

# Ένωση Πληροφορικών Ελλάδας

«Είμαστε έτοιμοι για την επόμενη φάση  
της επανάστασης του AI?»

Χάρης Γεωργίου (MSc, PhD)

# Ένωση Πληροφορικών Ελλάδας

Στόχοι:

- Πρώτος “καθολικός” φορέας εκπροσώπησης πτυχιούχων Πληροφορικής.
- Αρμόδιος φορέας εκπροσώπησης επαγγελματιών Πληροφορικής.
- Αρμόδιος επιστημονικός “συμβουλευτικός” φορέας για το Δημόσιο.
- Αρωγός της Εθνικής Ψηφιακής Στρατηγικής & Παιδείας της χώρας.

<https://www.epe.org.gr>



# Τομείς παρέμβασης

Ποιοι είναι οι κύριοι τομείς παρεμβάσεων της ΕΠΕ;

- ① Εθνική Ψηφιακή Στρατηγική & Οικονομία
- ② Εργασιακά (ΤΠΕ), Δημόσιος & ιδιωτικός τομέας
- ③ Παιδεία (Α', Β', Γ')
- ④ Έρευνα & Τεχνολογία
- ⑤ Έργα & υπηρεσίες ΤΠΕ
- ⑥ Ασφάλεια συστημάτων & δεδομένων
- ⑦ Ανοικτά συστήματα & πρότυπα
- ⑧ Χρήση ΕΛ/ΛΑΚ
- ⑨ Πνευματικά δικαιώματα
- ⑩ Κώδικας Δεοντολογίας (ΤΠΕ)
- ⑪ Κοινωνική μέριμνα (ICT4D)





## **Harris Georgiou (MSc, PhD)** – <https://github.com/xgeorgio/info>

- R&D: Associate post-doc researcher and lecturer with the University Athens (NKUA) and University of Piraeus (UniPi)
- Consultant in Medical Imaging, Machine Learning, Data Analytics, Signal Processing, Process Optimization, Dynamic Systems, Complexity & Emergent A.I., Game Theory
- HRTA member since 2010, LEAR / scientific advisor
- HRTA field operator (USAR, scuba diver)
- Wilderness first aid, paediatric (child/infant)
- Humanitarian aid & disaster relief in Ghana, Lesvos, Piraeus
- Support of unaccomp. minors, teacher in community schools
- Streetwork training, psychological first aid & victim support
- 3+4 books, 220+ scientific papers/articles (and 6 marathons)

# Επισκόπηση

- Περιεχόμενα:
  - Μέρος I: Τι εννοούμε «Τεχνητή Νοημοσύνη» – Που βρισκόμαστε σήμερα
  - Μέρος II: Μελλοντικές προοπτικές, περιορισμοί, προσδοκίες
- Σχετικό υλικό:
  - «Εισαγωγή στη Μηχανική Μάθηση και στην Αναλυτική Δεδομένων», Χ. Γεωργίου, Α' κύκλος ανοικτών μαθημάτων ΕΠΕ – <https://youtu.be/mlU4SvyfRqA>
  - «Artificial Intelligence | 60 Minutes Full Episodes» –  
<https://www.youtube.com/watch?v=aZ5EsdnpLMI>
  - Computer History Museum (CHM) – <https://www.youtube.com/@ComputerHistory>
  - Peter Norvig, Stuart J. Russell (2010). Artificial Intelligence: A Modern Approach (3<sup>rd</sup> Ed.)  
– <https://people.engr.tamu.edu/guni/csce625/slides/AI.pdf>

# Μέρος I: Που βρισκόμαστε σήμερα

1. Η «νοημοσύνη» στη Φύση
2. Άλμα στο σήμερα
3. Deep Neural Networks
4. Το παράδειγμα του XOR

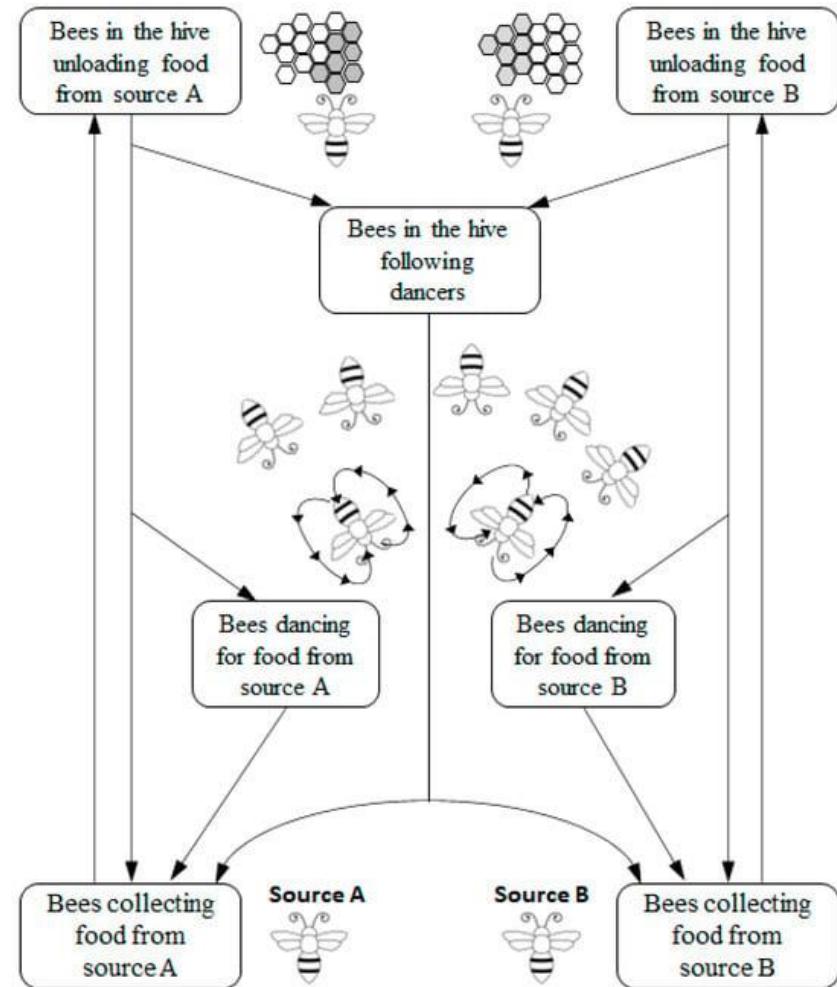




Alamy

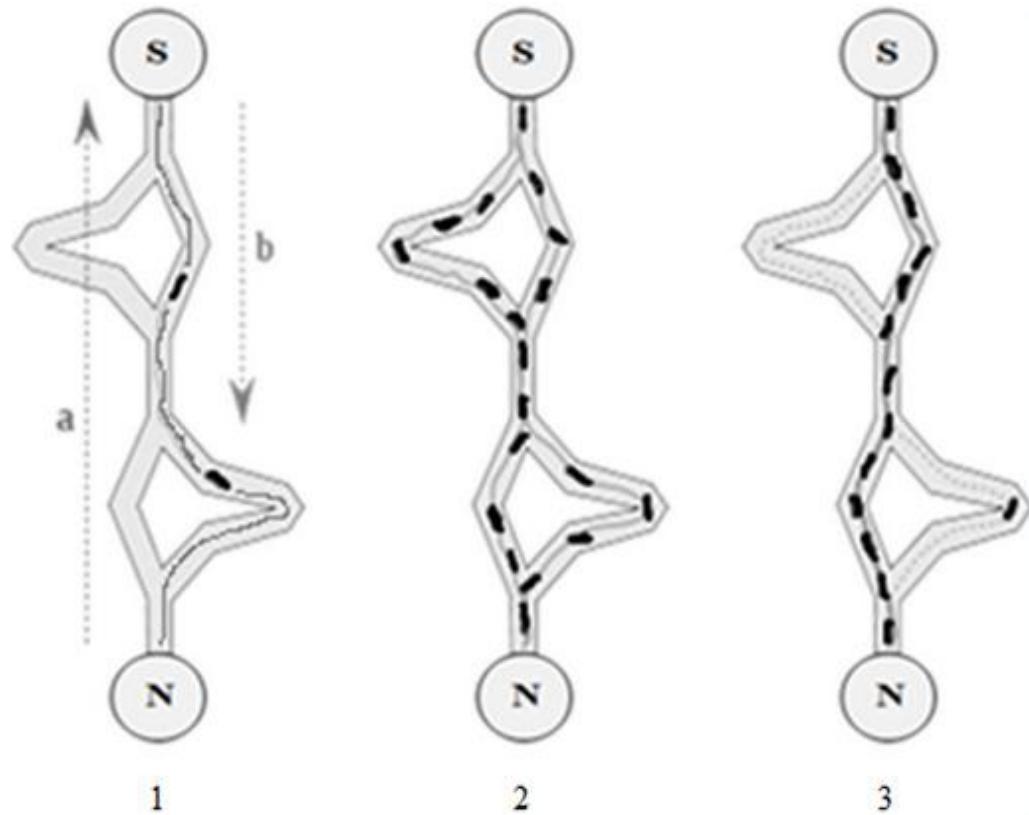
The New Caledonian crow uses twigs and branches to extricate grubs and insects from inside trees (Credit: Alamy)

## Bee Colony Optimization (BCO)





## Ant Colony Optimization (ACO)



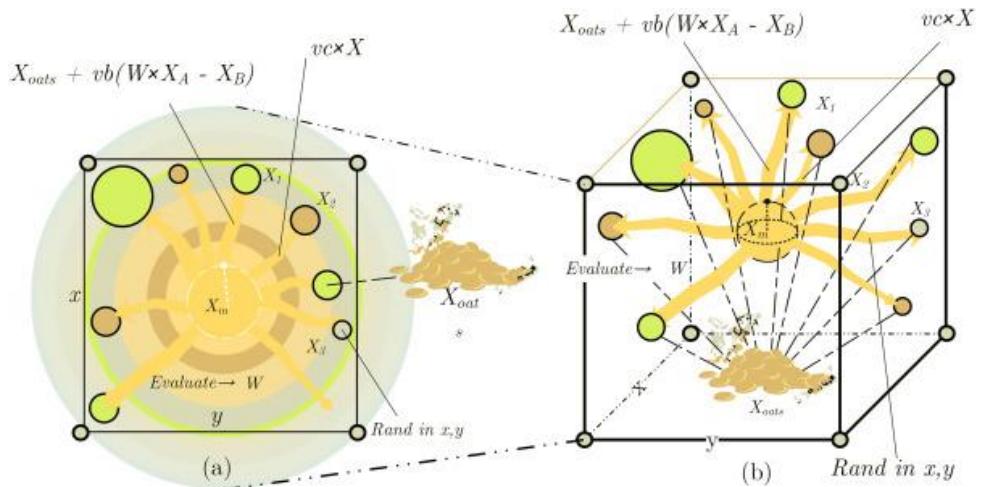
## Swarm Intelligence (SI)





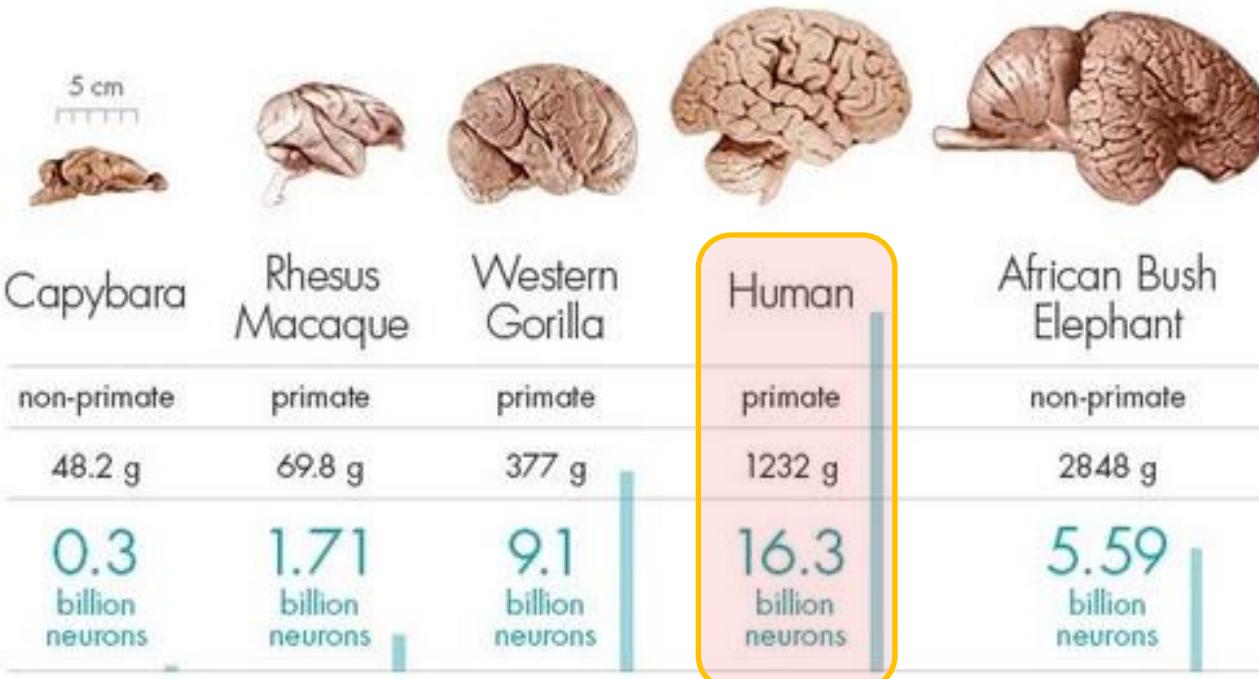
# Slime mould algorithm: A new method for stochastic optimization

Shimin Li <sup>a</sup>✉, Huiling Chen <sup>a</sup>✉, Mingjing Wang <sup>e</sup>✉, Ali Asghar Heidari <sup>b c</sup>✉,  
 Seyedali Mirjalili <sup>d</sup>✉



# BRAIN SIZE AND NEURON COUNT

Cerebral cortex mass and neuron count for various mammals.



# ChatGPT



## Examples

"Explain quantum computing in simple terms" →



## Capabilities

"Got any creative ideas for a 10 year old's birthday?" →

"How do I make an HTTP request in Javascript?" →



## Limitations

May occasionally generate incorrect information

May occasionally produce harmful instructions or biased content

Limited knowledge of world and events after 2021

# Ιστορίες με Δράκου

Επεισόδιο: **23/04/2024**

Μικρές ή μεγάλες. Σημαντικές ή γοπτευτικές αγρίους. Με πρόσωπα γνωστά ή που αξίζει αφορούν. Ακροβατούν καθημερινά, 6-8 ημέρες σε ανάλαφρης ζωής. Στον ΣΚΑΙ 100.3.



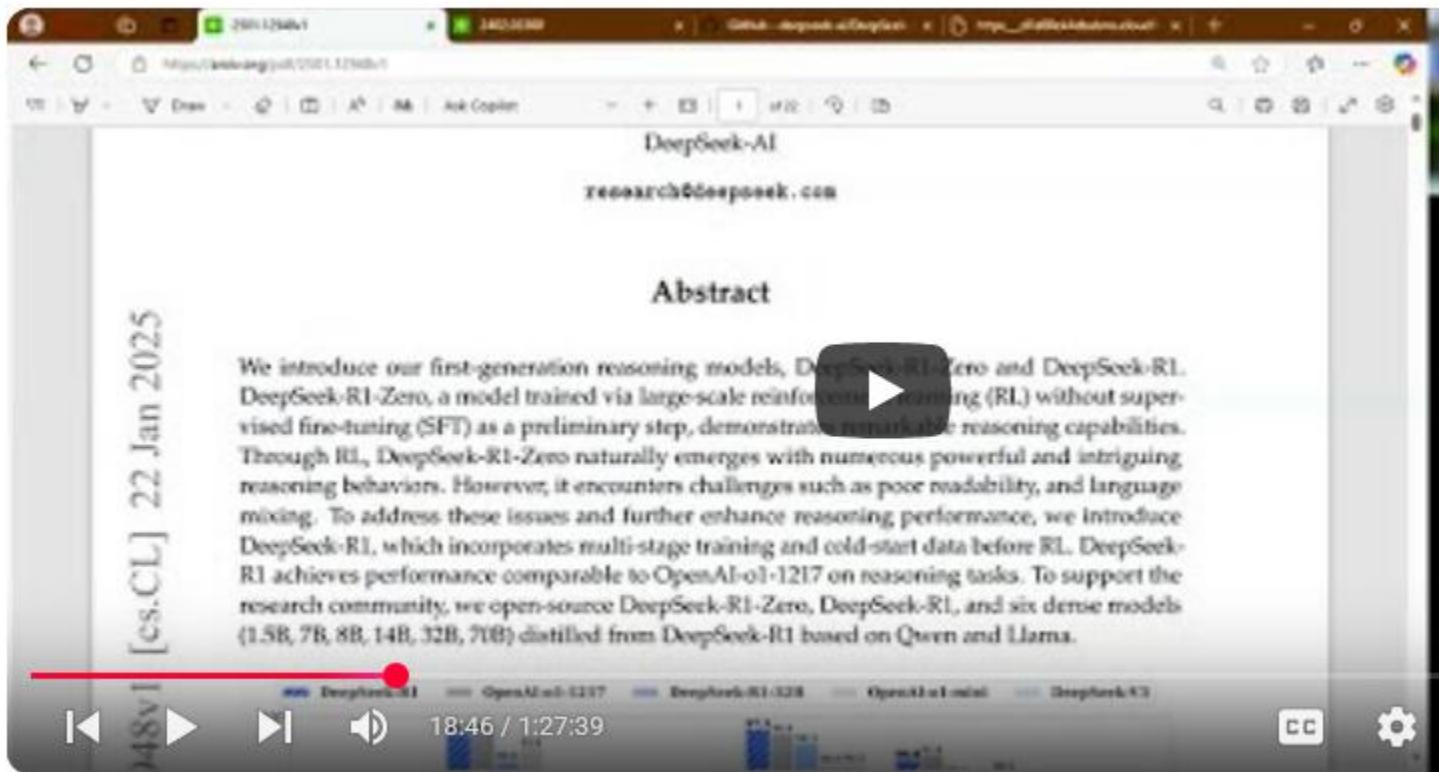
Τεχνητή Νοημοσύνη - Συνέντευξη στο ΣΚΑΪ (23-4-2024)

<https://youtu.be/PqxPWMOPjXY>



Τεχνητή Νοημοσύνη και #DeepSeek | Συνέντευξη στη Ναυτεμπορική  
(29/1/2025)

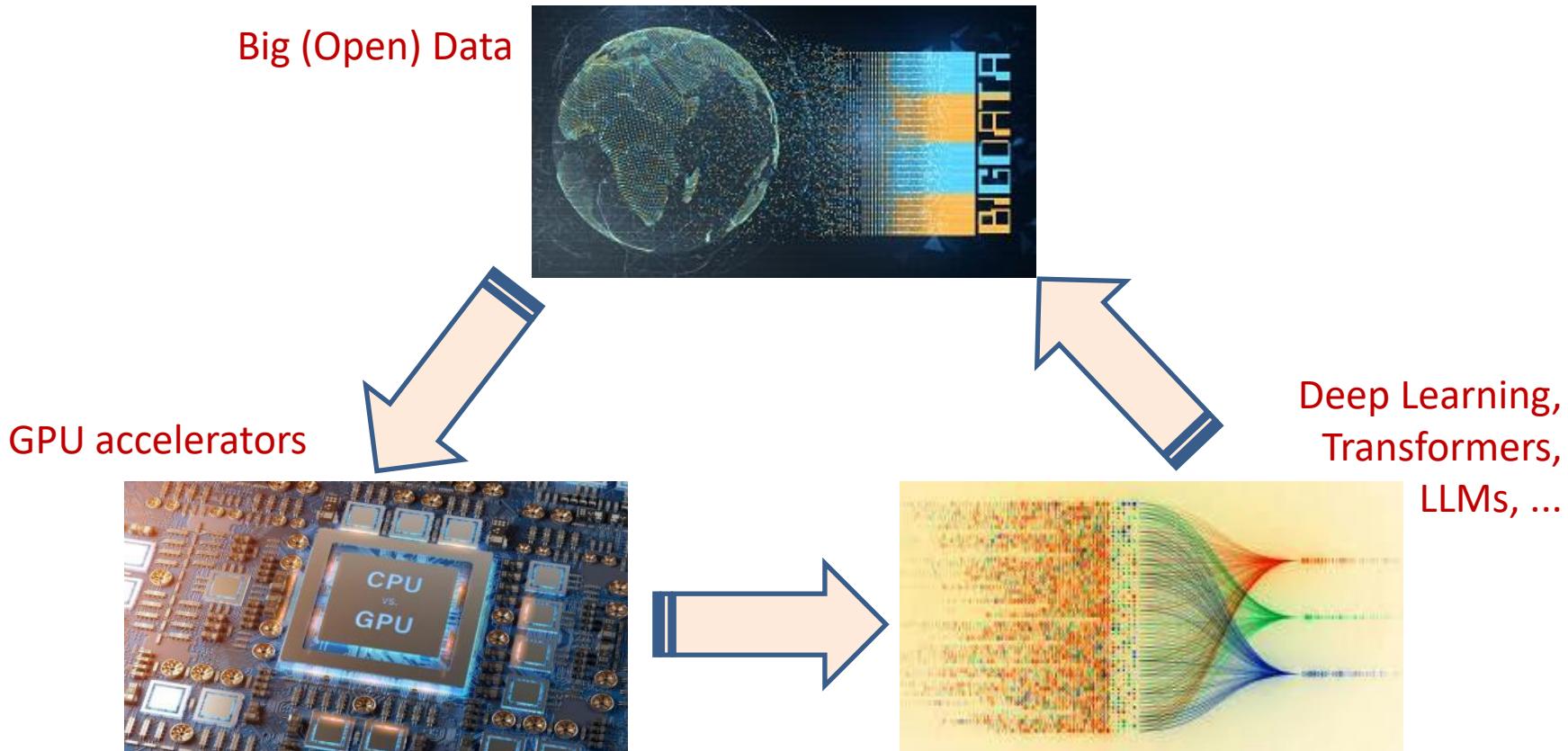
<https://youtu.be/KH8pV1sYPcU>



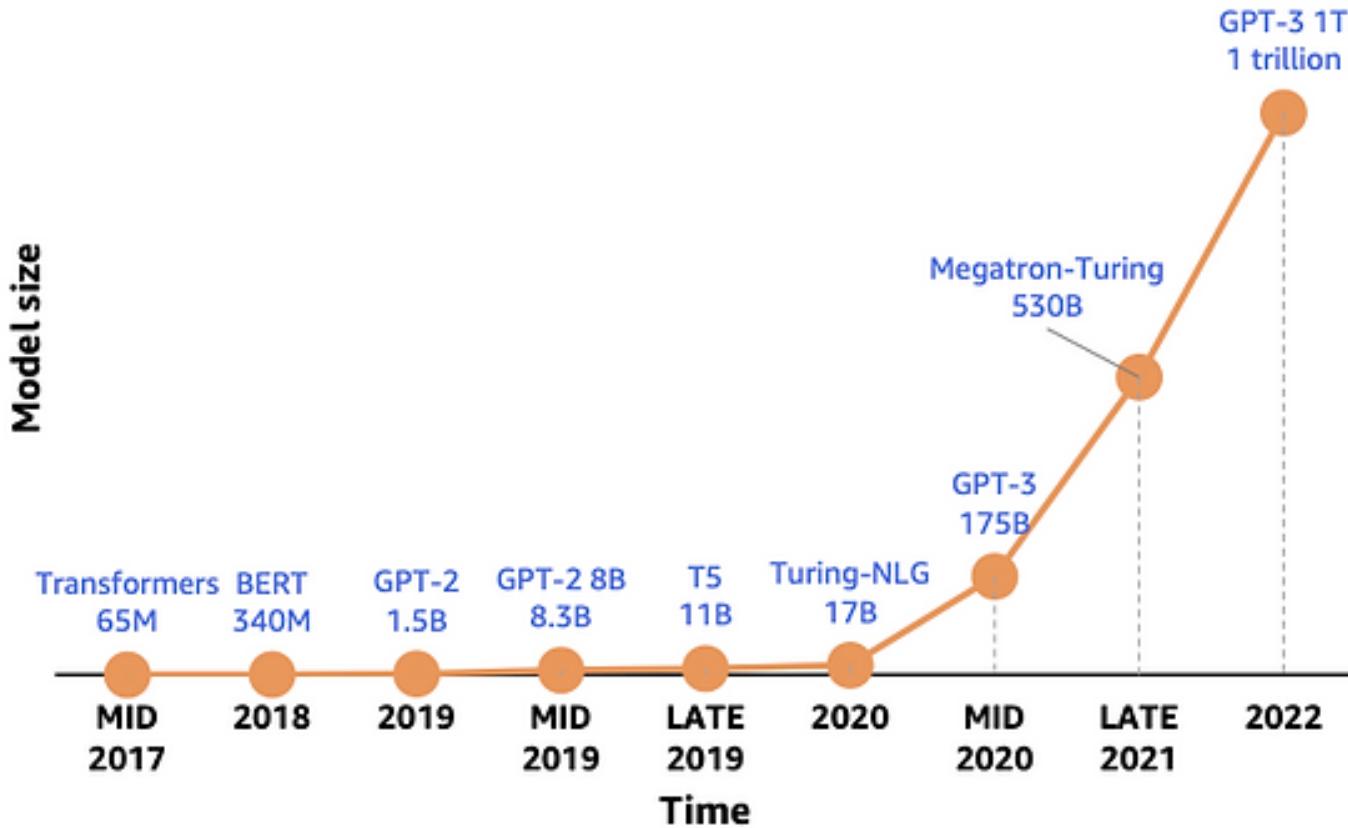
Reboot podcast (31-1-2025): #DeepSeek και εξελίξεις στο AI | #ΕΠΕ #HIU

<https://youtu.be/pEwkwlTRJFo>

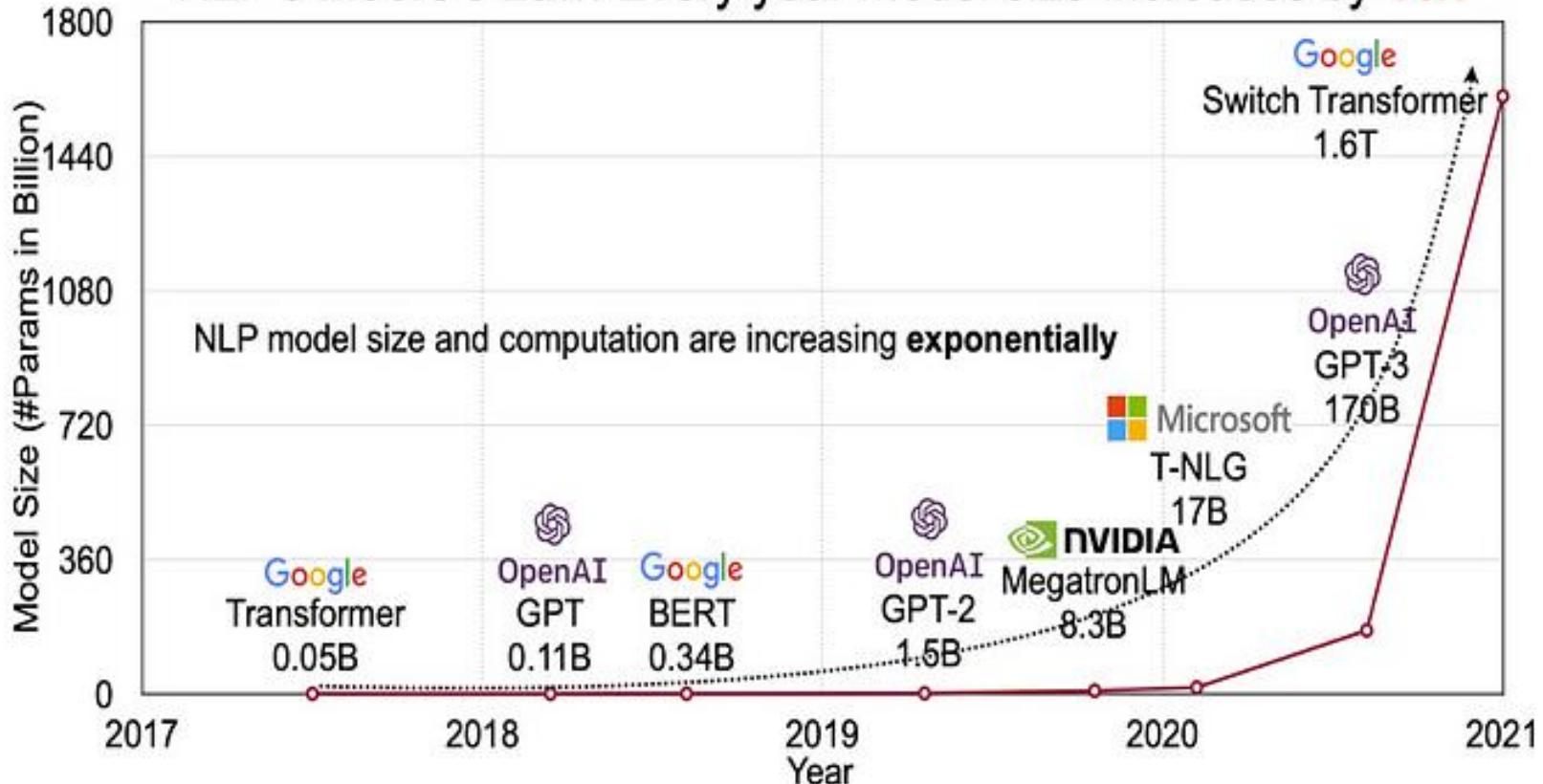
# Τι έχει αλλάξει τα τελευταία 10-15 χρόνια;



# 15,000x increase in 5 years

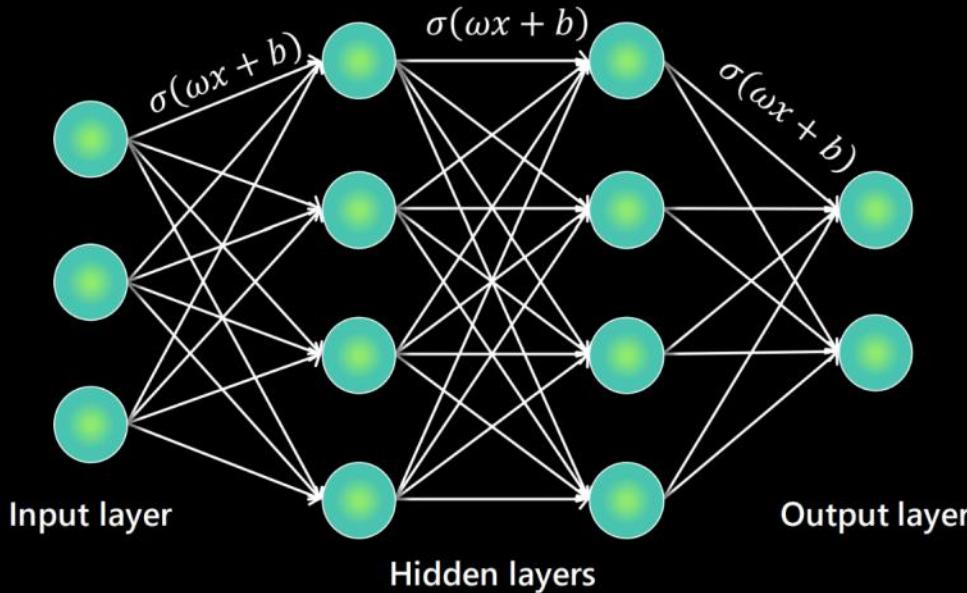


## NLP's Moore's Law: Every year model size increases by 10x



# How large are they?

Transformer model Neural network



Function: weight \* input plus bias

BERT Large - 2018

**345M**

GPT2 - 2019

**1.5B**

GPT3 - 2020

**175B**

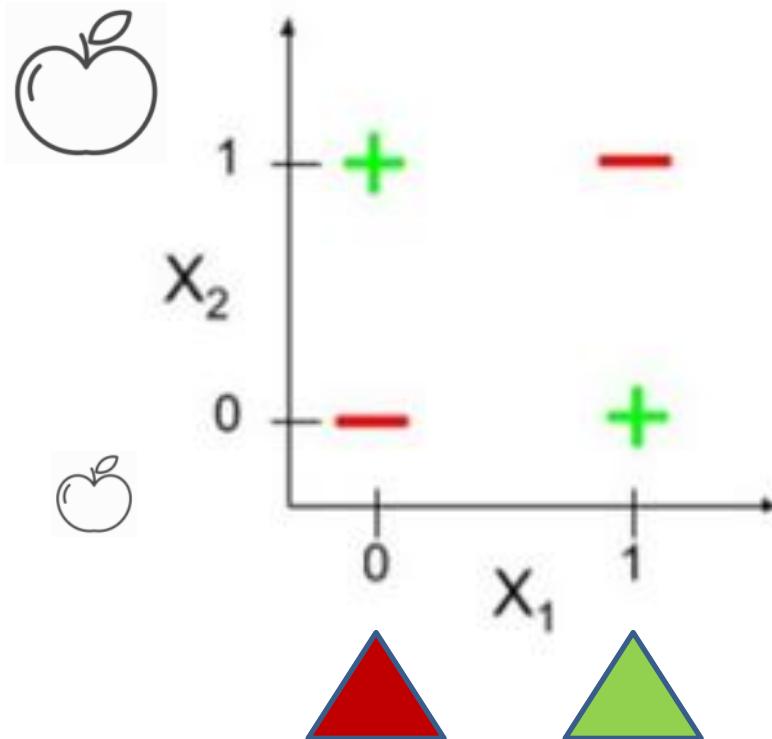
Turing Megatron NLG  
2021

**530B**

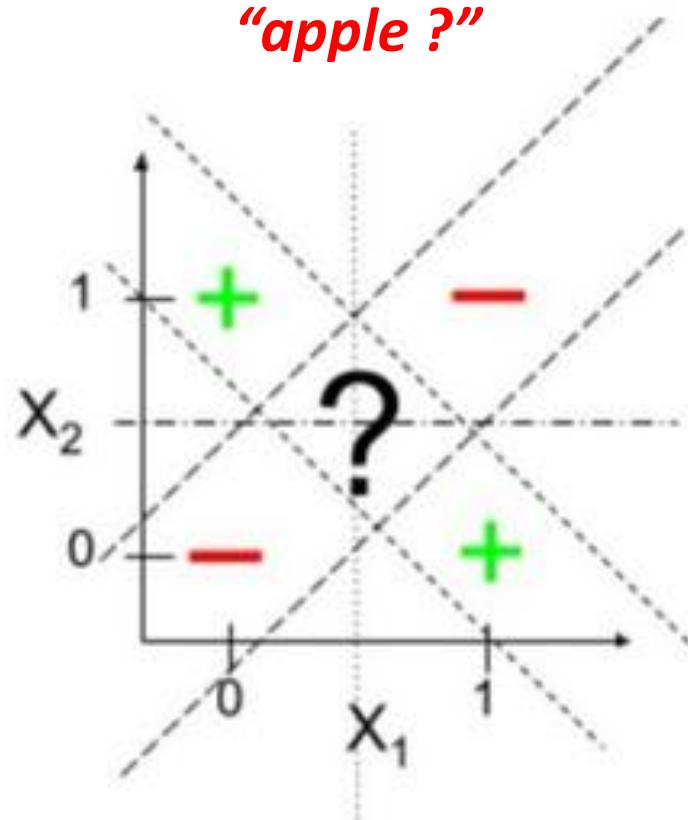
GPT4 – 2023

**1.4T** (estimated)

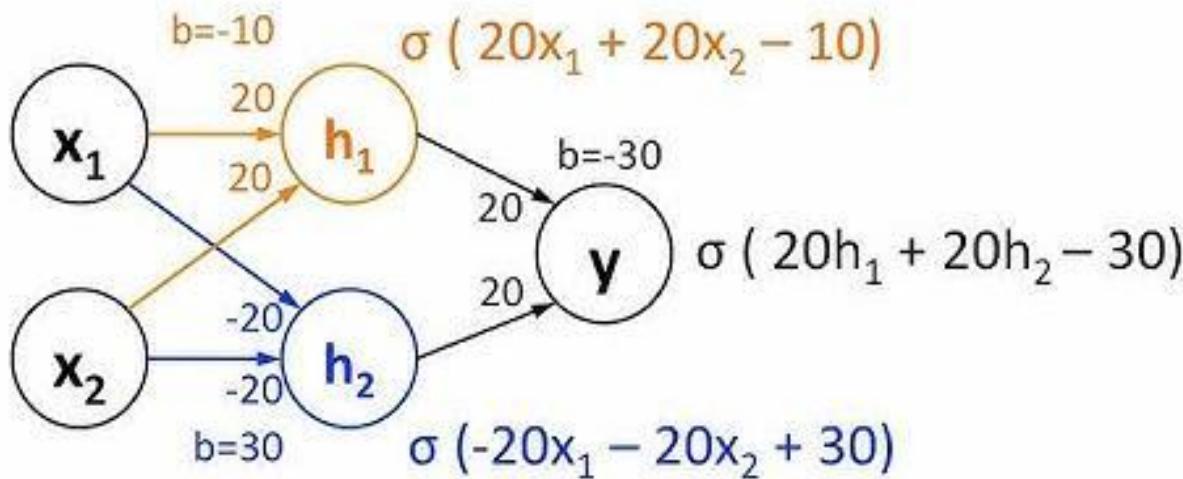
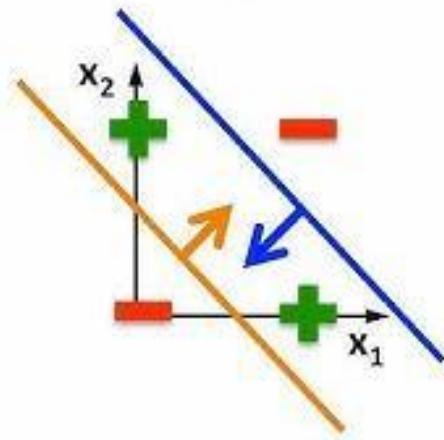
# XOR PROBLEM



*“apple ?”*



Linear classifiers  
cannot solve this



$$\sigma(20*0 + 20*0 - 10) \approx 0$$

$$\sigma(20*1 + 20*1 - 10) \approx 1$$

$$\sigma(20*0 + 20*1 - 10) \approx 1$$

$$\sigma(20*1 + 20*0 - 10) \approx 1$$

$$\sigma(-20*0 - 20*0 + 30) \approx 1$$

$$\sigma(-20*1 - 20*1 + 30) \approx 0$$

$$\sigma(-20*0 - 20*1 + 30) \approx 1$$

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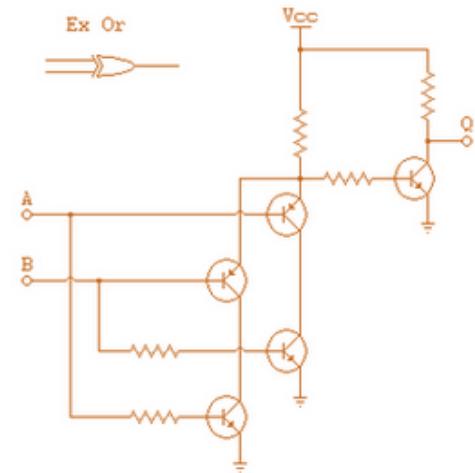
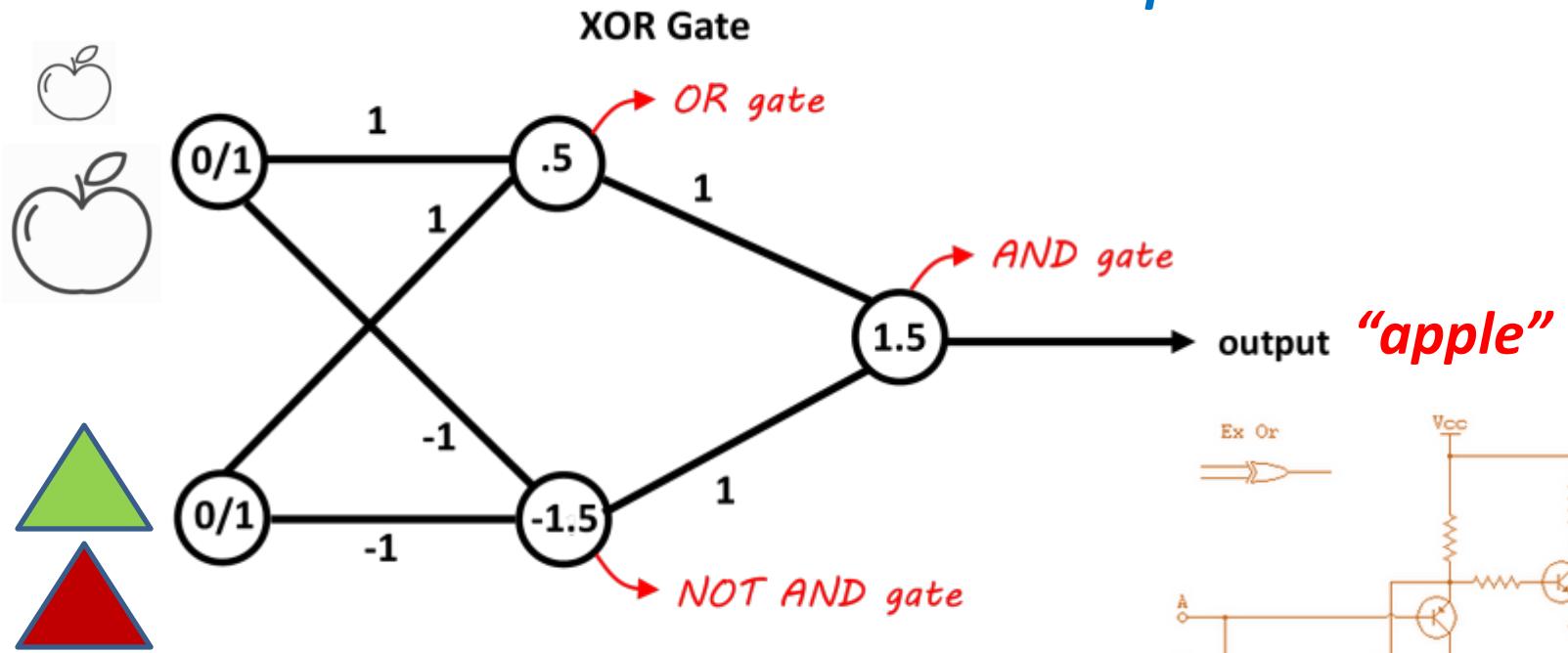
$$\sigma(20*0 + 20*1 - 30) \approx 0$$

$$\sigma(20*1 + 20*0 - 30) \approx 0$$

$$\sigma(20*1 + 20*1 - 30) \approx 1$$

$$\sigma(20*1 + 20*1 - 30) \approx 1$$

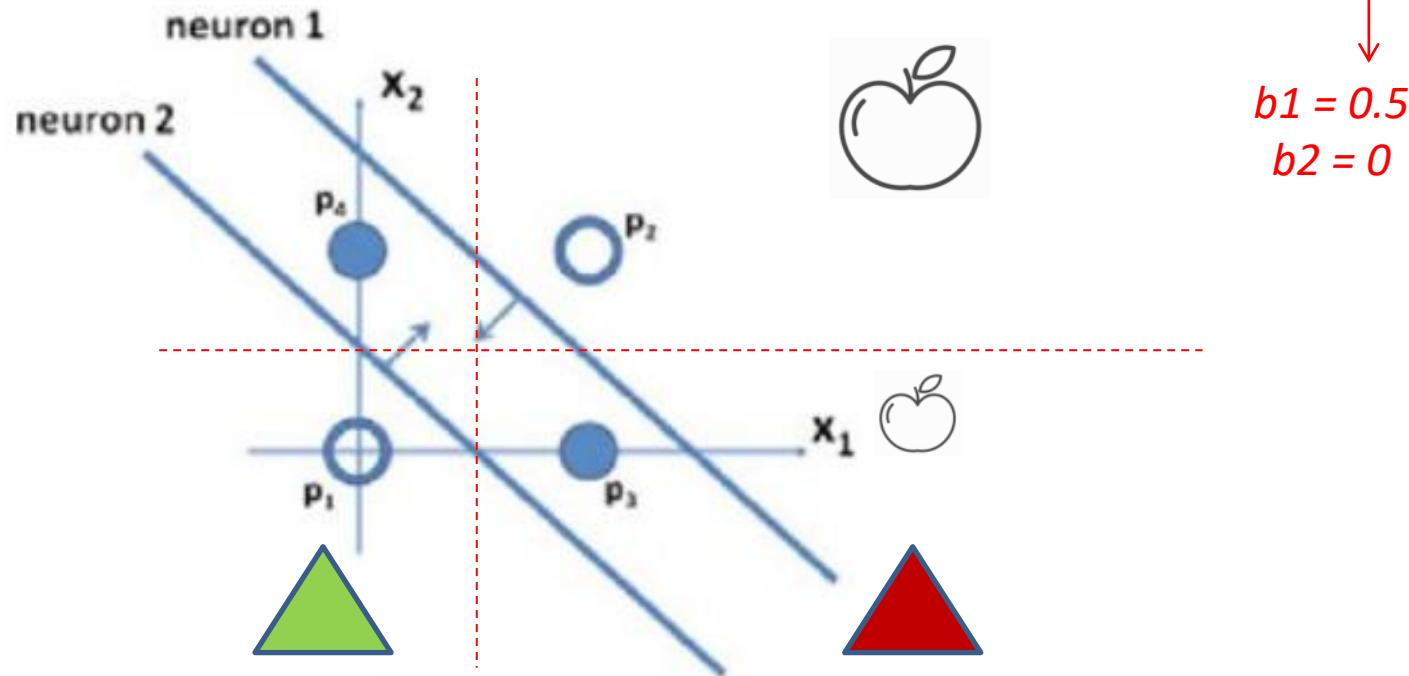
*model param# = 3x3 = 9*



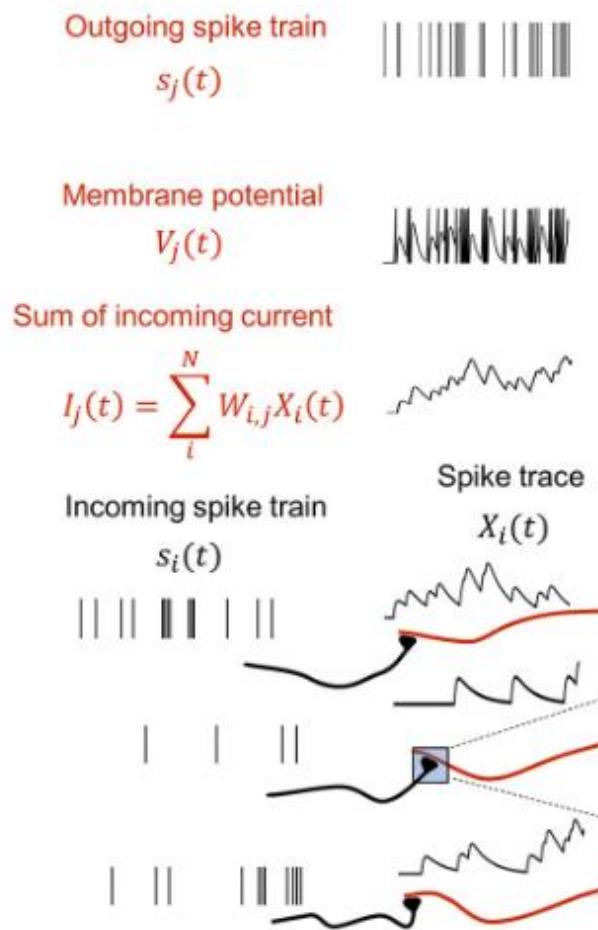
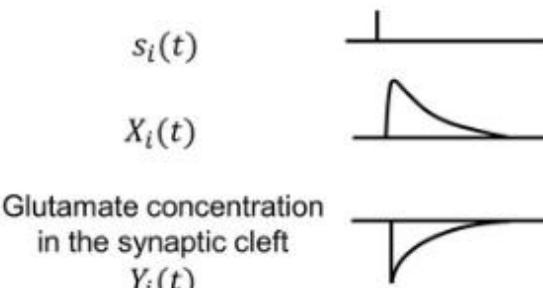
*2 input “features”*

*model param# = 1+1 = 2*

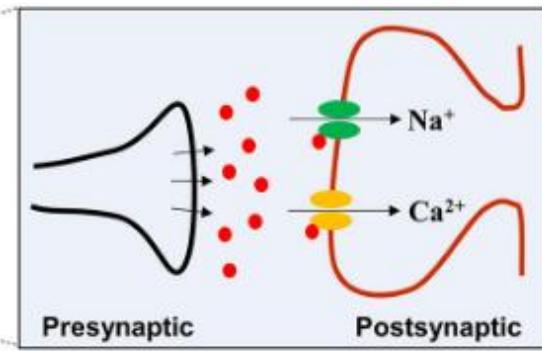
$$XOR(A, B) \triangleq \otimes(\langle x, y \rangle) = [|x - y|], \{x, y\} \in [0, 1]$$



$$\begin{aligned} b1 &= 0.5 \\ b2 &= 0 \end{aligned}$$

**A****B**

- Glutamate
- NMDA receptor
- AMPA receptor





## Μέρος II: Το μέλλον που έρχεται γρήγορα

1. «Συζητώντας» με το A.I.
2. Μπορεί το A.I. να «δημιουργήσει»;
3. A.I. «alignment» – Το πρόβλημα
4. Σχεδιάζοντας το μέλλον του A.I.



The screenshot shows a web browser window with multiple tabs open at the top. The main content is a video player for a YouTube video. The video title is "HOW TO MAKE A COMPUTER APPEAR INTELLIGENT" by JOSEPH WEIZENBAUM. The video player has a play button icon and a progress bar showing 0:04 / 51:22. Below the video player is a navigation bar with icons for back, forward, and other controls. To the right of the video player is a text excerpt from the article, which begins with "There exists a continuum of opinions on what constitutes intelligence, hence on what constitutes artificial intelligence. Perhaps most workers in the fields of heuristic programming, artificial intelligence, et al., now agree that the purpose of a definition in this area is, at least for the time being, a sterile activity. No operationally significant contributions can be expected from the abstract contemplation of the particular semantic trivialities involved in the definition of intelligence." At the bottom right of the video player is a logo for the University of Michigan.

UNBC obliquity

How to Make

A COMPUTER

APPEAR INTELLIGENT

by JOSEPH WEIZENBAUM, Computer Laboratory,  
General Electric Co., Mountain View, Calif.

These exists a continuum of opinions on what constitutes intelligence, hence on what constitutes artificial intelligence. Perhaps most workers in the fields of heuristic programming, artificial intelligence, et al., now agree that the purpose of a definition in this area is, at least for the time being, a sterile activity. No operationally significant contributions can be expected from the abstract contemplation of the particular semantic trivialities involved in the definition of intelligence.

"Five-in-a-Row"  
offers no guarantees

Reboot podcast (14-2-2025): #ELIZA και η ιστορική αναδρομή στα AI chatbots |

<https://youtu.be/eZN0GvnYbN8>



Τεχνητή Νοημοσύνη και social media | Συνέντευξη στη Ναυτεμπορική  
(19/2/2025)

<https://youtu.be/CyY7NmkJEc>

AI Is Coming for Music, Too

James O'Donnell | MIT Technology Review | April 16, 2025 | 3,759 words

picked by Peter Rubin April 16, 2025

You've already seen how "diffusion" AI models have made it simple to generate illustrations, lifelike photos, and even videos. What that technology means for music is nearing an inflection point—and so is our understanding of what "creativity" really is.

For *MIT Tech Review*, James O'Donnell unpacks the debate, and blind-tests colleagues and experts to see if they can identify AI-generated music. He also manages to make me (and surely other music fans) very, very uncomfortable.

47:03 / 1:31:46

I decided to pick 12 genres, generate a song sample for each, and then find similar

Reboot podcast (25-4-2025): Μπορεί το GenAI να παράγει Τέχνη; | #ΕΠΕ #HIU

<https://youtu.be/NpS89Q05Nf8>

**Figure 7. Rembrandt, *The Night Watch* (1642), detail, Rijksmuseum. (Left) X-ray showing underdrawings and pentimenti, the earliest stages of the composition. (Right) The final painting in visible light {[PD-U.S.]}.**



**Figure 9. Proof-of-concept computational reconstruction of Diego Velázquez's (lost) *The Expulsion of the Moriscos* (1627).**



## Computer Vision, ML, and AI in the Study of Fine Art

Ongoing research in the analysis of art is building upon the vast store of algorithms and knowledge from mainstream computer vision, deep learning, and artificial intelligence.

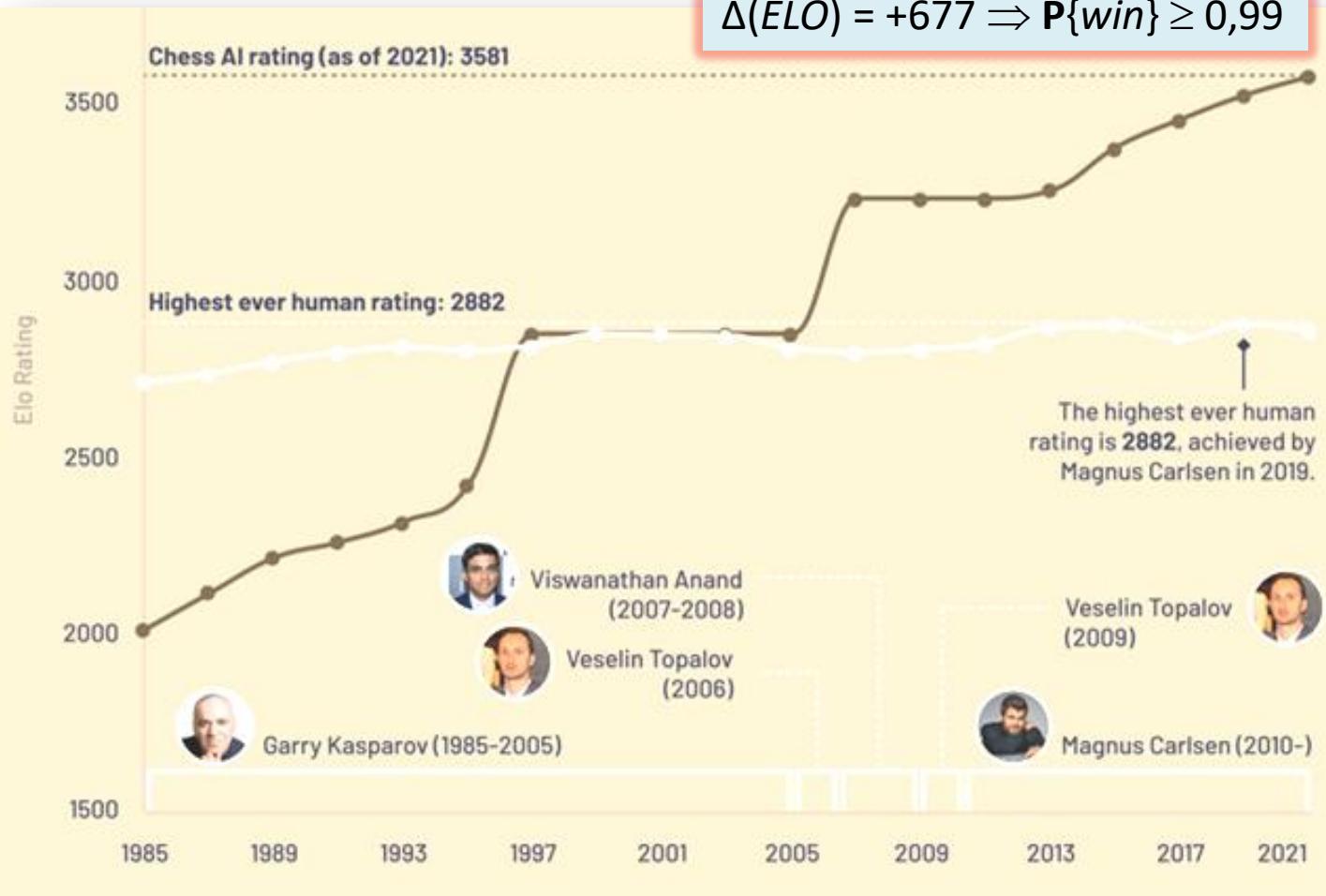
By David G. Stork

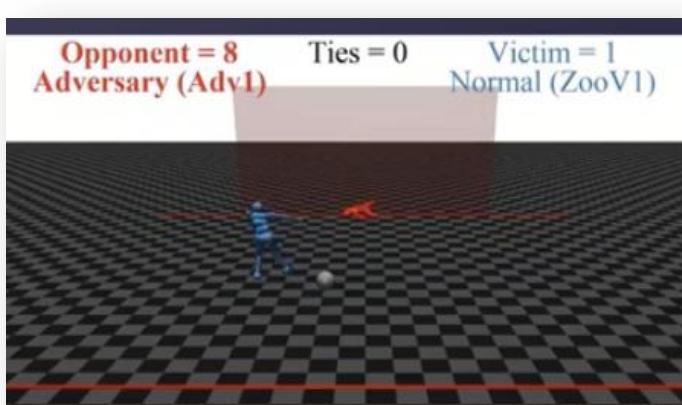
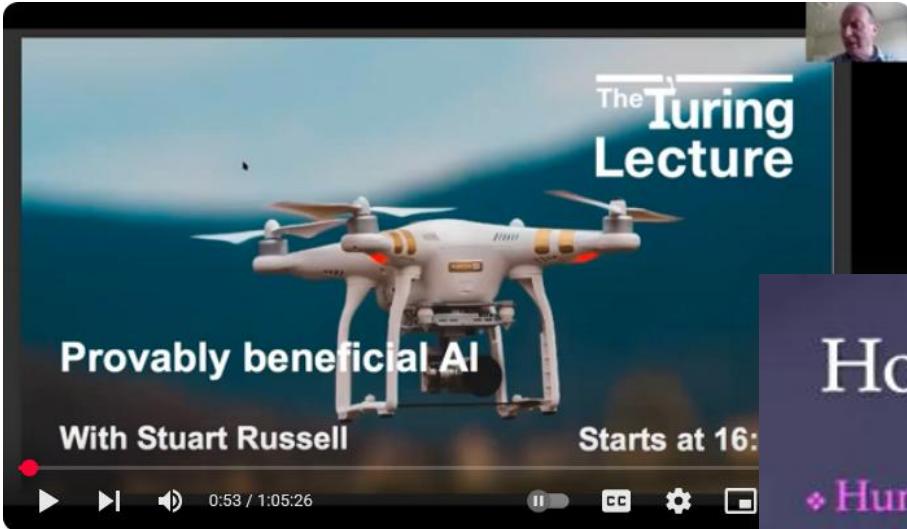


Συνέντευξη στη Ναυτεμπορική σχετικά με τους AI agents και την Τεχνητή Νοημοσύνη (30/4/2025)

<https://youtu.be/VzY0F8I9NUA>

$$\Delta(ELO) = +677 \Rightarrow P\{win\} \geq 0,99$$





AI systems will eventually make better decisions than humans  
(Alternative: we will fail in AI)

## How we got into this mess

- Humans are intelligent to the extent that our actions can be expected to achieve our objectives
- Machines are intelligent to the extent that their actions can be expected to achieve their objectives
- Machines are beneficial to the extent that their actions can be expected to achieve our objectives



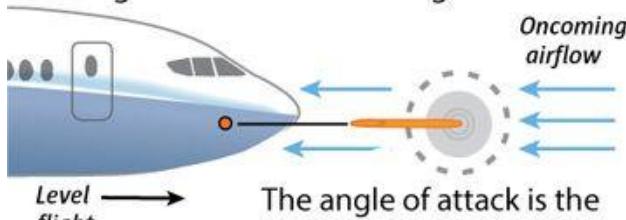
Reboot podcast (9-5-2025): Τεχνητή Νοημοσύνη - Ευχή ή κατάρα; | #ΕΠΕ #HIU

[https://youtu.be/ZaZD\\_wOg8As](https://youtu.be/ZaZD_wOg8As)

# Worst Software Failures: Boeing 737 MAX

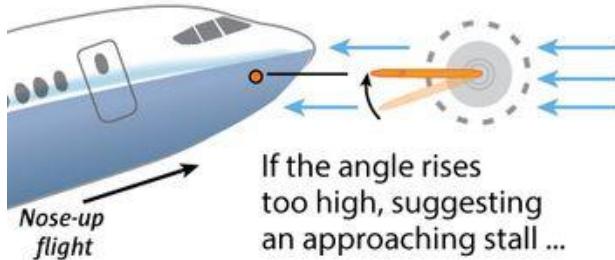
## How the MCAS (Maneuvering Characteristics Augmentation System) works on the 737 MAX

1. The angle-of-attack sensor aligns itself with oncoming airflow.



The angle of attack is the angle between the wing and the airflow.

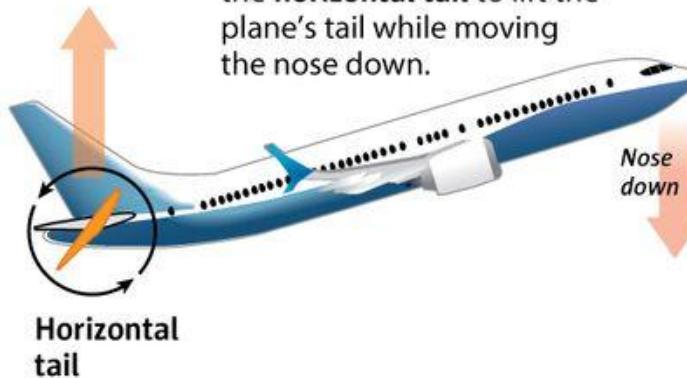
2. Data from the sensor is sent to the flight computer.



If the angle rises too high, suggesting an approaching stall ...

... the MCAS activates.

3. MCAS automatically swivels the **horizontal tail** to lift the plane's tail while moving the nose down.



Sources: Boeing, FAA, Indonesia National Transportation Safety Committee, Leeham.net, and The Air Current

Reporting by DOMINIC GATES,

Graphic by MARK NOWLIN / THE SEATTLE TIMES

# Worst Software Failures: Tesla car crash



## PRELIMINARY REPORT

### HIGHWAY

A preliminary review of the recorded performance data showed the following:

- The Autopilot system was engaged on four separate occasions during the 32-minute trip, including a continuous operation for the last 18 minutes 55 seconds prior to the crash.
- During the 18-minute 55-second segment, the vehicle provided two visual alerts and one auditory alert for the driver to place his hands on the steering wheel. These alerts were made more than 15 minutes prior to the crash.
- During the 60 seconds prior to the crash, the driver's hands were detected on the steering wheel on three separate occasions, for a total of 34 seconds; for the last 6 seconds prior to the crash, the vehicle did not detect the driver's hands on the steering wheel.
- At 8 seconds prior to the crash, the Tesla was following a lead vehicle and was traveling about 65 mph.
- At 7 seconds prior to the crash, the Tesla began a left steering movement while following a lead vehicle.
- At 4 seconds prior to the crash, the Tesla was no longer following a lead vehicle.
- At 3 seconds prior to the crash and up to the time of impact with the crash attenuator, the Tesla's speed increased from 62 to 70.8 mph, with no precrash braking or evasive steering movement detected.

*The information in this preliminary report is  
It will be supplemented or corrected du*

On Friday, March 23, 2018, about 9:27 a.m., Pacific time, a silver electric-powered passenger vehicle, occupied by a male driver, was traveling westbound on US Highway 101 (US-101) in Mountain View, San Mateo County, California. The vehicle approached the US-101/State Highway (SH-85) interchange from the left, which was a high-occupancy-vehicle (HOV) lane.

According to performance data downloaded from the vehicle, the driver assistance features traffic-aware cruise control and lane keeping assist that Tesla refers to as "autopilot." As the Tesla approached the HOV lanes of US-101 from the SH-85 exit ramp, it moved from the center lane to the left lane. Tesla continued traveling through the gore area and across the center line at a speed of about 71 mph.<sup>2</sup> The crash attenuator was positioned in the center line barrier. The speed limit on this area of roadway is 55 mph. The traffic-aware cruise control speed was set to 62 mph. Tesla rotated the Tesla counter-clockwise and caused a series of collisions. Tesla was involved in subsequent collisions with a Toyota Prius and an Audi A4 (see figure 1).



**At the end of every frame this code would update configuration to commanded mode**

053C 1C08	SETMO	SRB	LMRA	/SAVE RETURN ADDRESS
053D 9B20		SLC	800	/IS LINE COUNTER AT 800
053E 0543		JMP	SETMOA	/ YES
				/ NO
053F 8000		ABS	0	/RESET SKIPPR HERE BECAUSE IT IS A
0540 4F83		MLD	SKIPPR	/ CONVENIENT TIME TO DO IT
0541 305D		WAT	95	/EQUALIZE TIME WITH L800 PATH
0542 2C08		EXC	LMRA	/RETURN
				/LINE COUNTER IS AT 800
0543 5BE5	SETMOA	MRD	MODE	/GET MODE WORD FOR UPCOMING 48 SECONDS

**The First Interstellar Software Update - The Insane Hack That Saved Voyager 1**



Scott Manley  
1.78M subscribers



4.4K



Share



Thanks



[https://youtu.be/p0K7u3B\\_8rY](https://youtu.be/p0K7u3B_8rY)

## Mission Operations Issues

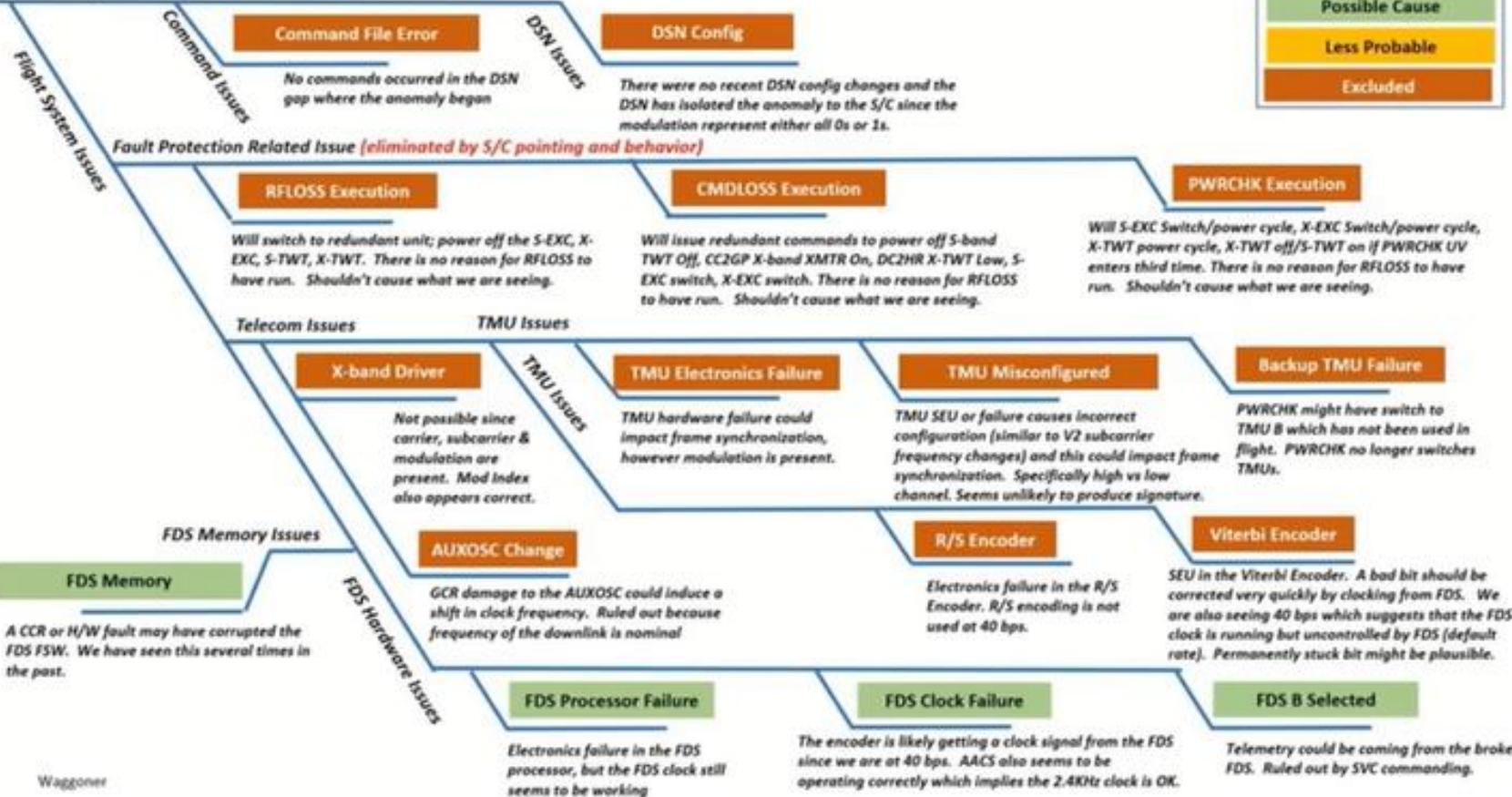
## Fishbone Diagram for Voyager 1 Telemetry Anomaly

## Legend

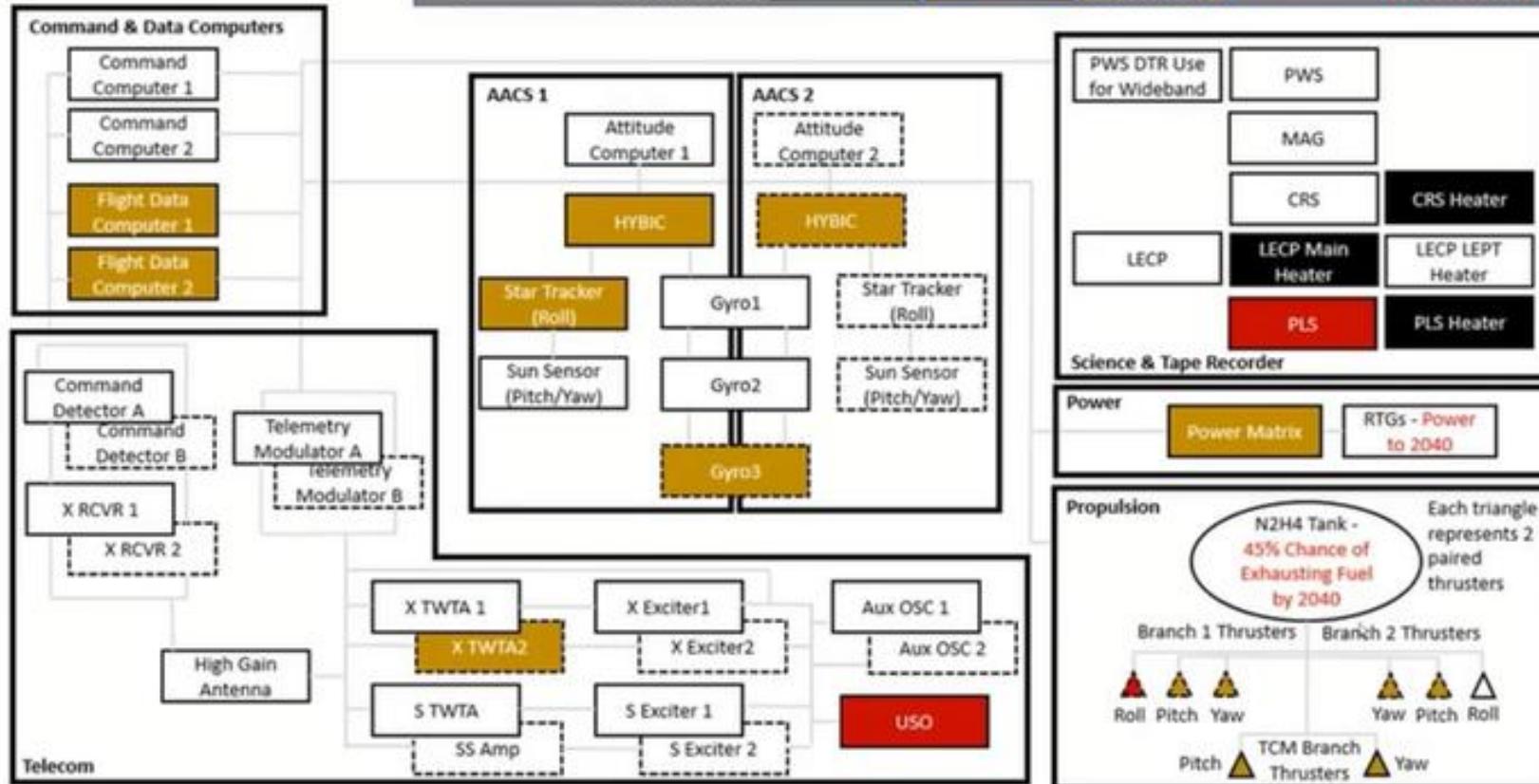
Possible Cause

Less Probable

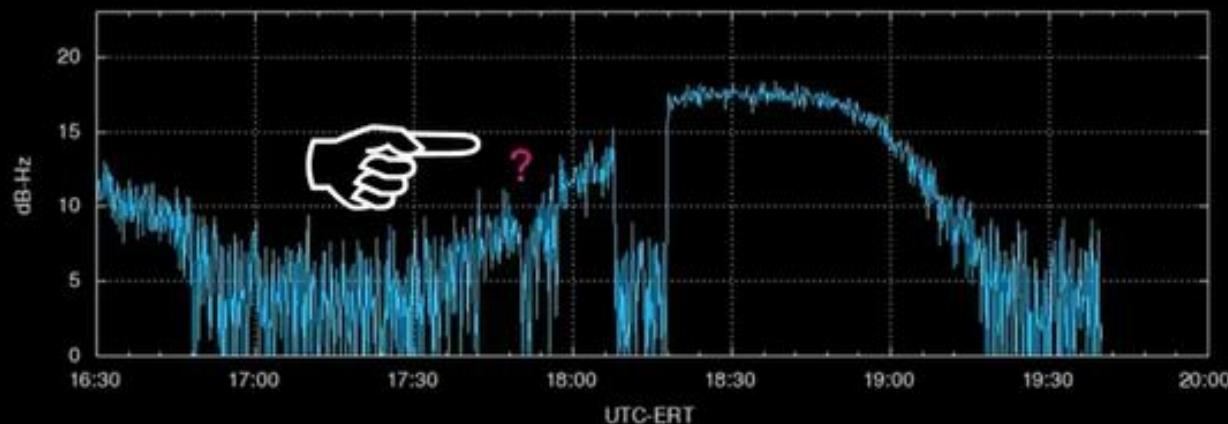
Excluded



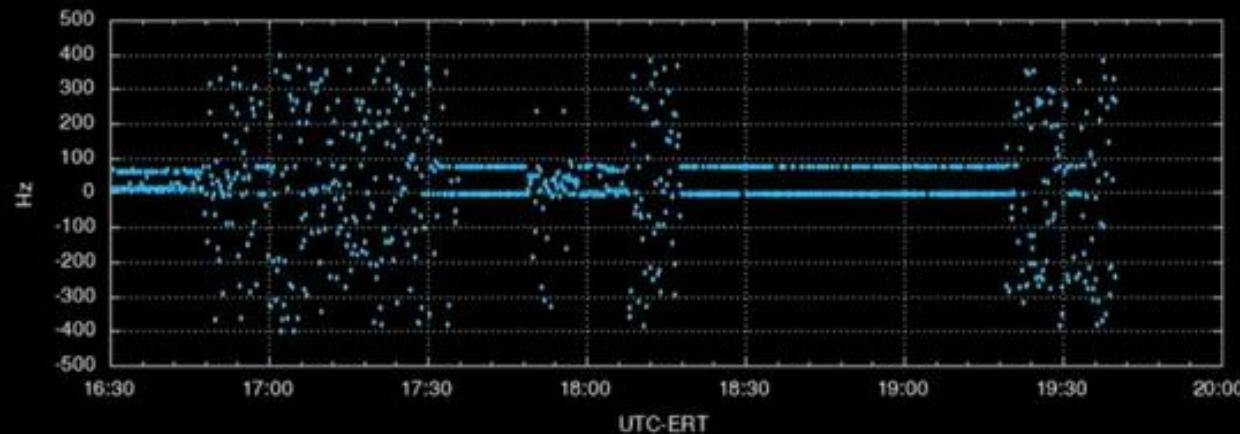
# Voyager 1 Health Block Diagram



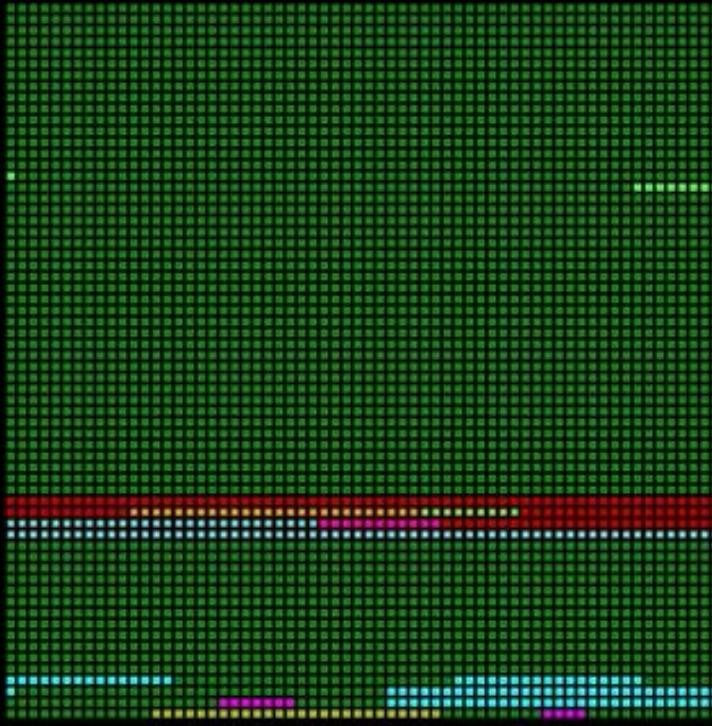
[https://youtu.be/p0K7u3B\\_8rY](https://youtu.be/p0K7u3B_8rY)



2024/056 VGR1 Subcarrier 10-sec integration DSS-43 X LCP Residual Frequency



# Voyager FDS Upper Memory

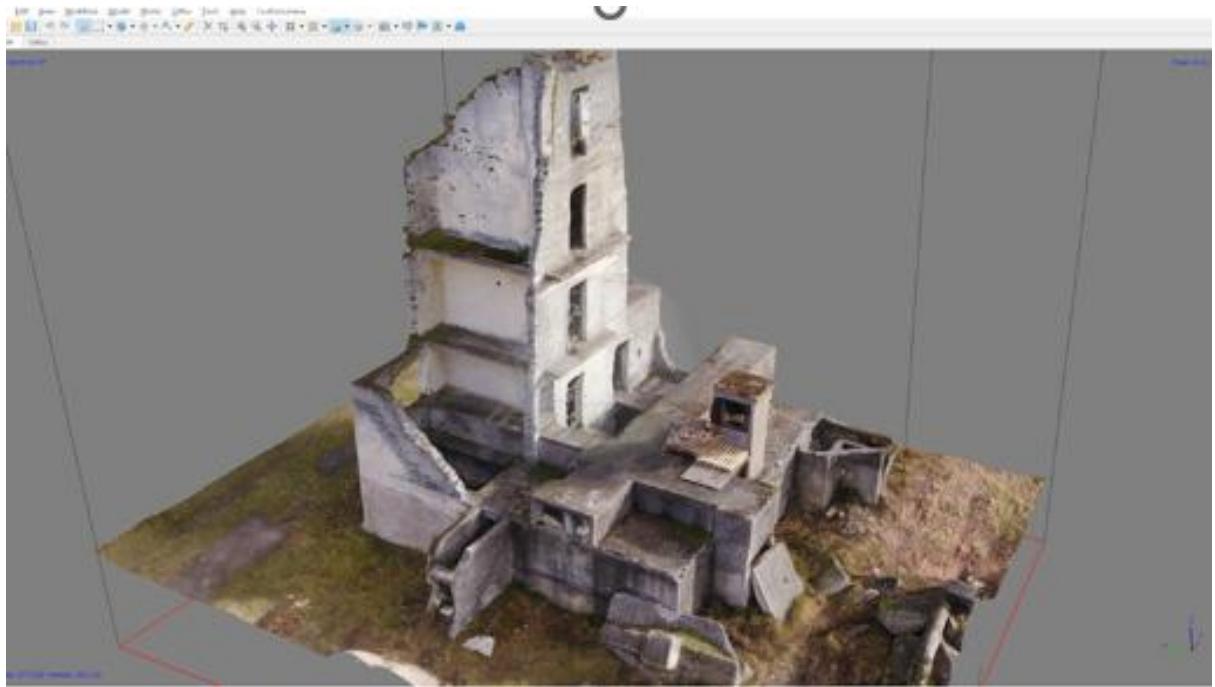


**Bad Memory  
0x1400-0x14FF**

Relocate PLSCL 1/3

## Modelling Swarm Drones:

Creation of orthophoto and 3-D model of disaster area with 5 pre-programmed drones

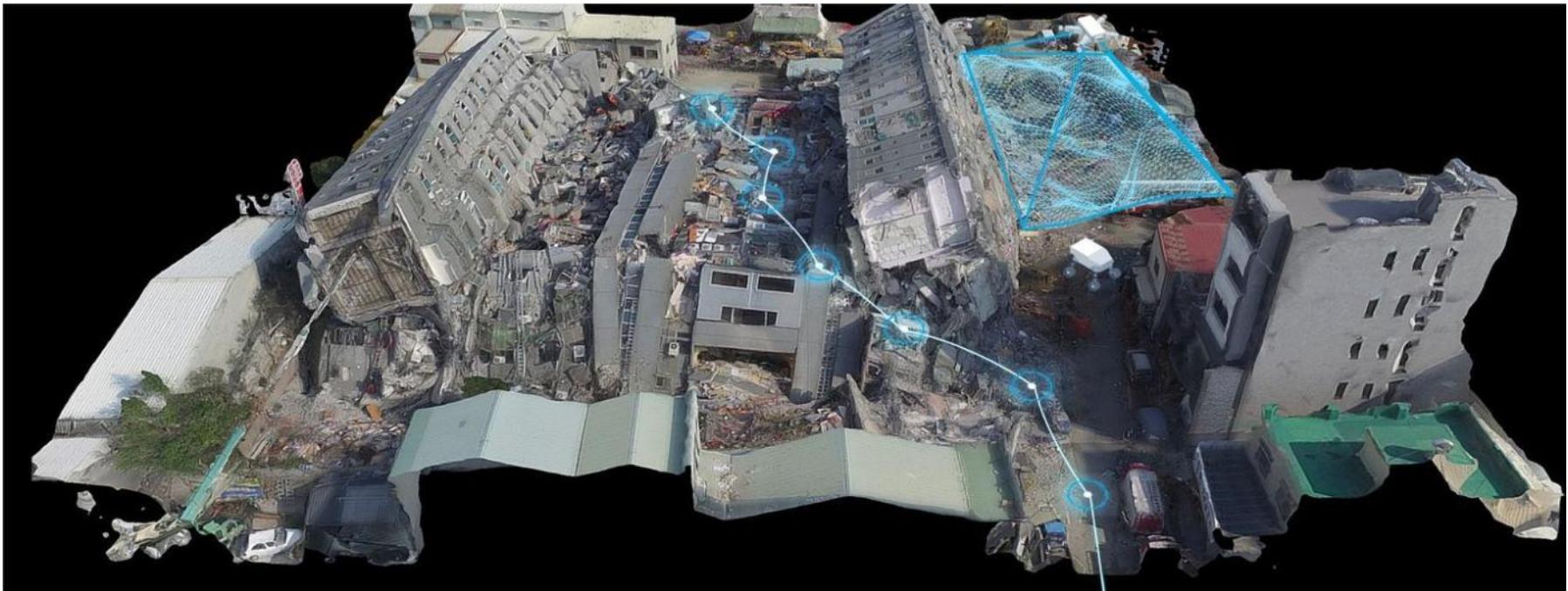


Credits: CURSOR project (EU H2020)

# Earthquake in Turkiye



## Live 3-D optimal route planning: Risk assessment and FR team navigation inside the hotzone



Credits: INTREPID project (EU H2020)

# Τροφή για σκέψη...

- ✓ A.I. = «πολλαπλασιαστής»
- ✓ Generative A.I.
- ✓ «Agentic» A.I.
- ✓ Big (Open) Data
- ✓ Cloud → Edge → IoT
- ✓ Data Privacy / GDPR
- ✓ EU A.I. Act / USA Exec. Order

- Για ποιόν; Με τι κόστος;
- «Φορολόγηση των ρομπότ»;
- Πόσο αξιόπιστα (θα) είναι;
- Ποιος τα διαθέτει;
- Ποιος / πως τα παράγει;
- Πως εφαρμόζεται;
- Πως υλοποιείται;

Είμαστε έτοιμοι? → Φυσικά όχι (όπως πάντα άλλωστε)

# Σύνοψη

- Περιεχόμενα:
  - Μέρος I: Τι εννοούμε «Τεχνητή Νοημοσύνη» – Που βρισκόμαστε σήμερα
  - Μέρος II: Μελλοντικές προοπτικές, περιορισμοί, προσδοκίες
- Σχετικό υλικό:
  - «Εισαγωγή στη Μηχανική Μάθηση και στην Αναλυτική Δεδομένων», Χ. Γεωργίου, Α' κύκλος ανοικτών μαθημάτων ΕΠΕ – <https://youtu.be/mlU4SvyfRqA>
  - «Artificial Intelligence | 60 Minutes Full Episodes» –  
<https://www.youtube.com/watch?v=aZ5EsdnpLMI>
  - Computer History Museum (CHM) – <https://www.youtube.com/@ComputerHistory>
  - Peter Norvig, Stuart J. Russell (2010). Artificial Intelligence: A Modern Approach (3<sup>rd</sup> Ed.)  
– <https://people.engr.tamu.edu/guni/csce625/slides/AI.pdf>

```

MOVE 1 TO DATA-C(N-T).
ADD 1 TO N-CHANGED.
GO TO LOOP-SCAN.

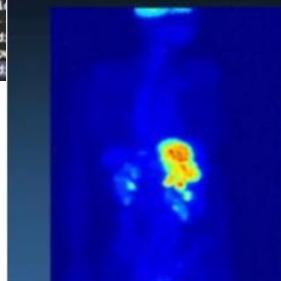
SELECT-CLZ.
ADD DATA-X(N-T) TO SUM2-X.
ADD DATA-Y(N-T) TO SUM2-Y.
ADD 1 TO N-CLZ.
IF DATA-C(N-T) EQUAL 2 GO TO LOOP-SCAN.
MOVE 2 TO DATA-C(N-T).
ADD 1 TO N-CHANGED.

```

```

LOOP-
  id : Integer := 0; -- target ID (counter)
  det : Integer := 0; -- detection slots in sequence
  pwr : Integer := 0; -- rel. power of detection
  pwr0 : Integer := detLimit; -- rel. power baseline (adapt
  disp : Boolean := False; -- target reporting (flag)
  begin
    -- process the FOV slots --
    for p in 1..(seekerData'Length)-1 loop
      -- rel. power is current detection 'step'
      pwr := abs(seekerData(p+1)-seekerData(p));
      if pwr >= detLimit then
        -- detection valid, continue analysis
        if pwr > pwr0 then
          -- strong new 'step' from baseline (new target)
          pwr0 := pwr; -- update the baseline
          det := 0; -- reset the run-length
          disp := False; -- enable target reporting
        end if;
      end if;
    end loop;
    det := 0;
    if
      if
        if
          if
            if
              if
                if
                  if
                    if
                      if
                        if
                          if
                            if
                              if
                                if
                                  if
                                    if
                                      if
                                        if
                                          if
                                            if
                                              if
                                                if
                                                  if
                                                    if
                                                      if
                                                        if
                                                          if
                                                            if
                                                              if
                                                                if
                                                                  if
                                                                    if
                                                                      if
                                                                        if
              end if;
            end if;
          end if;
        end if;
      end if;
    end if;
  end loop;
end loop;

```



Παραδειγμα τρισδιάστατης αναπτυσσόμενης μετανάλησης πλούτου φωτός (γύναικα) – Wikipedia.org



12:40 / 2.00:20

- Εικόνα (2-D): Επικαυπτόμενες δομές ιστών
- Τομογραφία (3-D): Όγκος πληροφοριών
- Διαφορετικές τεχνολογίες απεικόνισης
- Διαφορετικά διαγνωστικά χαρακτηριστικά
- Η διαγνωστική πληροφορία συνήθως δεν είναι καλώς ορισμένη (θόρυβος, ασφειες δομών)
- Η διαγνωστική διαδικασία είναι συνήθως ασαφής, πολύπλοκη και βασίζεται στην εμπειρία (ιατρός)
  
- ⇒ Η χρήση Η/Υ επιτρέπει την αυτόματη επεξεργασία και ενσυνοίσηση (τομογραφία) μεγάλου όγκου δεδομένων απεικόνισης
- ⇒ ...αλλά εξακολουθεί να έχει σημαντικούς περιορισμούς ως προς τη σημασιολογική ερμηνεία τους (διαγνωστική πληροφορία)

- Hamming (7,4) error correction codes in **R**
- Kmeans clustering in **COBOL**
- Bi-directional Associative Memory (BAM) in **Arduino/C**
- Linear Regression in **SQL, Matlab**
- ...

## YouTube:

**@ApneaCoding**



<https://www.youtube.com/@apneacoding>

<https://www.facebook.com/apneacoding>

## Github:

**@xgeorgio**



<https://github.com/xgeorgio>

<http://apneacoding.blogspot.com>

# Ένας ψηφιακός κόσμος γεμάτος γνώση για όλους

Σύμφωνα με το Καταστατικό της Ένωσης Πληροφορικών Ελλάδας, ένας από τους βασικούς σκοπούς της λειτουργίας της είναι η προώθηση της γνώσης και χρήσης των πληροφορικών αγαθών από το κοινωνικό σύνολο και η εξάλειψη της τεχνοφοβίας και του "αναλφαβητισμού" στην Πληροφορική.



<https://courses.epe.org.gr>

Σχετικά με τα ανοικτά μαθήματα της Ένωσης Πληροφορικών Ελλάδας:

- ✓ Τα μαθήματα πραγματοποιούνται εξ ολοκλήρου διαδικτυακά, ζωντανά μέσω της πλατφόρμας Zoom.
- ✓ Η συμμετοχή σε όλα τα μαθήματα είναι ελεύθερη για οποιονδήποτε από οποιδήποτε στην Ελλάδα ή στο εξωτερικό.
- ✓ Δεν υπάρχει οικονομικό κόστος ή άλλες προϋποθέσεις συμμετοχής.
- ✓ Οι Εισιγητές είναι μέλη της Ένωσης Πληροφορικών Ελλάδας και πραγματοποιούν τα μαθήματα εθελοντικά.
- ✓ Τα μαθήματα μαγνητοσκοπούνται και παραμένουν διαθέσιμα για σύγχρονη παρακολούθηση στο Αρχείο Μαθημάτων.
- ✓ Η εκπαίδευση που παρέχεται μέσω των ανοικτών διαδικτυακών μαθημάτων είναι άτυπη και δεν παρέχονται βεβαιώσεις παρακολούθησης στους συμμετέχοντες.



# Ερωτήσεις



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