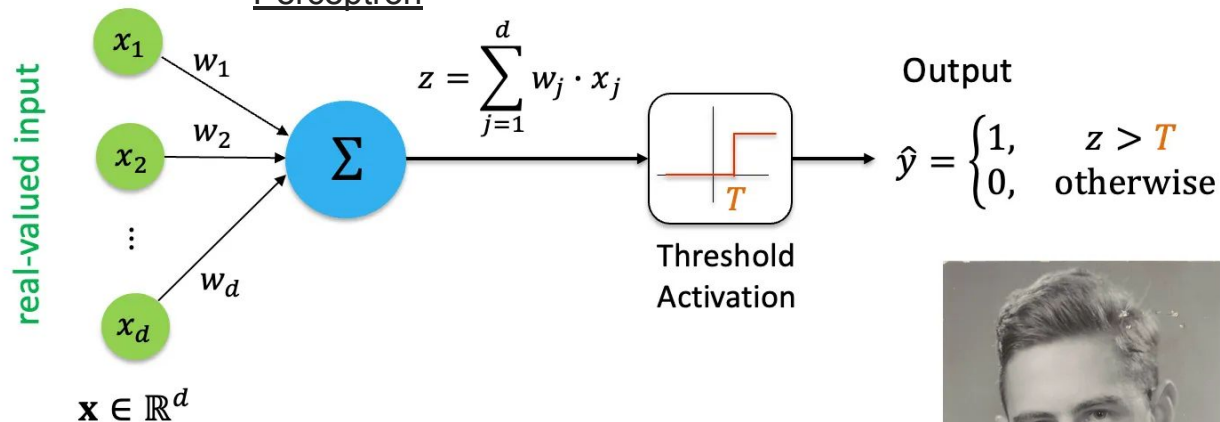
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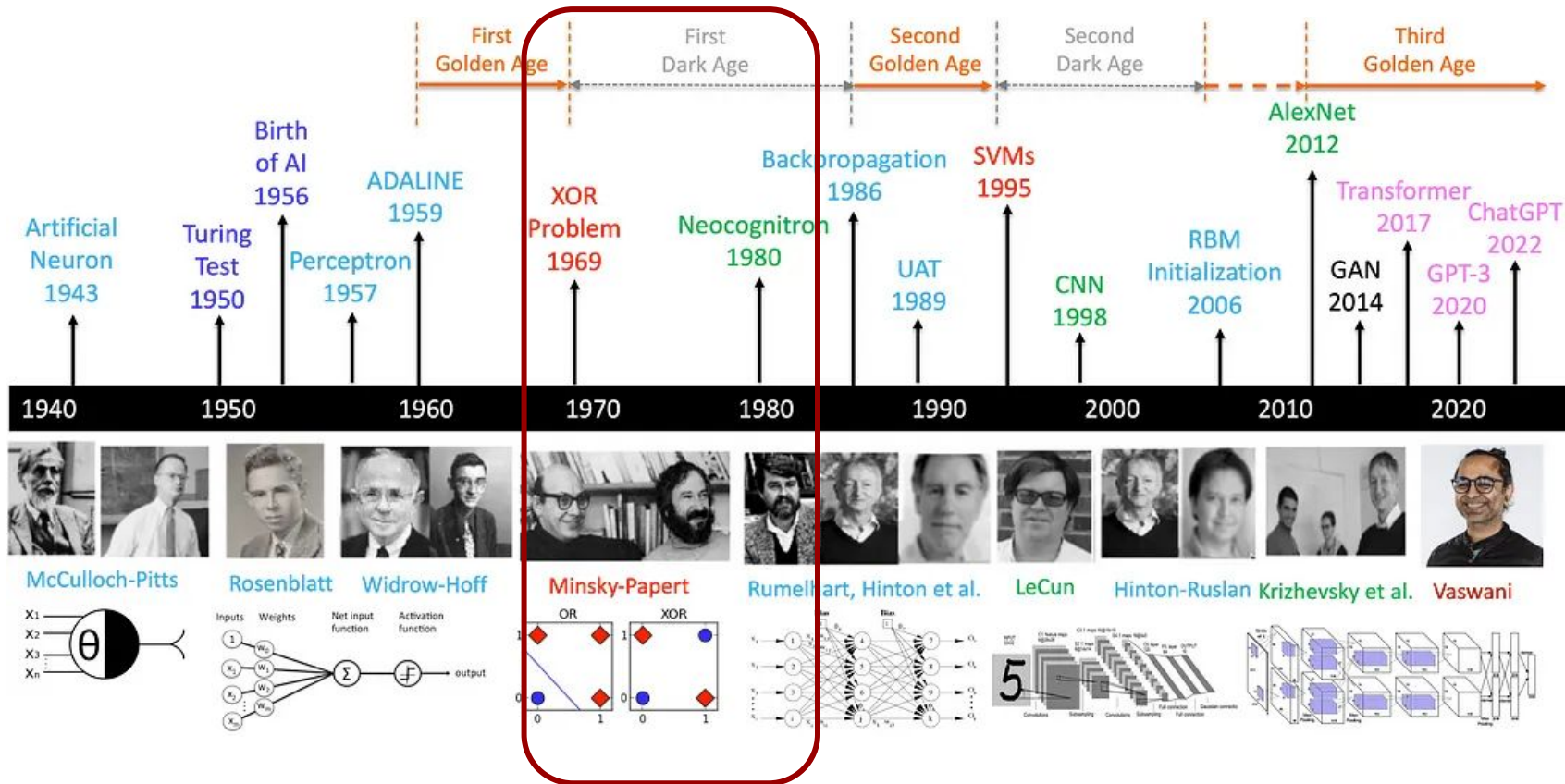


Perceptron



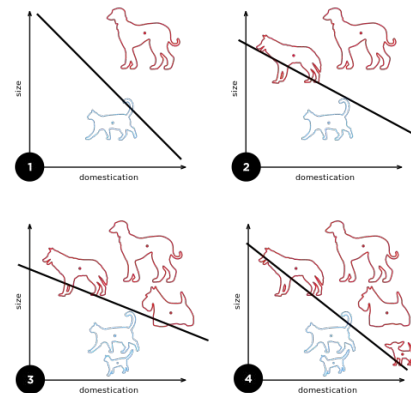
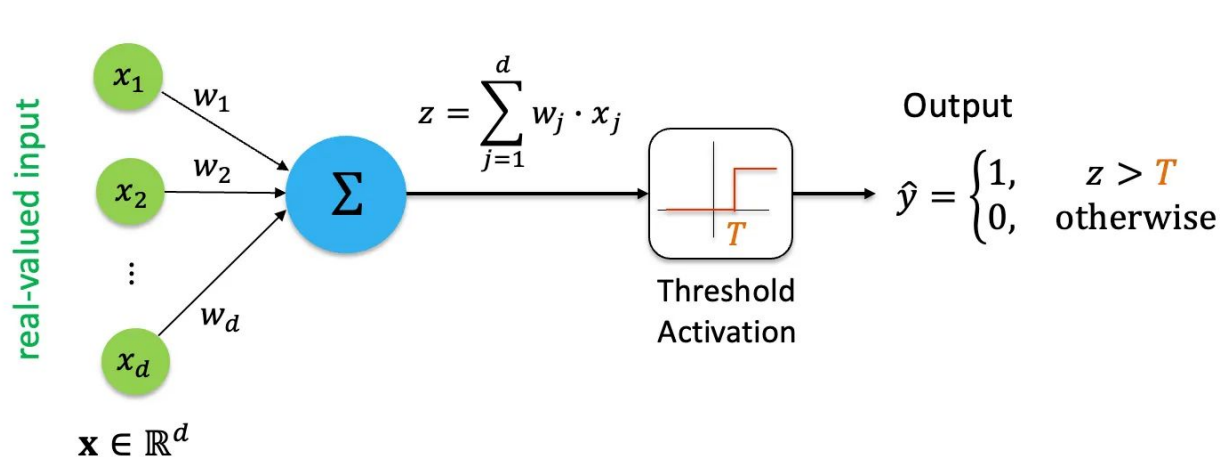
Frank Rosenblatt

# A brief history of Artificial Intelligence

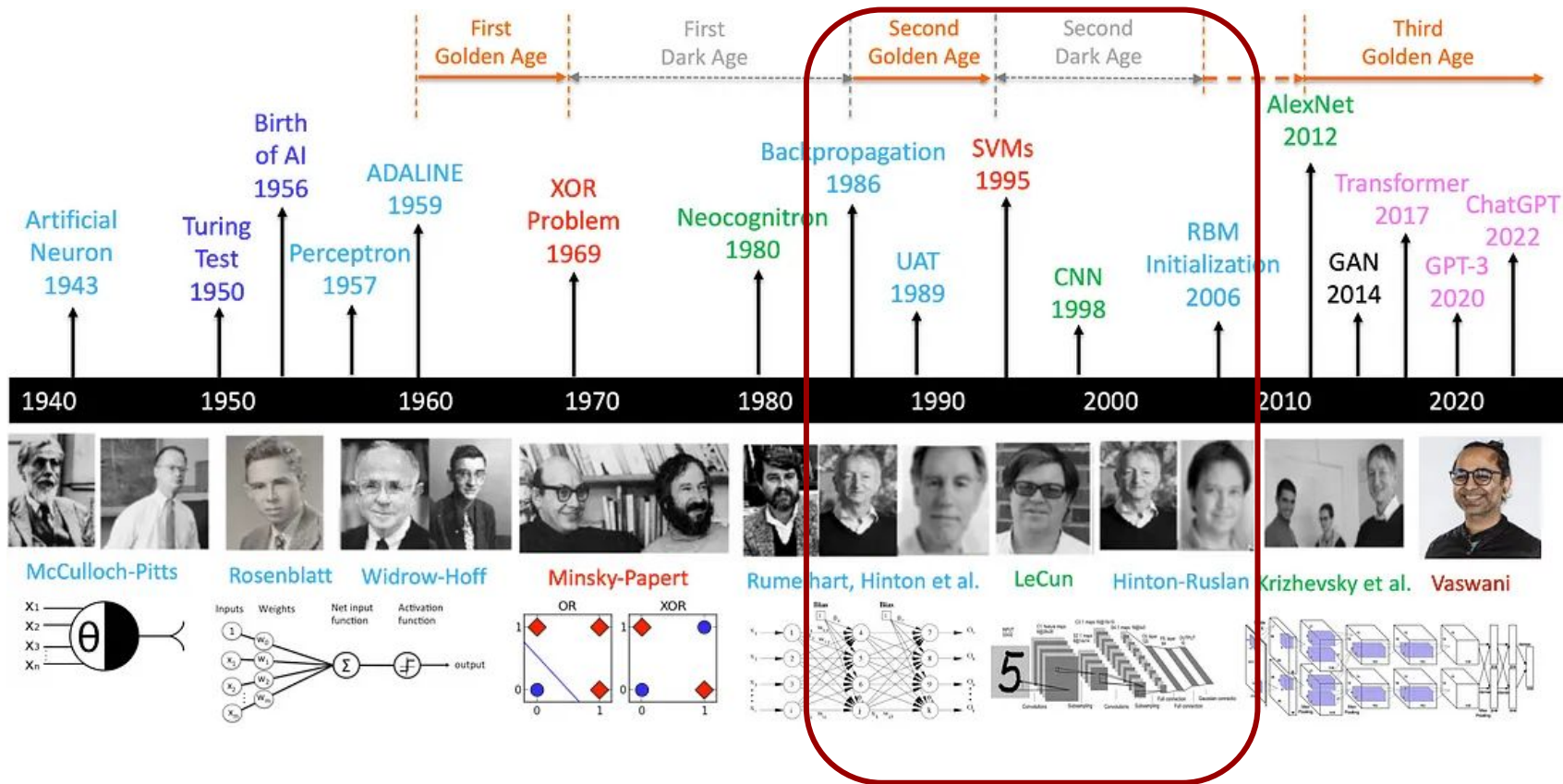


# AI Winter 1974-1990

- 1965: Dreyfus, “What computers can’t do”
- 1969: Minsky and Papert publish Perceptrons
- 1974: DARPA cuts AI funding
- 1980: Searle’s Chinese Room Argument, in “Minds, brains, and programs”

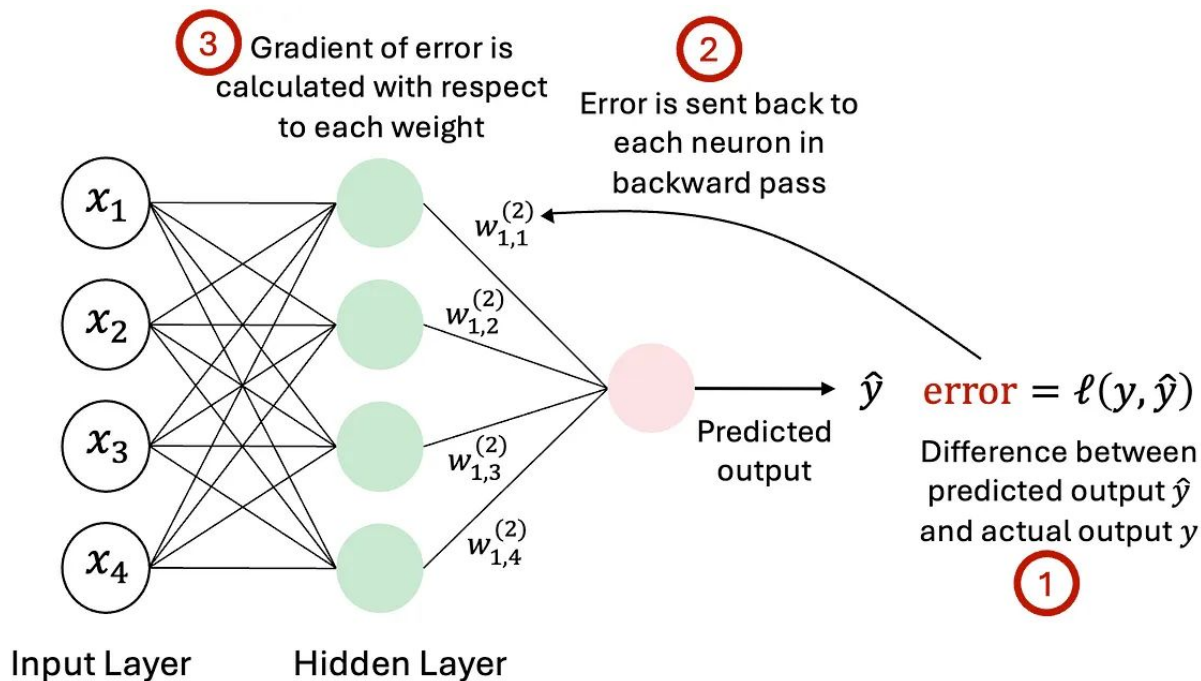


# A brief history of Artificial Intelligence



# Quiet Progress 1990 - 2012

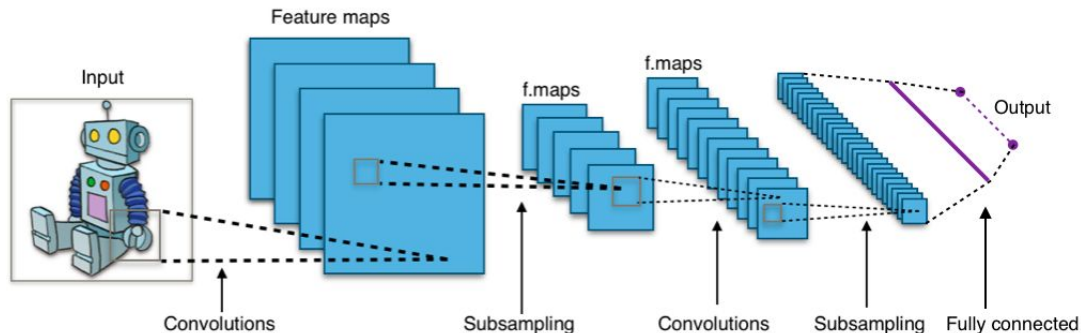
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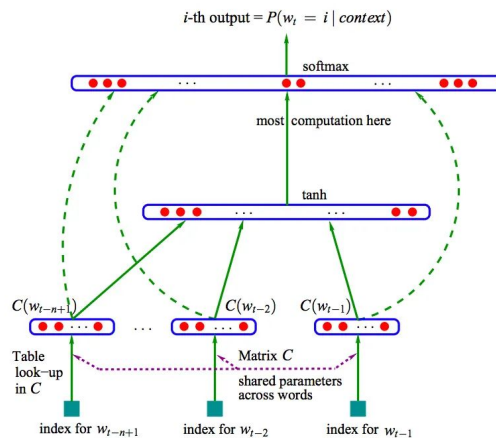
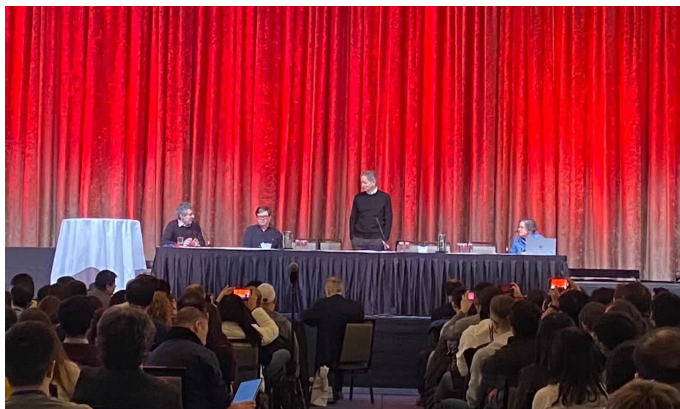


Figure 1: Neural architecture:  $f(i, w_{t-1}, \dots, w_{t-n+1}) = g(i, C(w_{t-1}), \dots, C(w_{t-n+1}))$  where  $g$  is the neural network and  $C(i)$  is the  $i$ -th word feature vector.

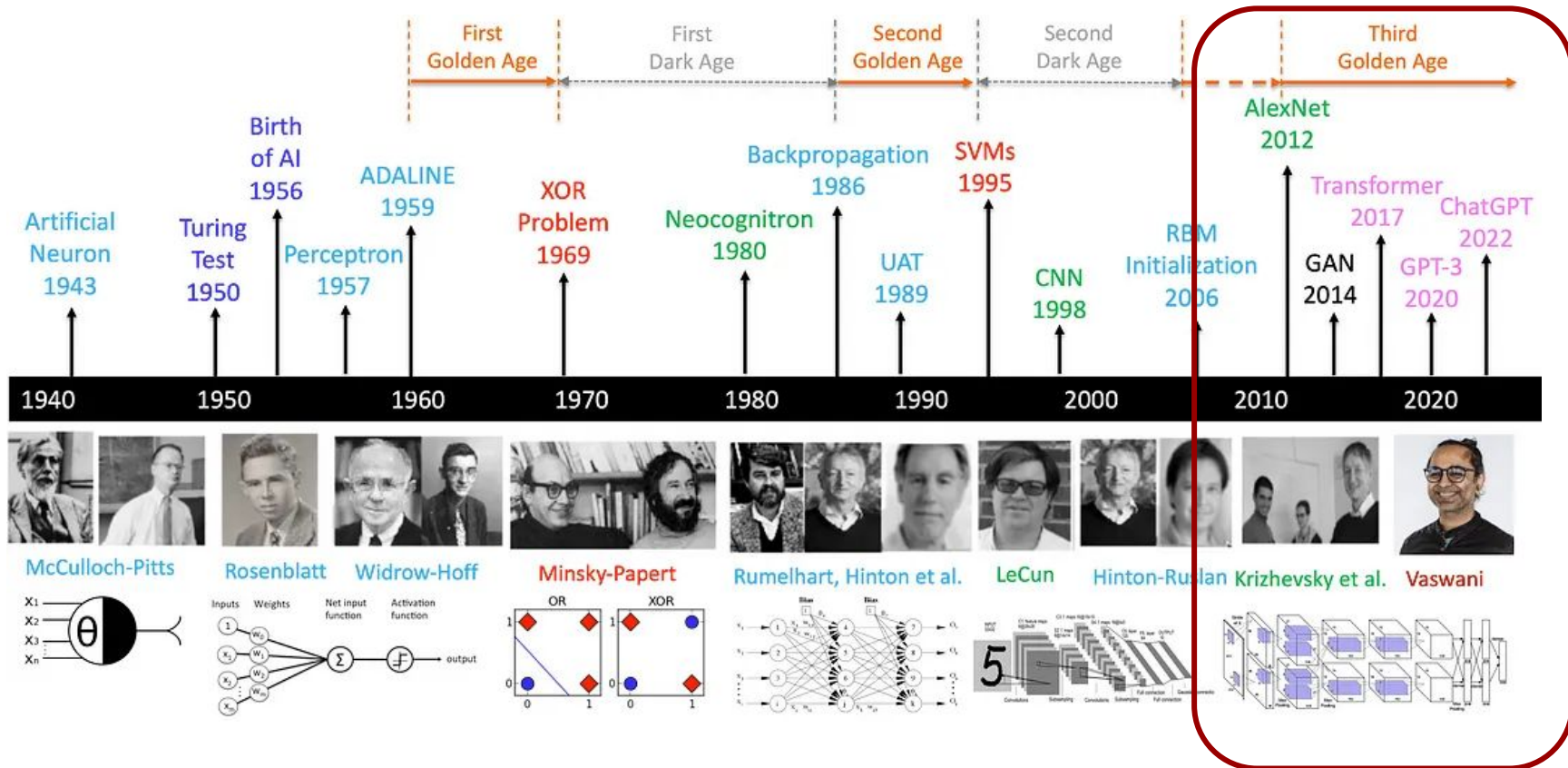
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# A brief history of Artificial Intelligence



# Golden age again!

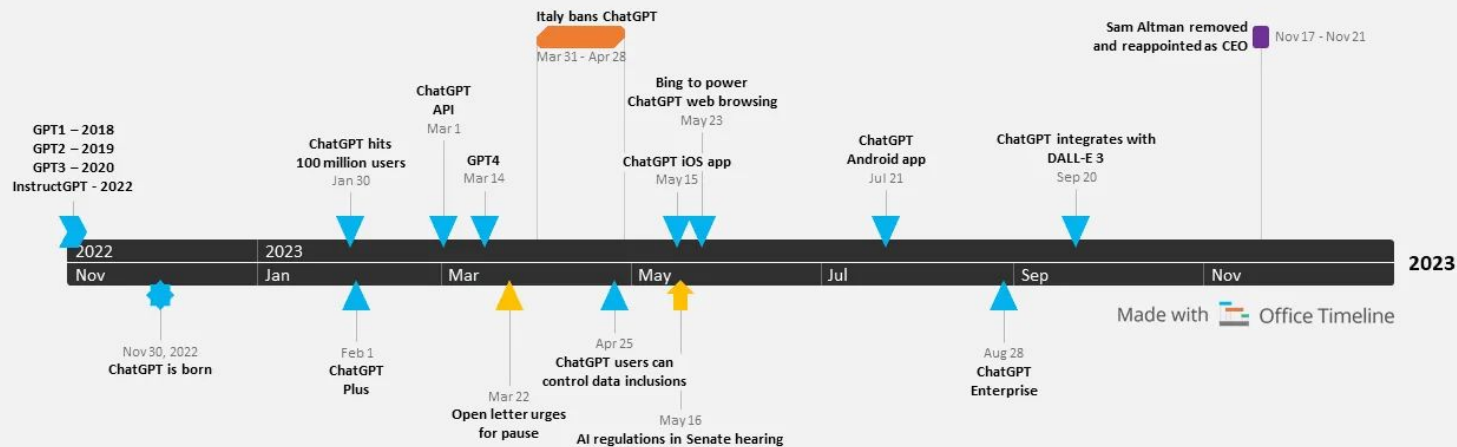
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- 2012: Hinton uses Deep ConvNets to solve ImageNet classification
- 2013: Hinton hired by Google, uses NN on mobile
- Boston Dynamics acquired by Google
- Yann LeCun heads FAIR for Facebook
- 2014: Google acquires DeepMind
- 2015: Musk donates \$10m to Future of Life to study existential risk for AI
- Autonomous vehicle testing begins
- 2016: AlphaGo beats Lee Sedol
- 2017: AlphaZero beats Stockfish

# LLM & GenAI era



## ChatGPT history and timeline



# LLM & GenAI era

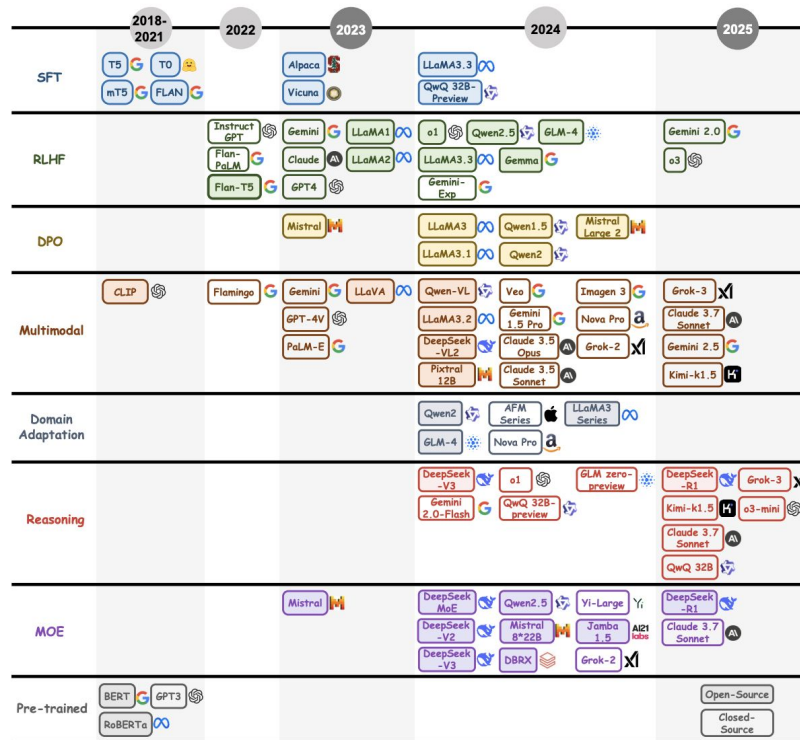
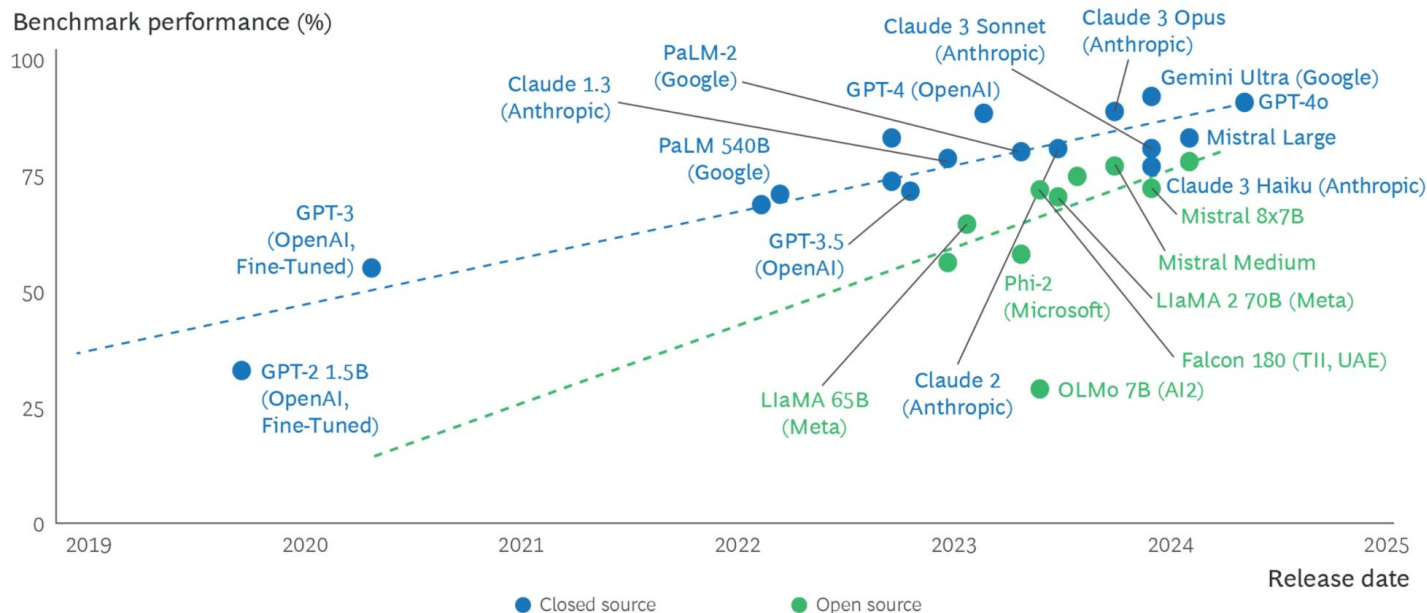


Figure 3: Timeline of post-training technique development for Large Language Models (2018–2025), delineating key milestones in their historical progression.



# LLM & GenAI era

## Exhibit 2 - The Performance Curve of GenAI Model Evolution



**Sources:** Open LLM leaderboard; HELM leaderboard; Chatbot Arena leaderboard; expert interviews; BCG analysis.

**Note:** Performance is calculated with the Measuring Massive Multitask Language Understanding (MMLU) benchmark, one of several tests used to estimate model performance and accuracy. Data is current as of May 2024.

# LLM & GenAI era

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