



UNIVERSITÀ  
CATTOLICA  
del Sacro Cuore

# SADIBA 47

SPEECH BY **NICOLA GRANDIS - ASC27 S.R.L.**

"ARTIFICIAL INTELLIGENCE IN THE WORLD TO COME"

**( in 5 yrs )**



BUILT IN ITALY, PLAYED GLOBALLY



## Acknowledgements



Up2Starts - Intesa San Paolo  
TOP 10 Start-up



Unioncamere  
TOP 10 Start-up



Lazio Innova  
Boost Your Ideas



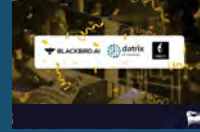
Confindustria  
Best Practices Award  
for Innovation



WAIC  
TOP 50 Start-up



Noovle  
Noovle Cloud  
Challenge



ENI  
Data Mining  
Selection Day



Fortune Italia  
Top AI 20 startup



WAIC  
Best Startup Pitch



Telsy - Regione Lazio  
Open Innovation  
Challenge



Lazio Innova  
Find the Vehicle



WAICF Cannes  
Neurons Awards



CORRIERE DELLA SERA

Il Sole 24 ORE

AGI  
AGENZIA  
ITALIA

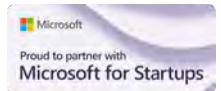
agenzia  
NOVA



ISO9001

TIM ENTERPRISE  
DIGITAL PLAYERS

aws startup  
programs

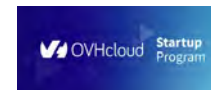


la Repubblica

WIRED

Forbes

DiRE  
AGENZIA DI STAMPA NAZIONALE



NVIDIA  
INCEPTION PROGRAM

Google Cloud  
for Startups

il manifesto

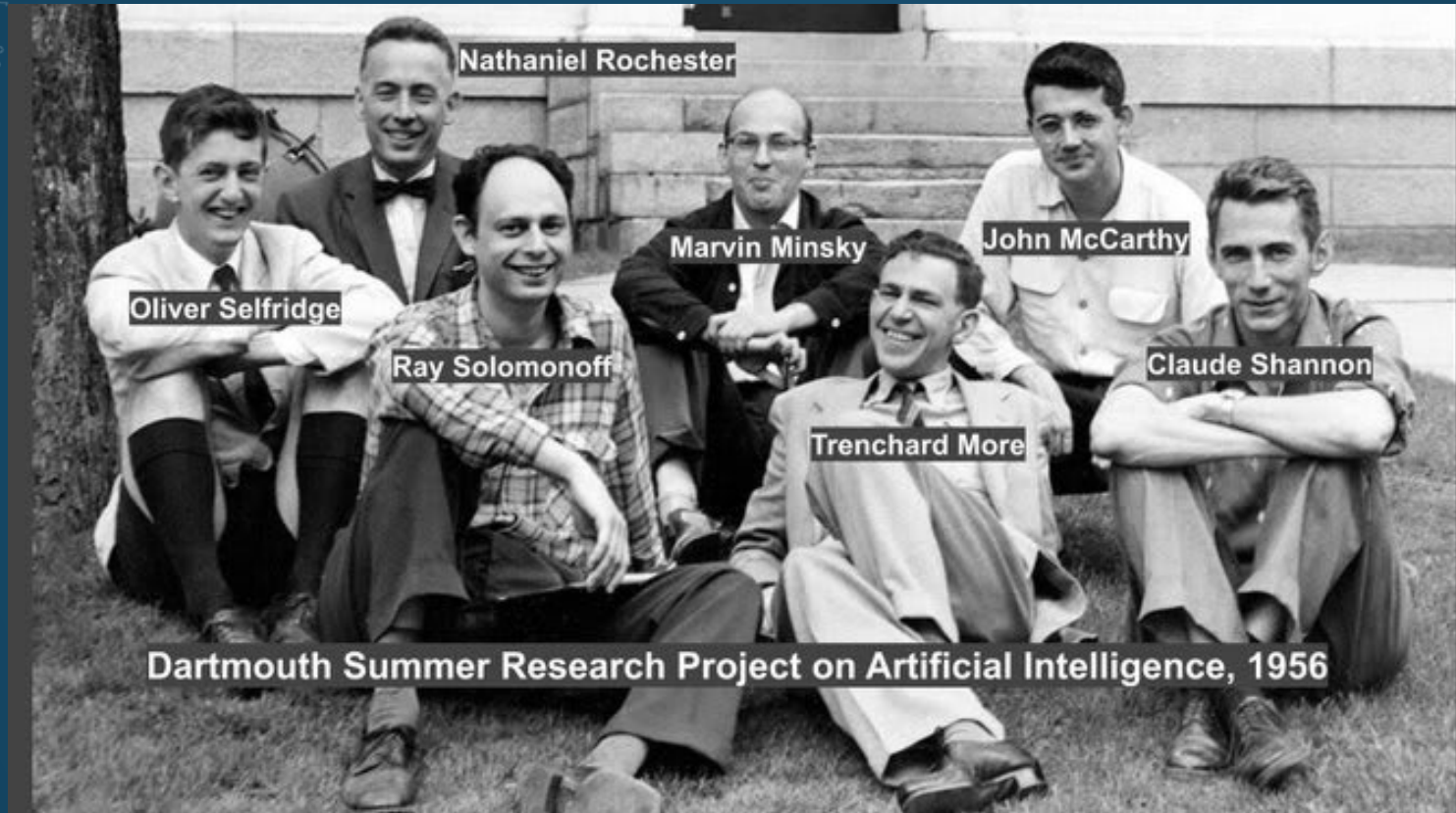
adnkronos

L'Espresso

affaritaliani.it  
il primo quotidiano on-line



# FATHERS OF AI



## ARTIFICIAL «INTELLIGENCE»

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# HISTORY OF **OPEN ISSUES** ON AI

**MATHEMATICS**

**LOGIC**

**HALTING  
PROBLEM**

**THEORY OF  
INFORMATION**

**ENTROPY**



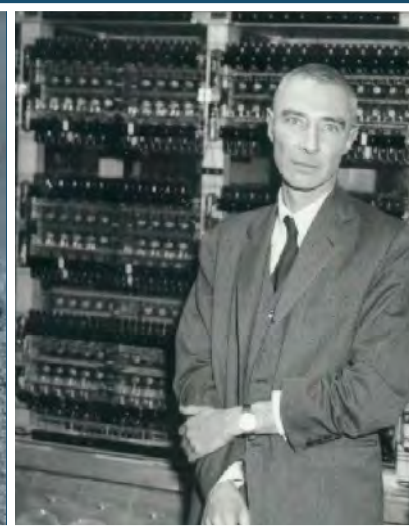
Hilbert



Gödel



Turing



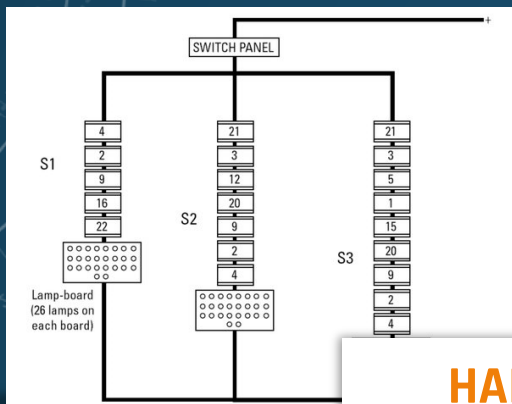
Shannon



Von Neumann



# PROBLEMS STILL OPEN TODAY

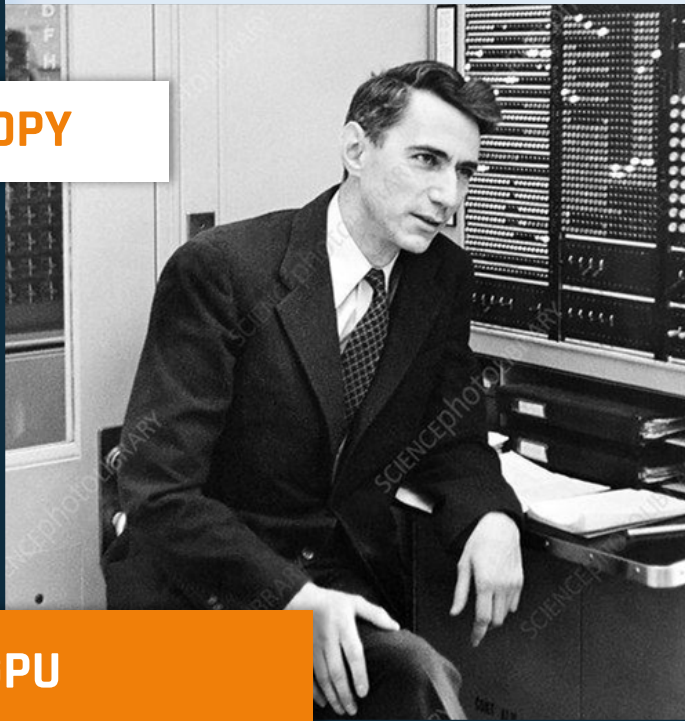


**HALTING**

**ENTROPY**



**WE DON'T HAVE AN AGI**



**THAT LITTLE WE DO, NEEDS GPU**

**Von Neumann Entropy:**  $S_{VN} \equiv -Tr[\rho \ln(\rho)]$

**Shannon Entropy of Energy:**  $S_E \equiv -\sum_j P_j \ln(P_j)$

where  $P_j$  is the probability to measure energy eigenvalue  $E_j$



# FATHERS OF **NEURAL NETWORKS**

DEEP LEARNING

PERCEPTRON



Lecun

Hinton

Bengio

**FEED FORWARD NETWORKS**

**GRADIENT DESCENDING**

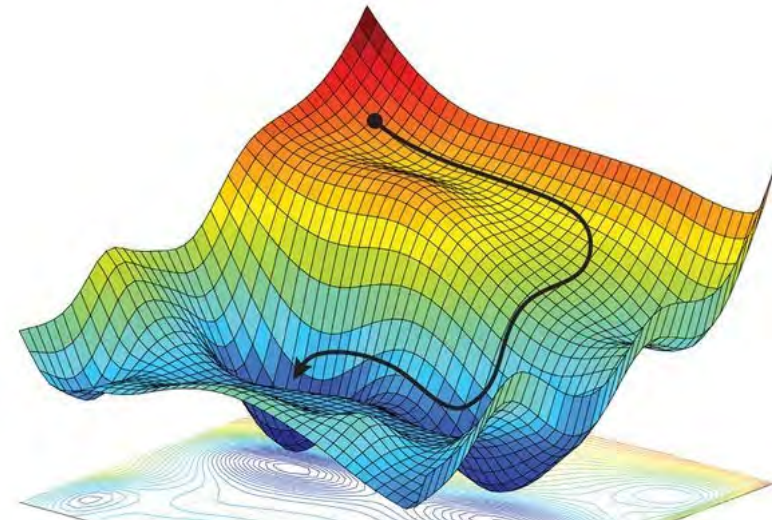
HOW WE **LEARN** THE WORLD



 **HUMANS**

FEED FORWARD NETWORKS

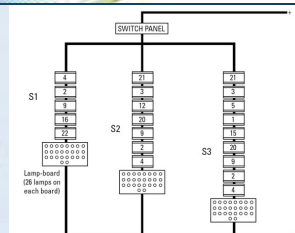
GRADIENT DESCENDING



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**Shannon Entropy of Energy:**  $S_E \equiv -\sum_j P_j \ln(P_j)$

where  $P_j$  is the probability to measure energy eigenvalue  $E_j$



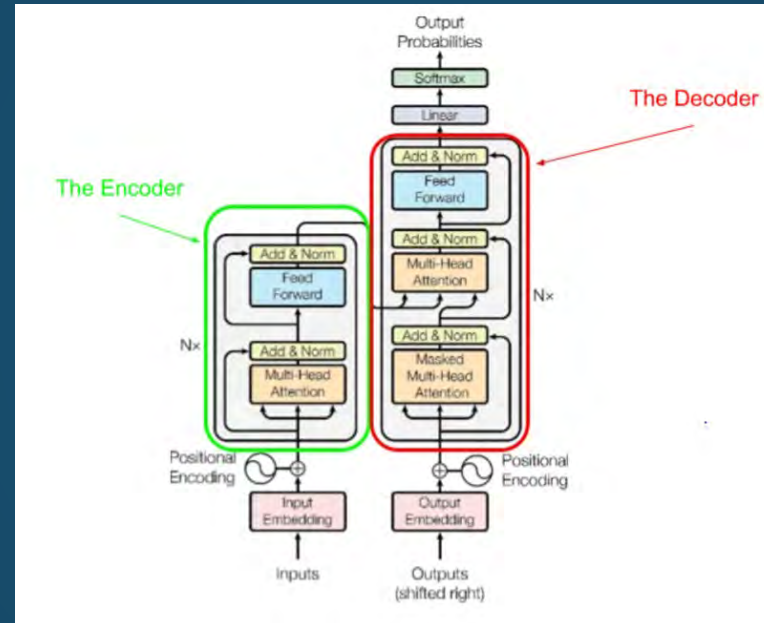
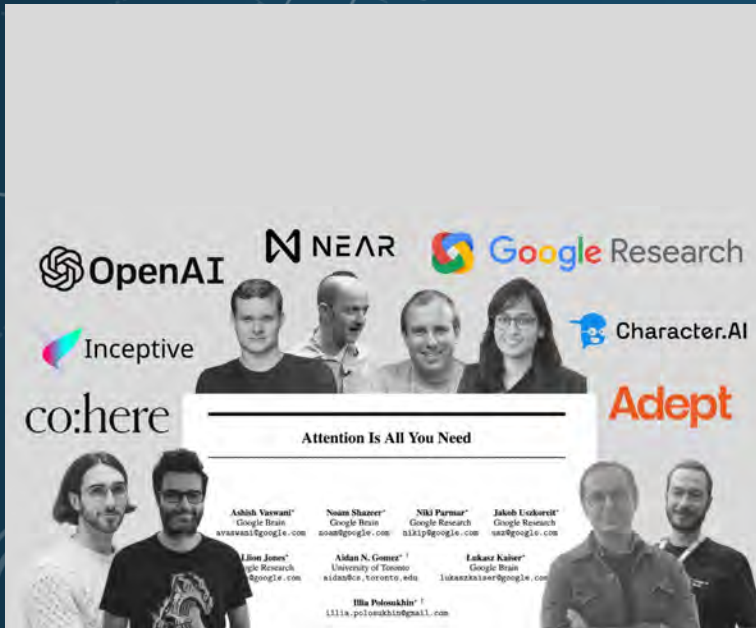
**MACHINES**

# RESEARCH GOOGLE

# TRANSFORMER TRANSLATOR

# GENERAL PRETRAINED TRANSFORMER

LLM ( LARGE LANGUAGE MODEL)



12/06/2017

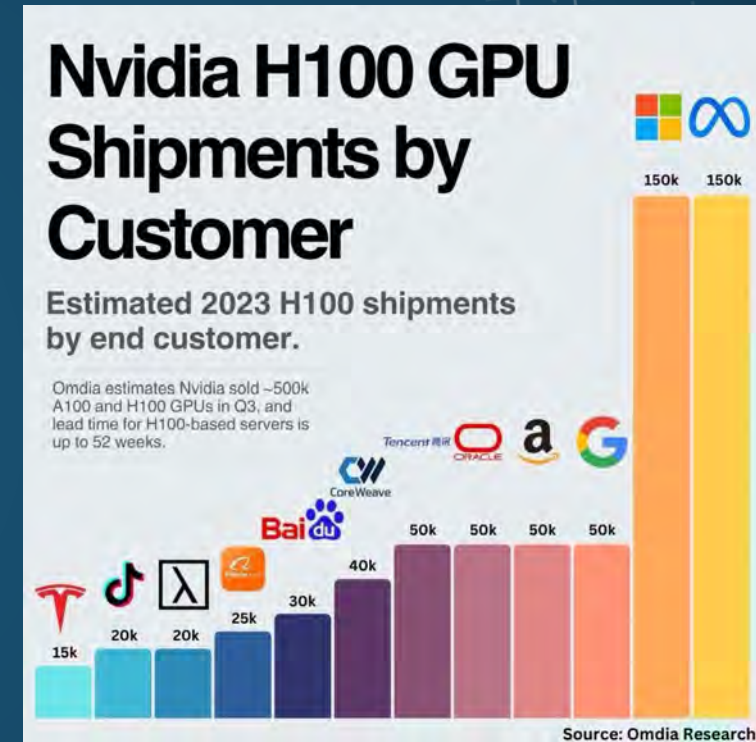
30/11/2022

5 yrs





# DIMENSIONS



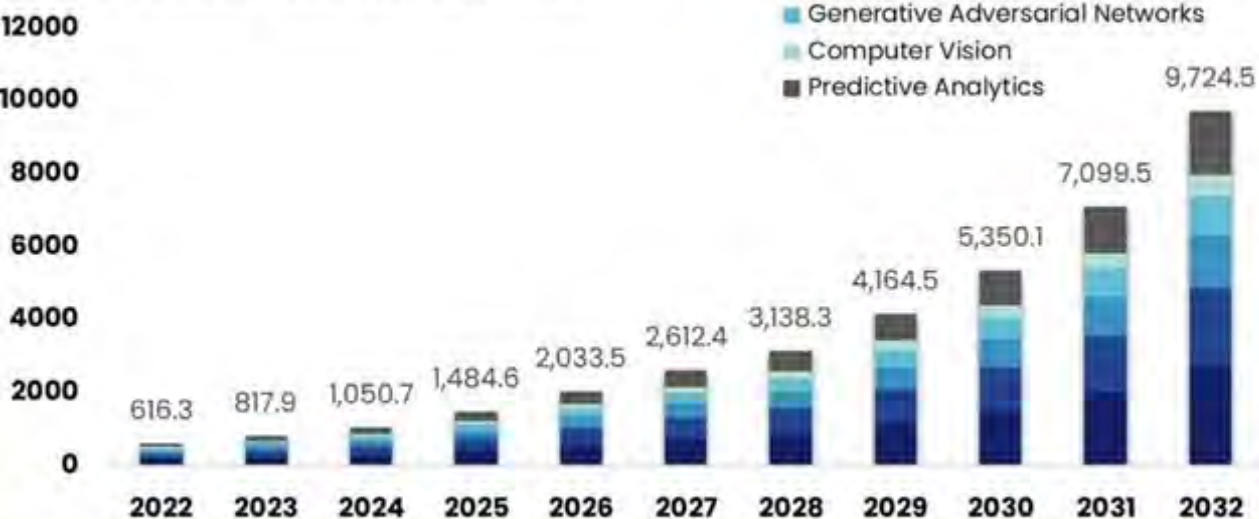
[ META ORDERED  
600.000 H100 GPU ]



[ LEONARDO1 CINECA  
1.400 A100 GPU ]

# Generative AI in Banking Market

Size, by Technology, 2022-2032 (USD Million)



The Market will Grow At the CAGR of: **32.7%** The forecasted market size for 2032 in USD: **\$9,724.5M** MarketResearch

- Natural Language Processing
- Deep Learning
- Reinforcement Learning
- Generative Adversarial Networks
- Computer Vision
- Predictive Analytics

The market is expected to REGISTER a CAGR of over

**42.9%**



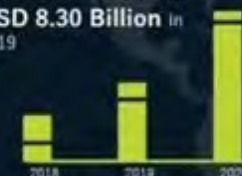
**35.3%**

of the market share was accounted for by North America in 2019



The year-over-year growth rate for 2018 was **41.70%**

The market was valued at **USD 8.30 Billion** in 2019



The market is **FAIRLY FRAGMENTED** with numerous players holding a significant market share



One of the **KEY DRIVERS** in this market is the growing demand for data-driven decision-making solution and better fraud detection solutions in the banking sector



READ THE REPORT:

GLOBAL AI IN BANKING MARKET 2017-2027

Trends & Latest Highlights



# 2032

## BANKING OUTLOOK



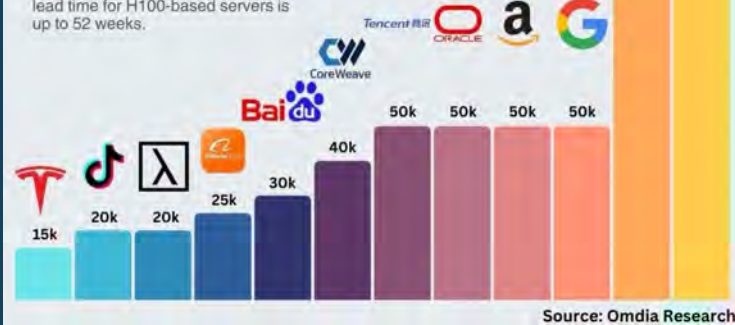


# DO YOU REMEMBER?

## Nvidia H100 GPU Shipments by Customer

Estimated 2023 H100 shipments by end customer.

Omdia estimates Nvidia sold ~500k A100 and H100 GPUs in Q3, and lead time for H100-based servers is up to 52 weeks.



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GPU

BATTLE FOR ENTROPY

||

*My greatest concern was what to call it. I thought of calling it 'information', but the word was overly used, so I decided to call it 'uncertainty'. When I discussed it with **John von Neumann**, he had a better idea. Von Neumann told me, "You should call it **entropy**, for two reasons. In the first place your uncertainty function has been used in statistical mechanics under that name, so it already has a name. In the second place, and more important, nobody knows what entropy really is, so in a debate you will always have the advantage."*



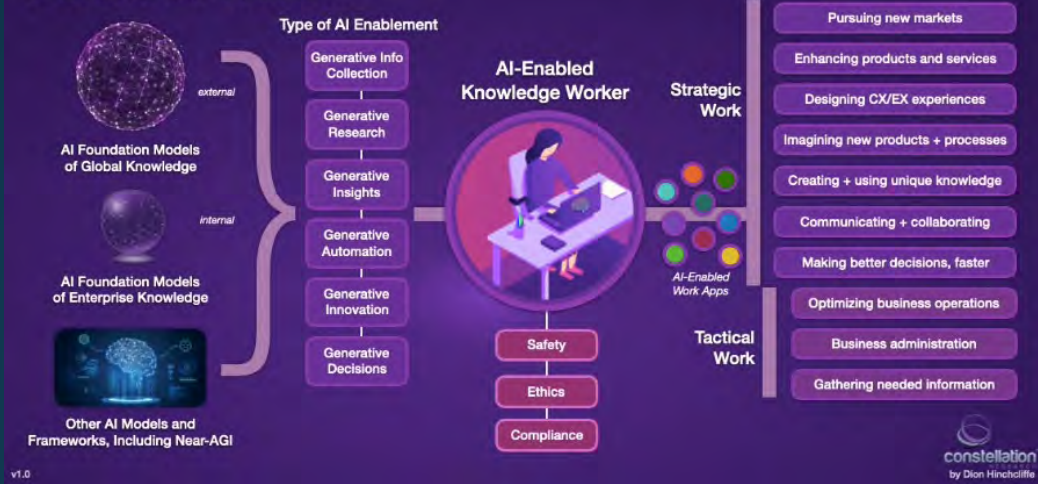
||

Claude Shannon

You will always need a GPU with important memory close to the computation unit,

We are far from advanced wearable AI.

# Generative AI and the Future of Work



# WHERE AI GOES



MARKETING

5 yrs

2017-2022

RESEARCH

Ding-Shum Lecture



## Objective-Driven AI

Towards AI systems that can learn, remember, reason, plan, have common sense, yet are steerable and safe

**Yann LeCun**

New York University

Meta - Fundamental AI Research



Ding-Shum Lecture  
Department of Mathematics  
Harvard University  
2024-03-28

M-51, HSO

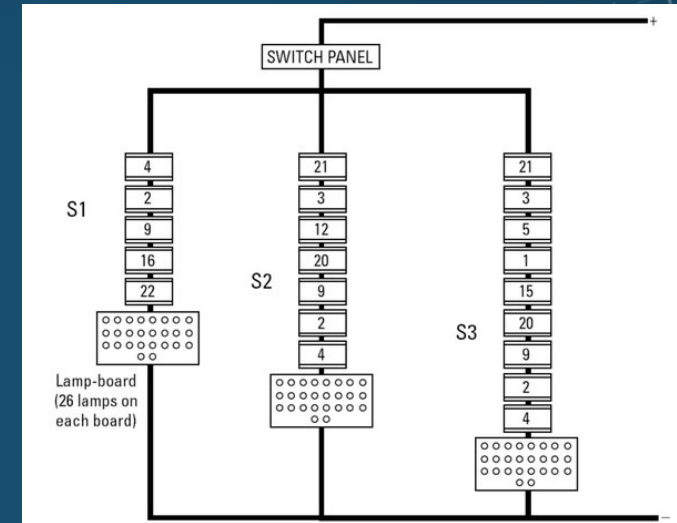
# DO YOU REMEMBER?



Modular Cognitive Architecture for Objective-Driven AI Y. LeCun

- ▶ **Configurator**
  - ▶ Configures other modules for task
- ▶ **Perception**
  - ▶ Estimates state of the world
- ▶ **World Model**
  - ▶ Predicts future world states
- ▶ **Cost**
  - ▶ Compute "discomfort"
- ▶ **Actor**
  - ▶ Find optimal action sequences
- ▶ **Short-Term Memory**
  - ▶ Stores state-cost episodes

Y. LeCun



OBJECTIVE  
DRIVEN

HALTING PROBLEM  
BATTLE

5 yrs ? 😊



*"Intelligence is not a scalar quantity."*



Yan Lecun

A LLM HOWEVER GREAT, PREDICTS ONE WORD AFTER ANOTHER,  
BUT DOES NOT KNOW WHAT IT IS SAYING.



*"AGI will arrive in five years."*

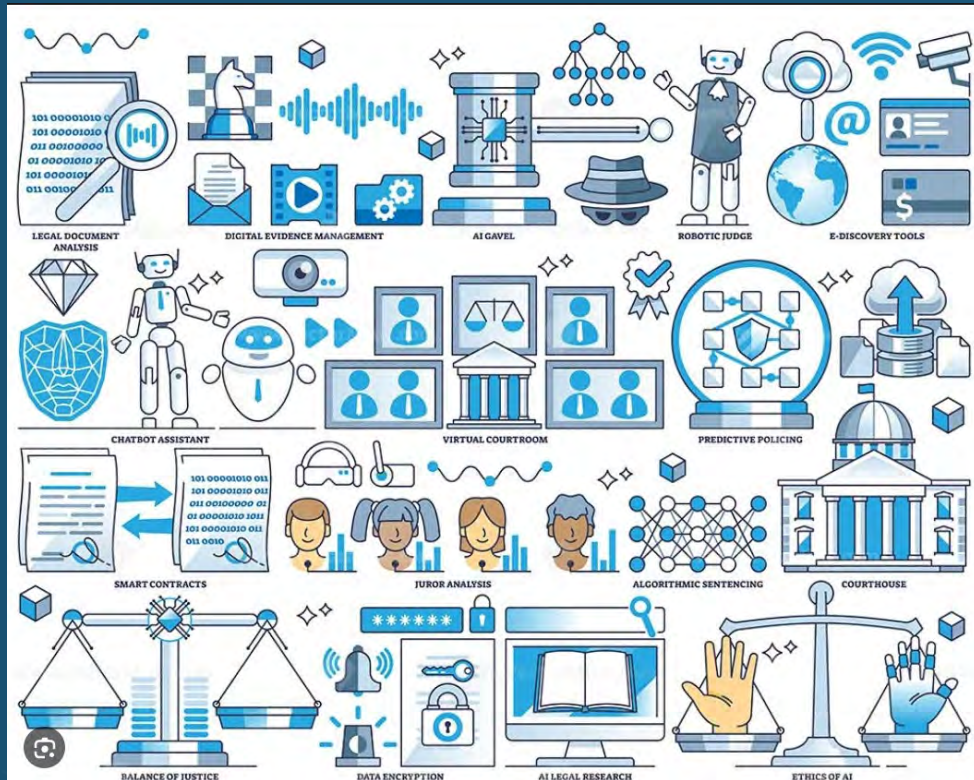


Jensen Huang

AI maintains a distance of **5 years** between Research and the Real World. In the car industry, the distance is about 15 years, in aviation 30, in space 50, and in construction 100 or more.



WE WILL **WIN**



AI is a process **science**

In processes there are **humans**

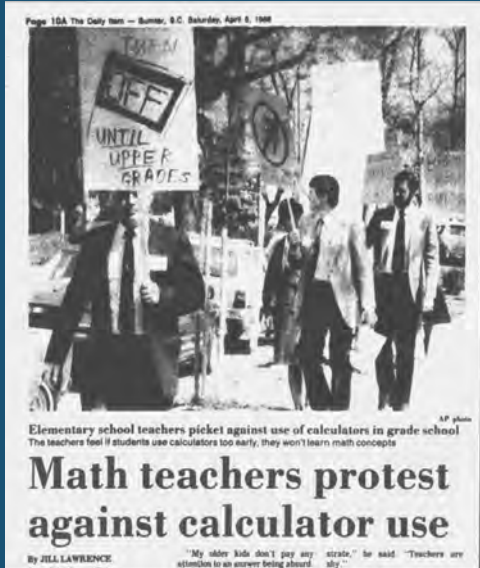
Humans are **imperfect**

This develops our **genius**

AI can only repeat, **we resolve**



# DIFFERENT FUTURE



Who will **buy**

Who will **do it**

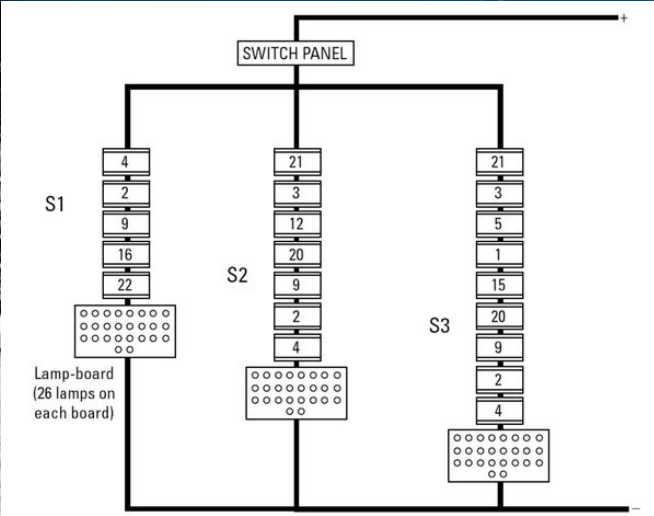
Who will **suffer it**

Who will **govern it**

Who will be **left behind**

Who will **benefit**





2020



Hyper-Personalization

2015



Recognition

2022



Conversation & Human Interaction

2022



Patterns & Anomalies

2010

The Seven Patterns of AI

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Autonomous Systems



2022

Goal-Driven Systems



2029

Predictive Analytics & Decisions



2018

2032

OBJECTIVES

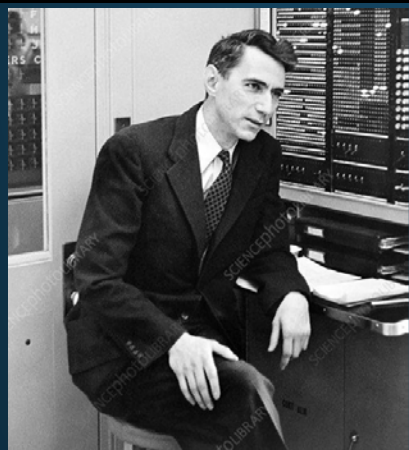
...5 yrs



AAA, looking for land for **Datacenter**  
 With possibility of building a **Nuclear Plant**



In 2029, 100BLN DataCenter, Stargate.



**2032**

*Infrastructure &  
 Hardware*

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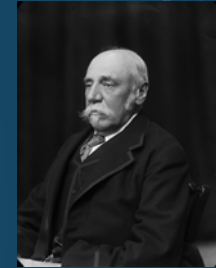
Market growth by component type





*«The Ethic is: The Obedience to the unenforceable»*

John Fletcher Mouton, Chimico, Ministro del munizionamento, 1942



AI has **no ethics**, it is we humans who use it with our genius

**We** will always be there in **our** processes.

Fighting against the **Halting Problem** and **Entropy**.

# WE EVOLVE IN THIS WAY



**NO HALTING PROBLEM**

**WE LIKE SOME ENTROPY**



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SADIBA 47

**THANK YOU**

Nicola Grandis

