The AI Revolution: Present and Near Future

Álvaro Soto
Catholic University, Chile

Two main parts

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1. Insights about the state-of-the-art in AI

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    - 1st revolution: A memory based machine (2012)

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   - A new way to teach

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   - 1st revolution: A memory based machine (2012)
   - 2nd revolution: A reasoning based machine (2020)
2. Effects in education and research
   - A new way to teach
   - A new way for scientific discovery

Part 1a: State-of-the-art in AI

A Memory Based Machine

Deep Learning, 2012

ImageNet Classification with Deep Convolutional Neural Networks

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An Associative Memory

#3FDD5E

This is a racquet

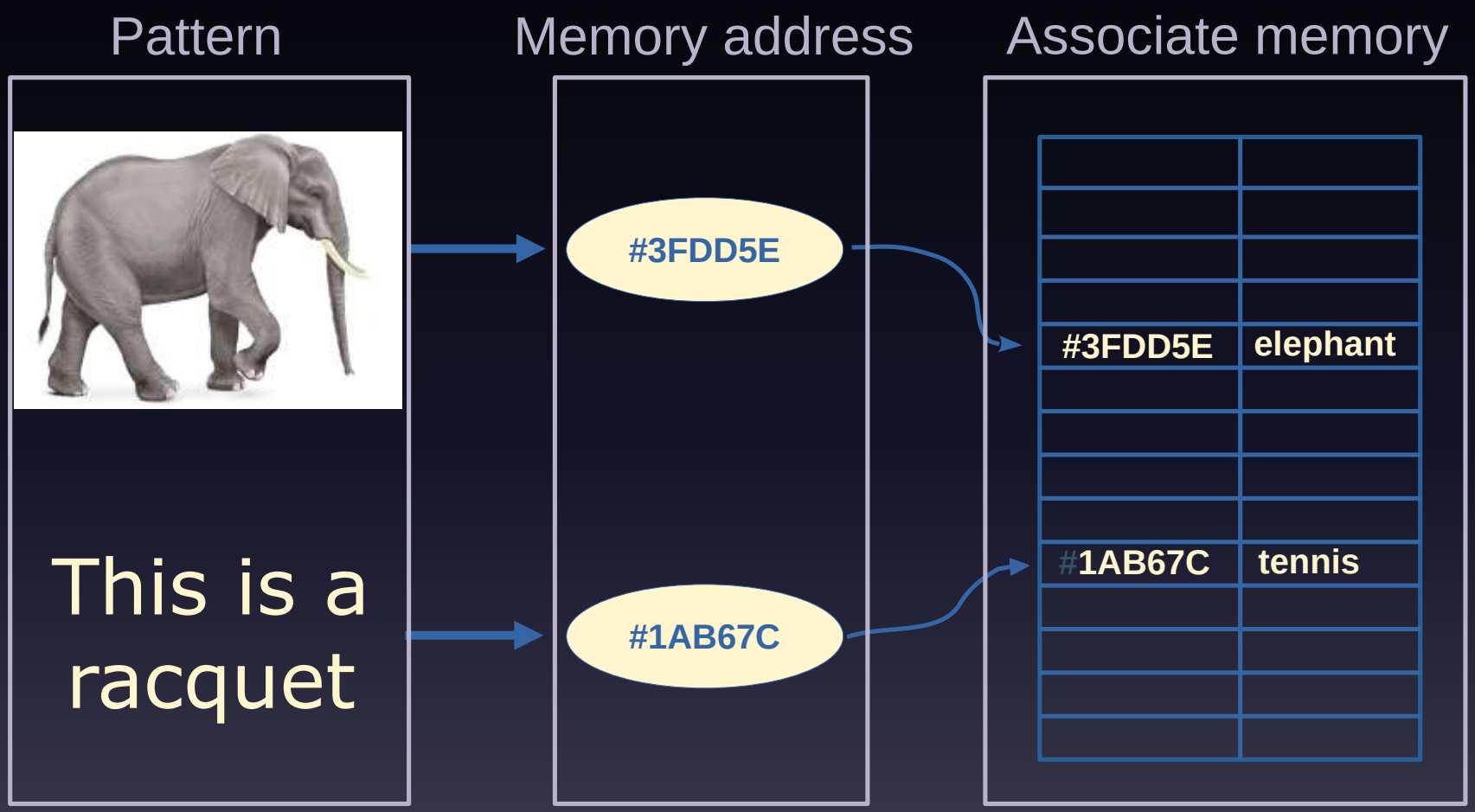
#1AB67C

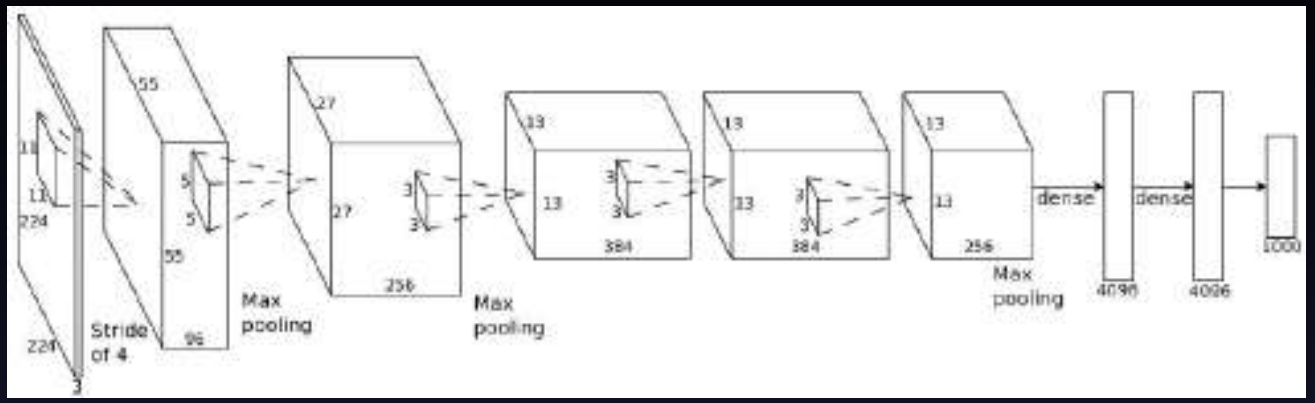
This is a racquet

#3FDD5E

#1AB67C

#3FDD5E	elephant
#1AB67C	tennis


Pattern
Memory address
Associate memory
This is a racquet
#3FDD5E
#1AB67C
#3FDD5E
elephant
#1AB67C
tennis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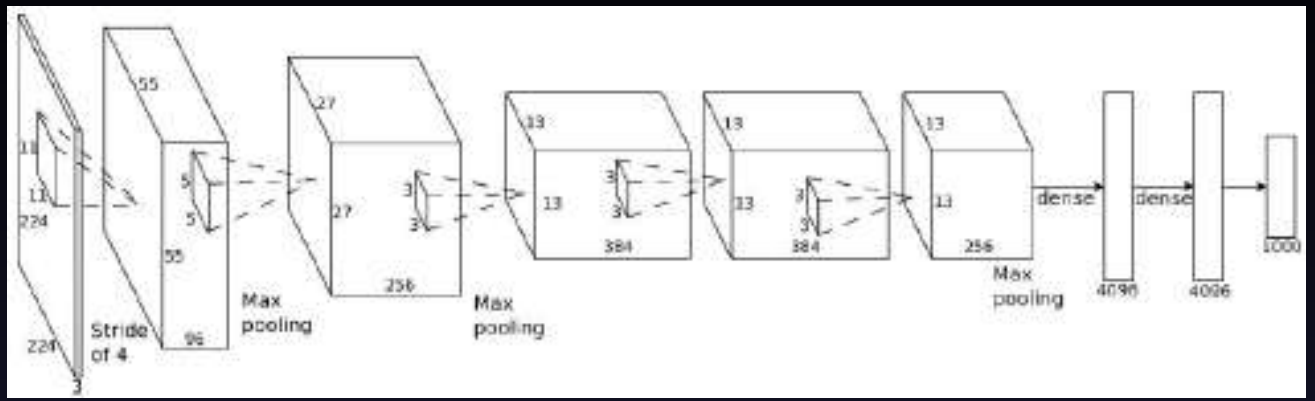
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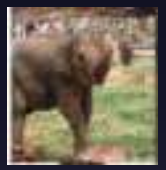

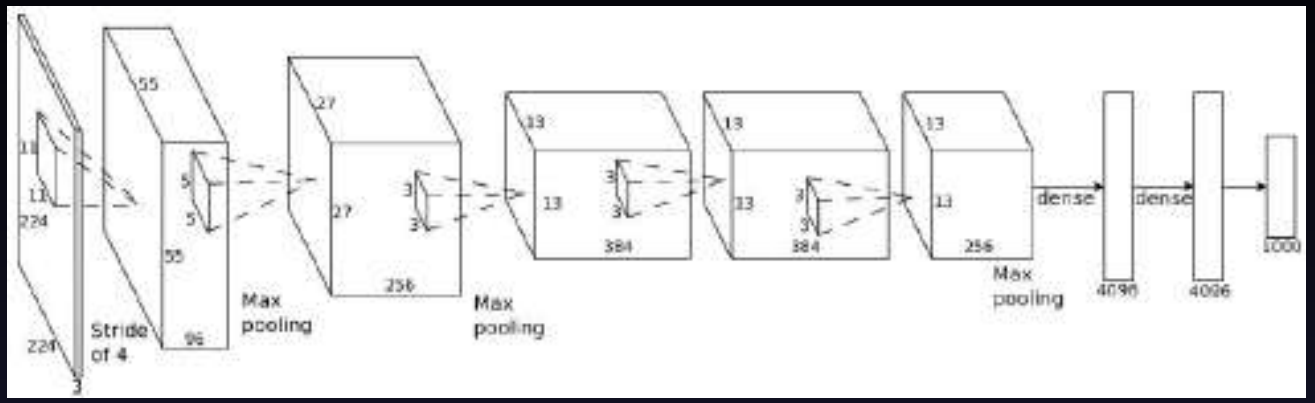
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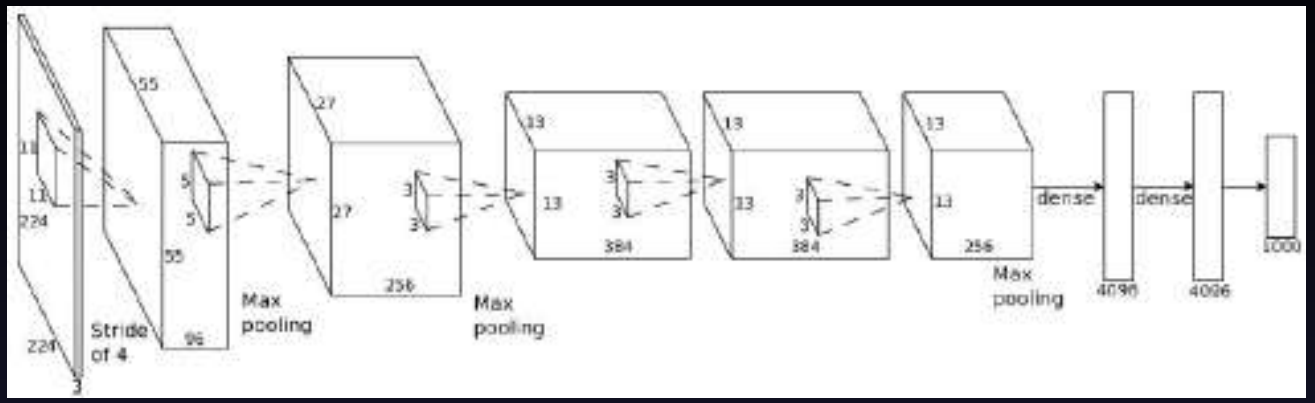
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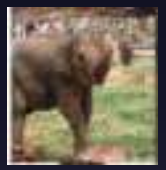

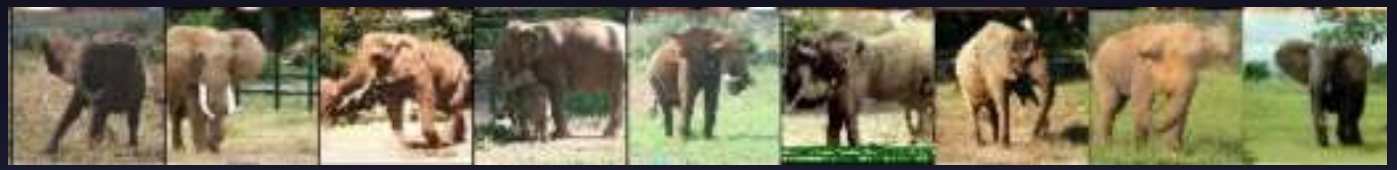

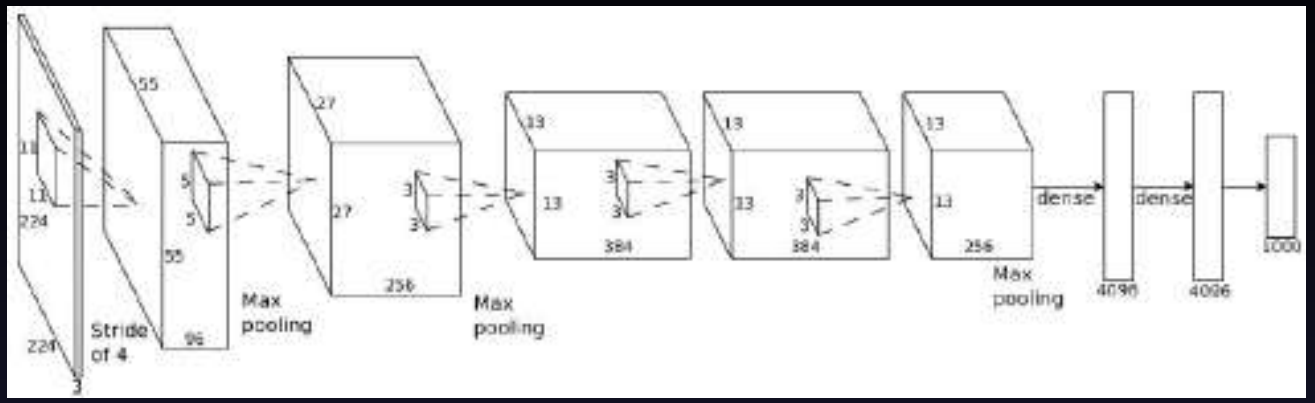
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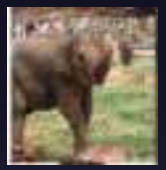

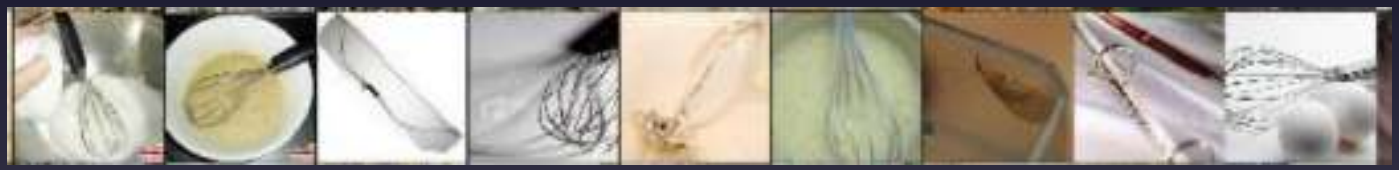

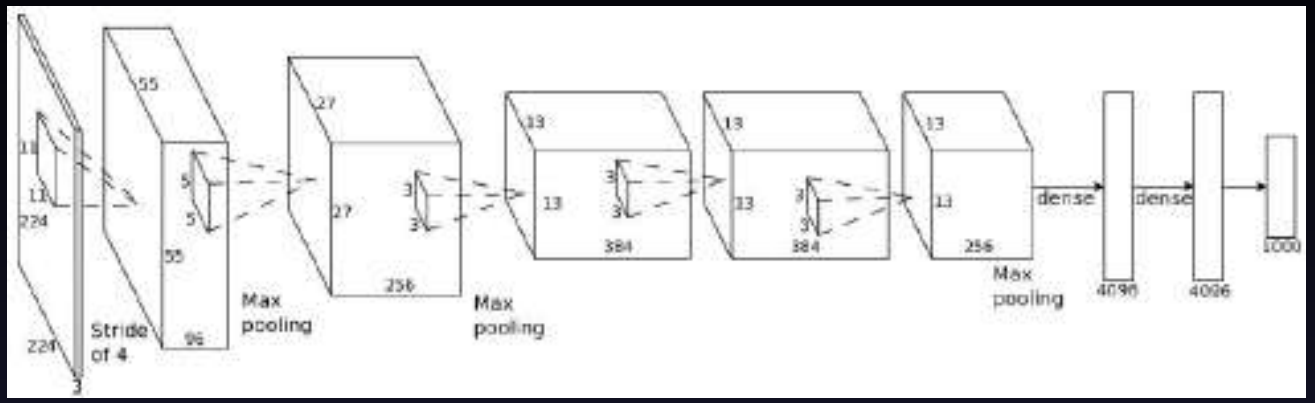
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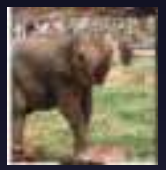

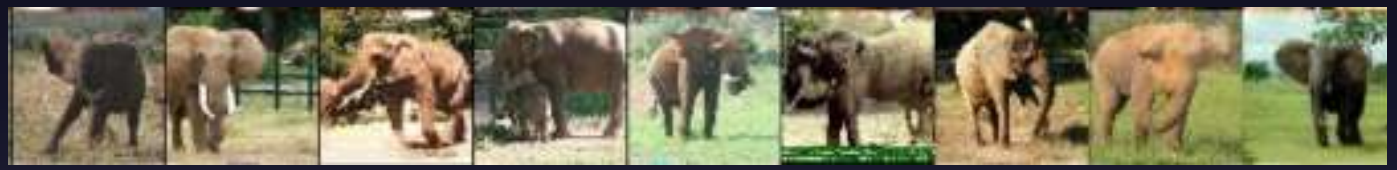

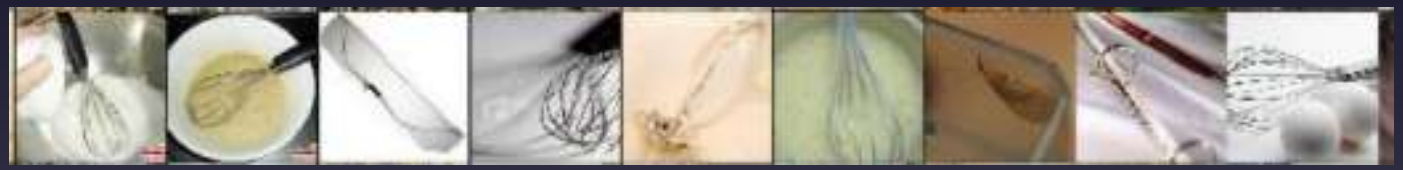

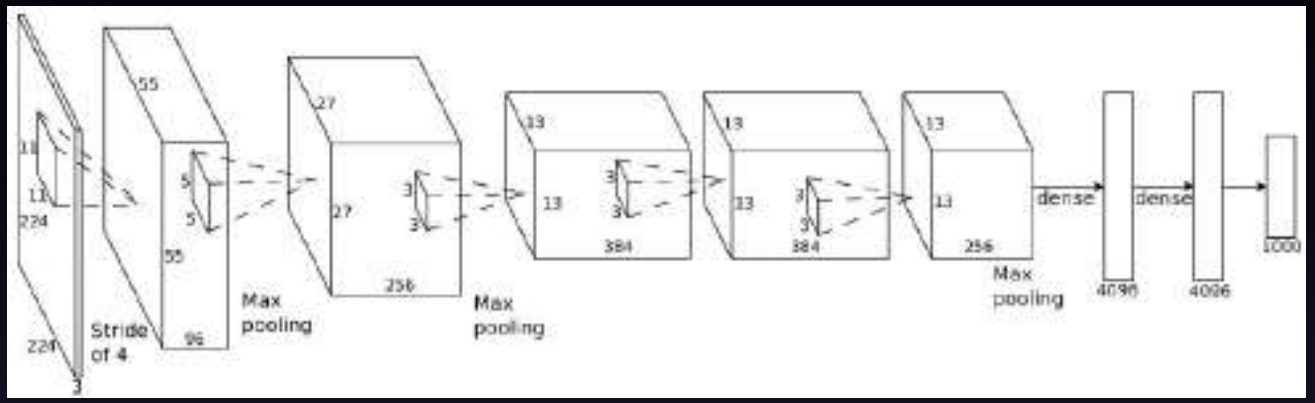
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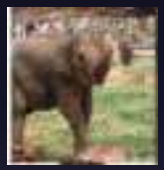
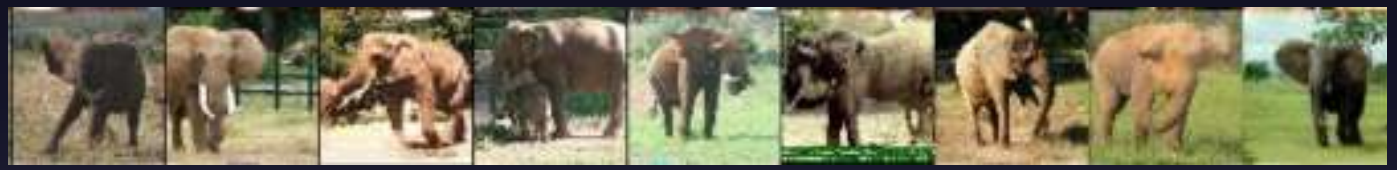
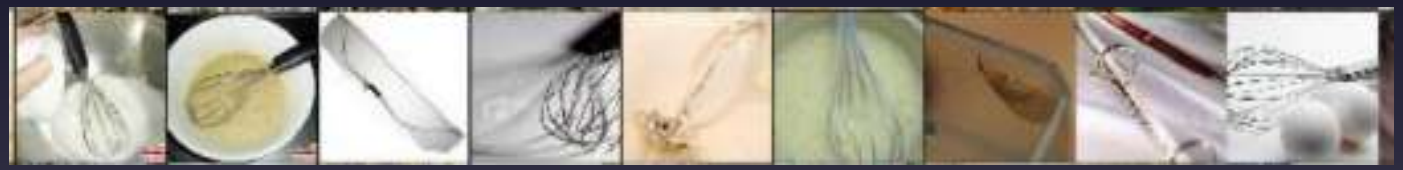
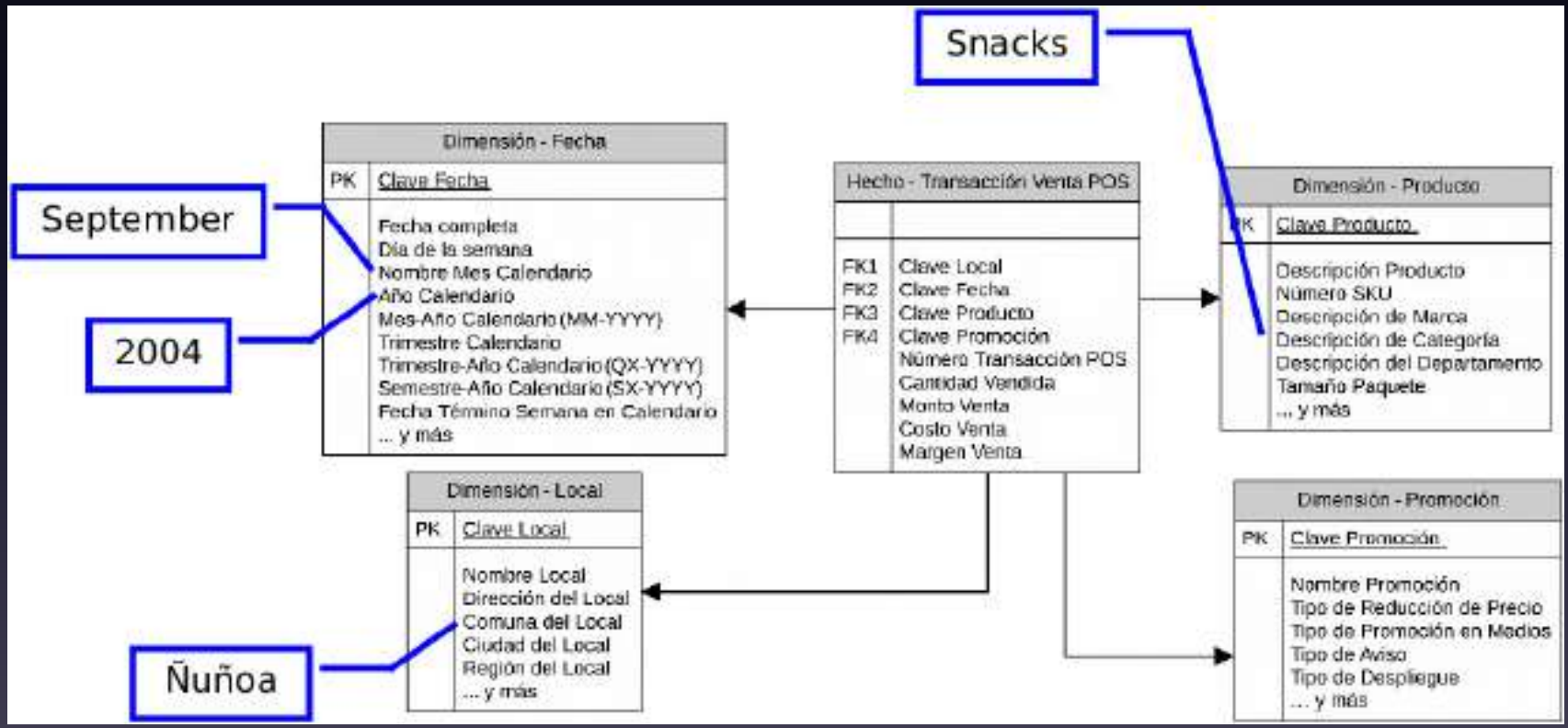


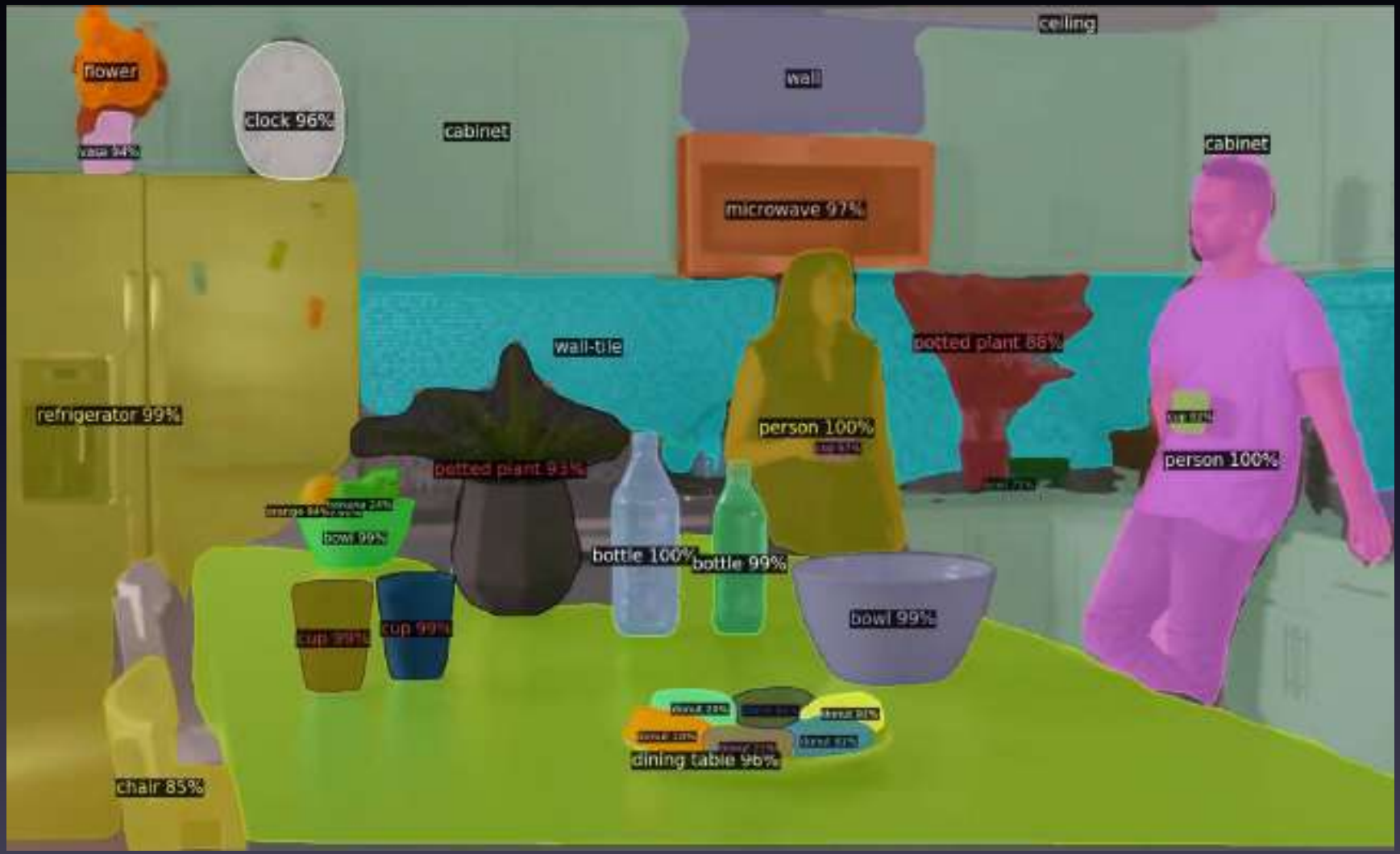




Computer: snacks in Ñuñoa, September 2004?



Computer: What's going on?


flower
clock 96%
cabinet
wall
ceiling
cabinet
microwave 97%
refrigerator 99%
wall-tile
potted plant 66%
person 100%
person 100%
potted plant 93%
bowl 99%
bottle 100%
bottle 99%
bowl 99%
cup 99%
dining table 96%
chair 85%

Part 1b: State-of-the-art in AI

A Reasoning Based Machine

GPT-3, 2020

Language Models are Few-Shot Learners

Tom B. Brown* Benjamin Mann* Nick Ryder* Melanie Subbiah*

Jared Kaplan† Prafulla Dhariwal Arvind Neelakantan Pranav Shyam Girish Sastry

Amanda Askell Sandhini Agarwal Ariel Herbert-Voss Gretchen Krueger Tom Henighan

Rewon Child Aditya Ramesh Daniel M. Ziegler Jeffrey Wu Clemens Winter

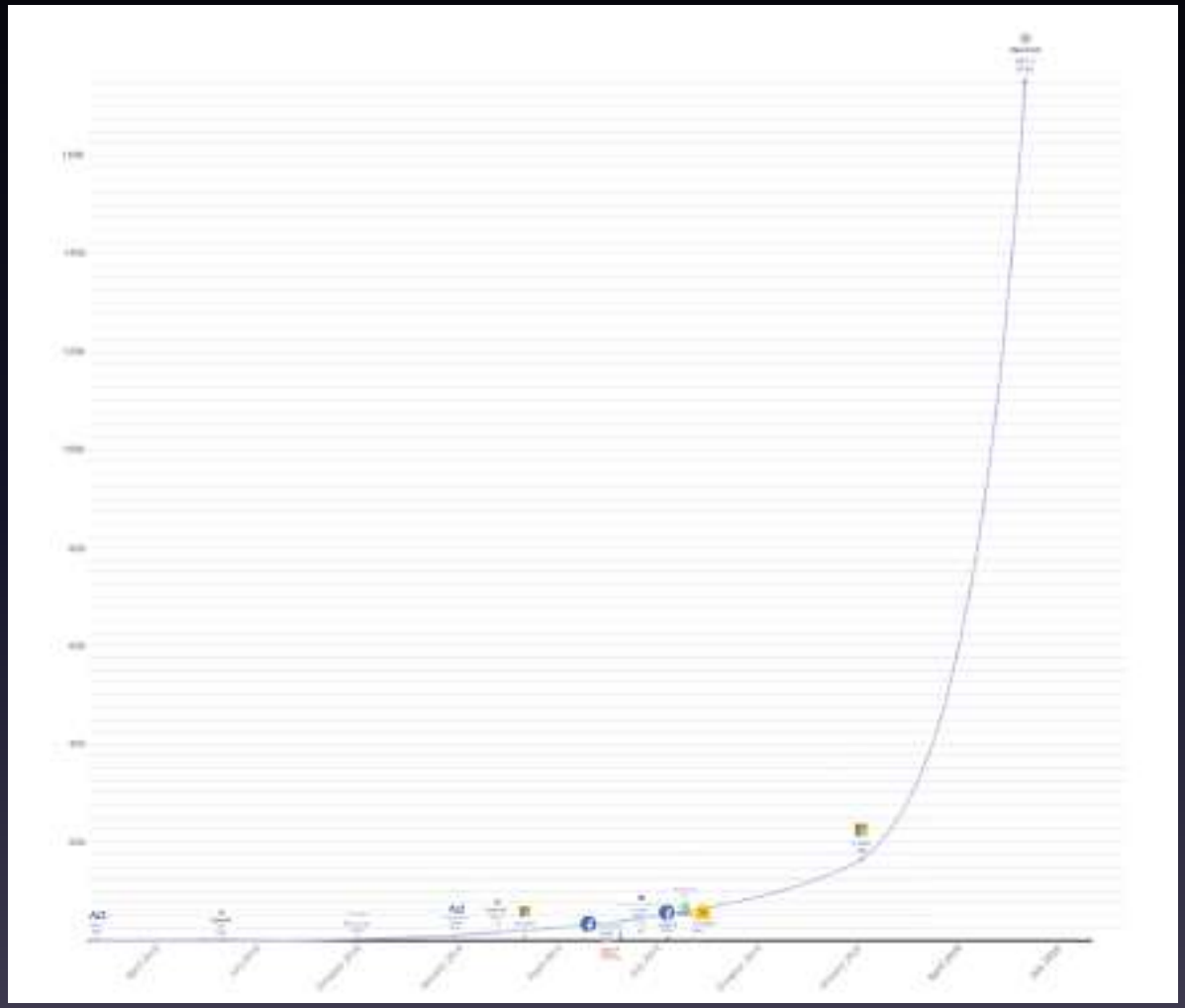
Christopher Hesse Mark Chen Eric Sigler Mateusz Litwin Scott Gray

Benjamin Chess Jack Clark Christopher Berner

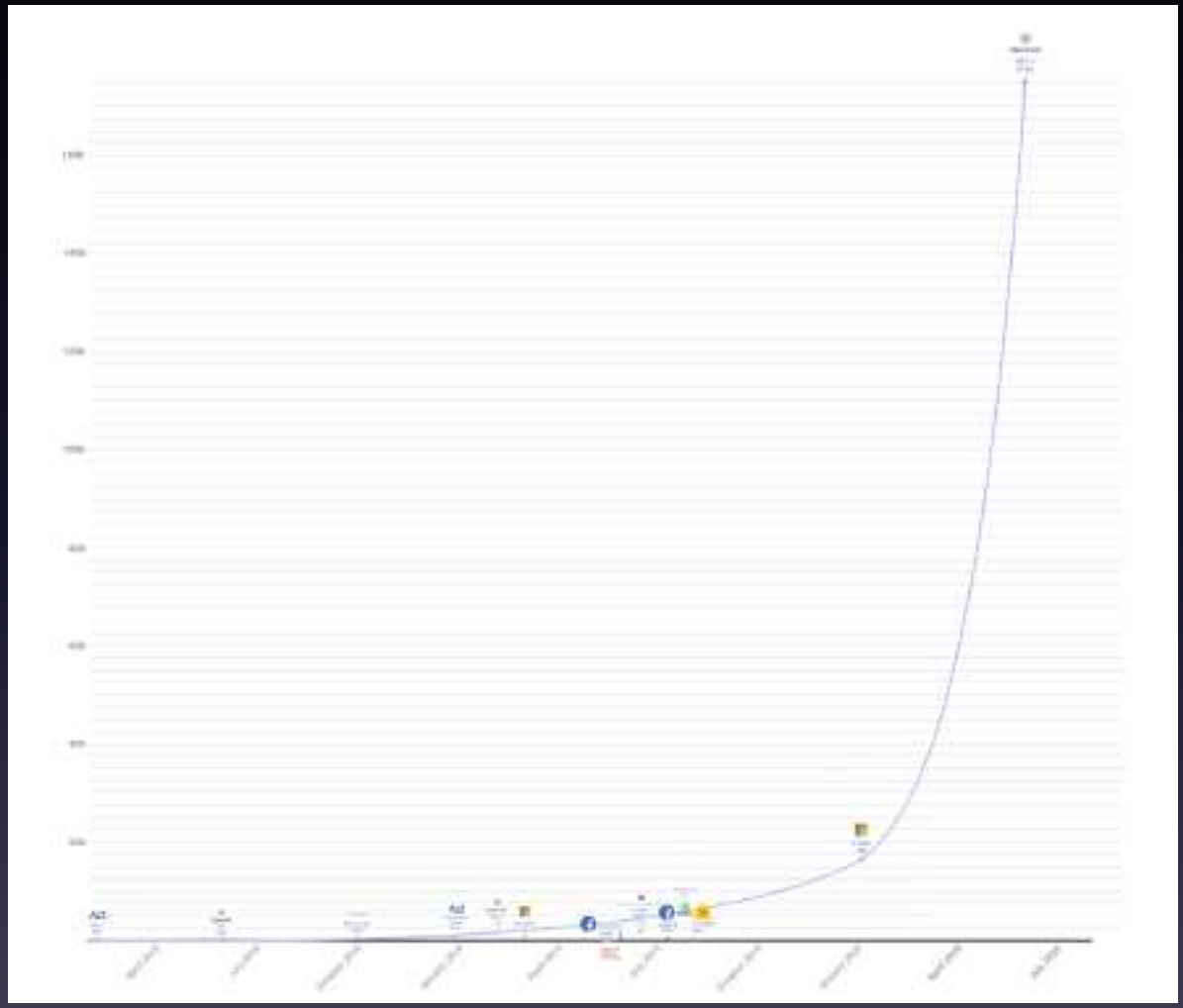
Sam McCandlish Alec Radford Ilya Sutskever Dario Amodei

OpenAI

GPT-3: 175 Billion Parameters



GPT-3: 175 Billion Parameters



Training data 225 billion words

GPT-3: A Few-Shot Learner

GPT-3: A Few-Shot Learner

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A "Burringo" is a car with very fast acceleration.  An example of a sentence that uses the
word Burringo is:
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GPT-3: A Few-Shot Learner

A "Burringo" is a car with very fast acceleration. An example of a sentence that uses the word Burringo is:

In our garage we have a Burringo that my father drives to work every day.

T. Brown et al., 2020

Reasoning as an Emergent Property

Reasoning as an Emergent Property

Write a conversation between the two animals.

Reasoning as an Emergent Property

Write a conversation between the two animals.

cat: hey dog, can i ride on your back?
dog: sure, why not?
cat: i'm tired of walking in the snow.

J. Li et al., 2023

Summary:
State-of-the-art in AI

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- Highly powerful pattern recognition abilities through effective associative memories

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State-of-the-art in AI

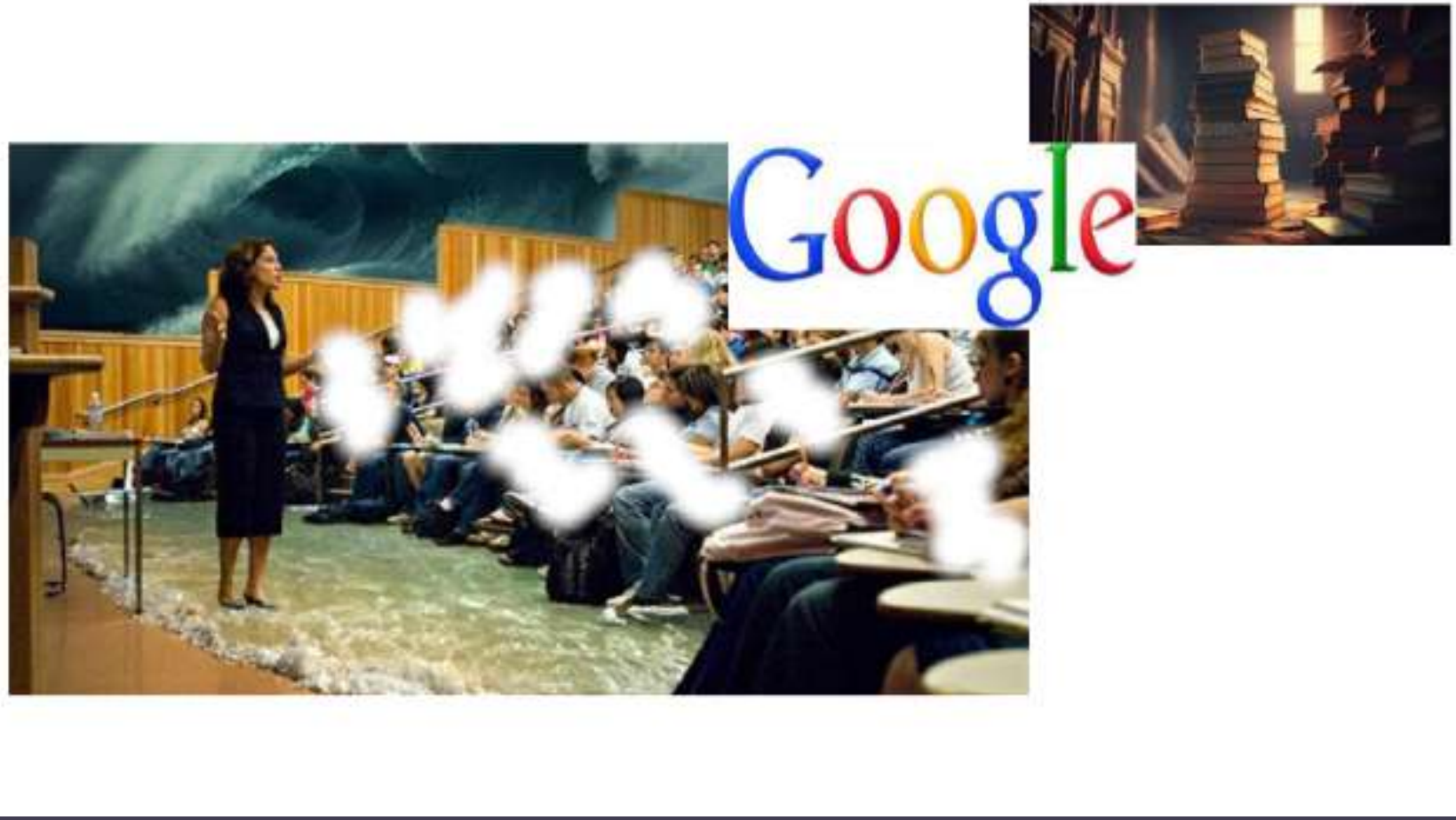
- Highly powerful pattern recognition abilities through effective associative memories
- Powerful but still unstable reasoning abilities through large parametric models.

Part 2: Effect in education

New way to teach

80’s

90’s



2025

Part 2: Effect in research

New way for scientific discovery

90’s

Google

2025

Summary:
Effects in Education and Research

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- A new scenario to access knowledge. Need to redefine role of professor.

Summary:
Effects in Education and Research

- A new scenario to access knowledge.
  Need to redefine role of professor.
- A new scenario for scientific discovery.
  Need to provide scientists with a suitable AI infrastructure.

Thanks!