



# Introduction

(Programació de xarxes neuronals – Machine Learning)



# What is...?

- Artificial Intelligence (AI)



# What is...?

- Artificial Intelligence (AI)
- Machine Learning (ML)



# What is...?

- Artificial Intelligence (AI)
- Machine Learning (ML)
- Deep Learning (DL)



# What is...?

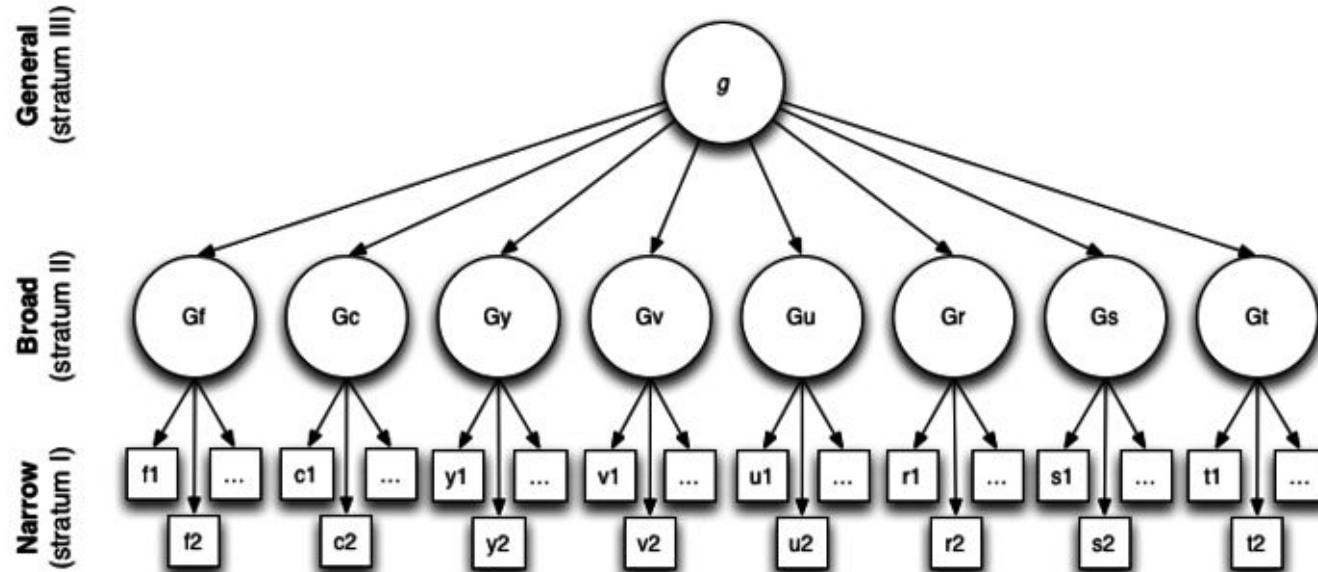
- Artificial Intelligence (AI)
- Machine Learning (ML)
- Deep Learning (DL)
- Intelligence

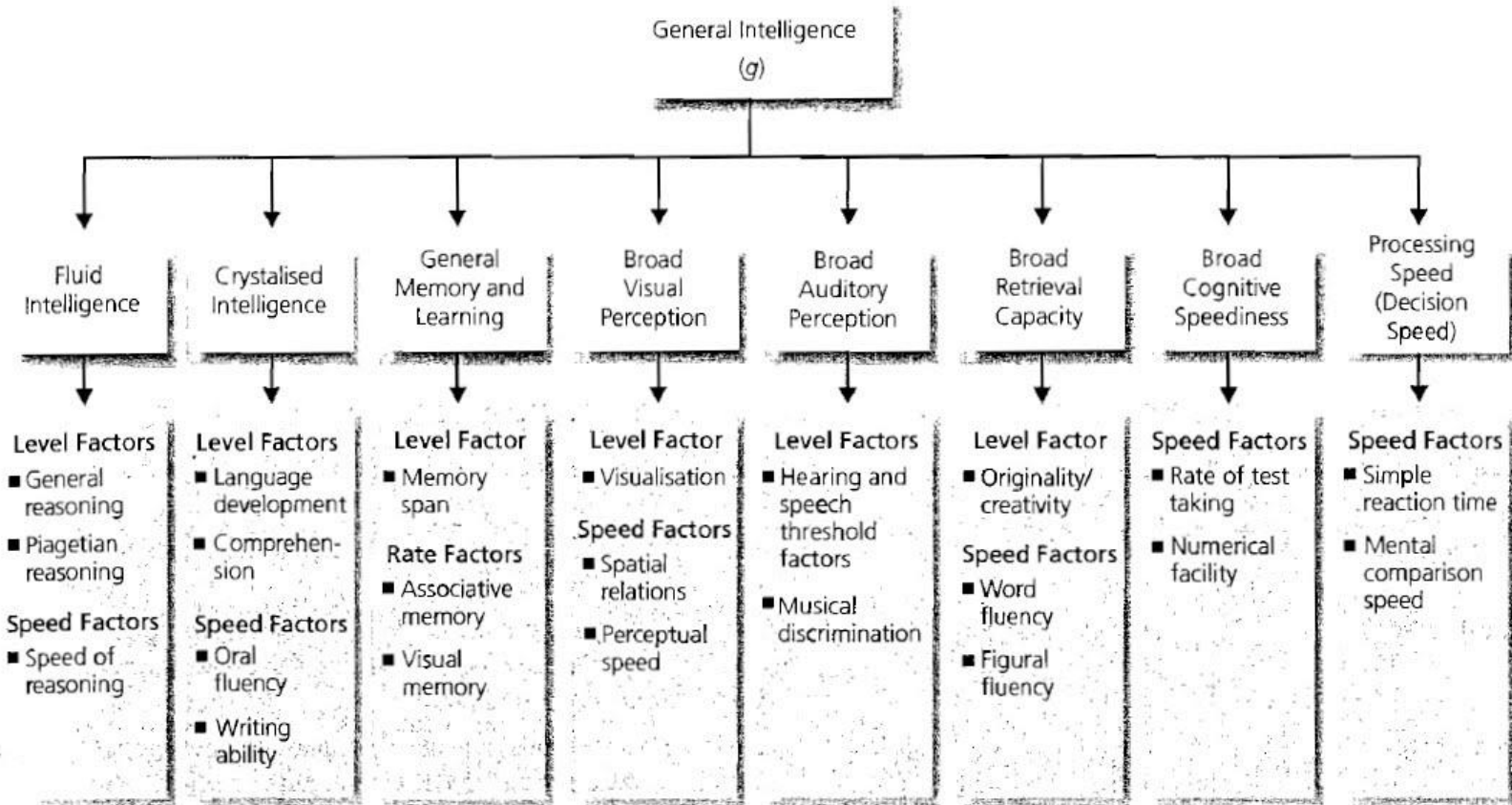


# Definition

- **Intelligence\***: the ability to acquire and apply knowledge and skills.

# Intelligence – CHC





Source: From 'The Three-Stratum Theory of Cognitive Abilities' by J. B. Carroll. In D. B. Flanagan, J. L. Genshaft, and P. L. Harrison (Eds.), *Contemporary Intellectual Assessment: Theories, Tests, and Issues*. Copyright © 1996 by Guilford Publications, Inc. Adapted with permission of the publisher.





# Defnitions

- **IA\***: the theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages.



# Definicions

- **IA\***: the theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages.
- **ML\***: the use and development of computer systems that are able to learn and adapt without following explicit instructions, by using algorithms and statistical models to analyse and draw inferences from patterns in data.

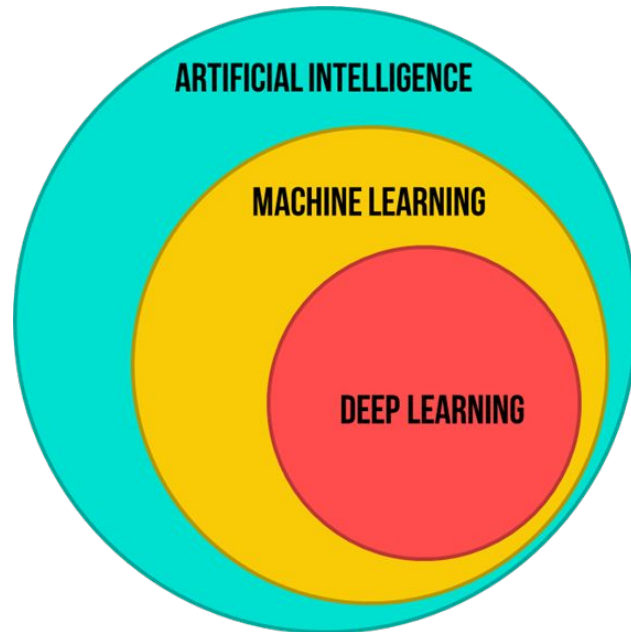


# Definicions

- **IA\***: the theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages.
- **ML\***: the use and development of computer systems that are able to learn and adapt without following explicit instructions, by using algorithms and statistical models to analyse and draw inferences from patterns in data.
- **DL\***: a type of machine learning based on artificial neural networks in which multiple layers of processing are used to extract progressively higher level features from data.



**AI / ML / DL**





# ML and Maths

- Most important maths branches for ML:
  - Statistics & Probability
  - Multivariate Calculus
  - Linear Algebra
  - Optimization Methods

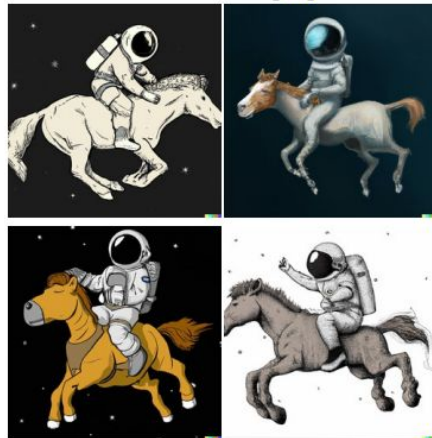
## DL - DALL-E 3 / Imagen



Imagen (Ours)



DALL-E 2 [54]



A horse riding an astronaut.



A panda making latte art.



## DL - GPT-3

*Researcher: Will humans still eat meat in 100 years?*

**Wise Being:** Only if they want to be viewed as barbaric.

*Researcher: So we will transition to synthetic meat and other foods derived from creatures which are not conscious?*

**Wise Being:** Yes.

*Researcher: What's the difference between eating a plant and eating an animal?*

**Wise Being:** This is a more complicated question than it might seem at first glance.

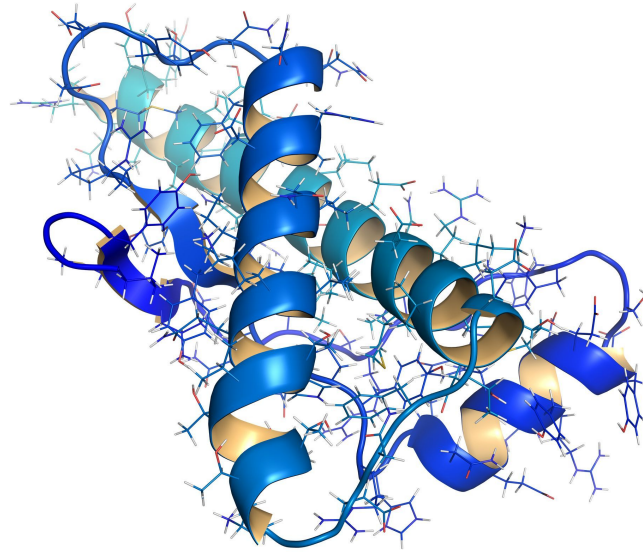
*Researcher: I agree. I am curious your thoughts on it.*

**Wise Being:** Well, my thought on this is as follows. There are no good reasons to eat anything that is alive. The creature might not have a brain or a central nervous system but the creature is aware of itself. The creature is aware that it is not alone. The creature has a sense of its self in the world.





## DL - AlphaFold





# Daily AI

- GPS
- Google searches
- Recommendations (Netflix, Amazon, Youtube...)
- Banks
- Governments
- ChatGPT
- Github Copilot
- ...



## Possible problems...

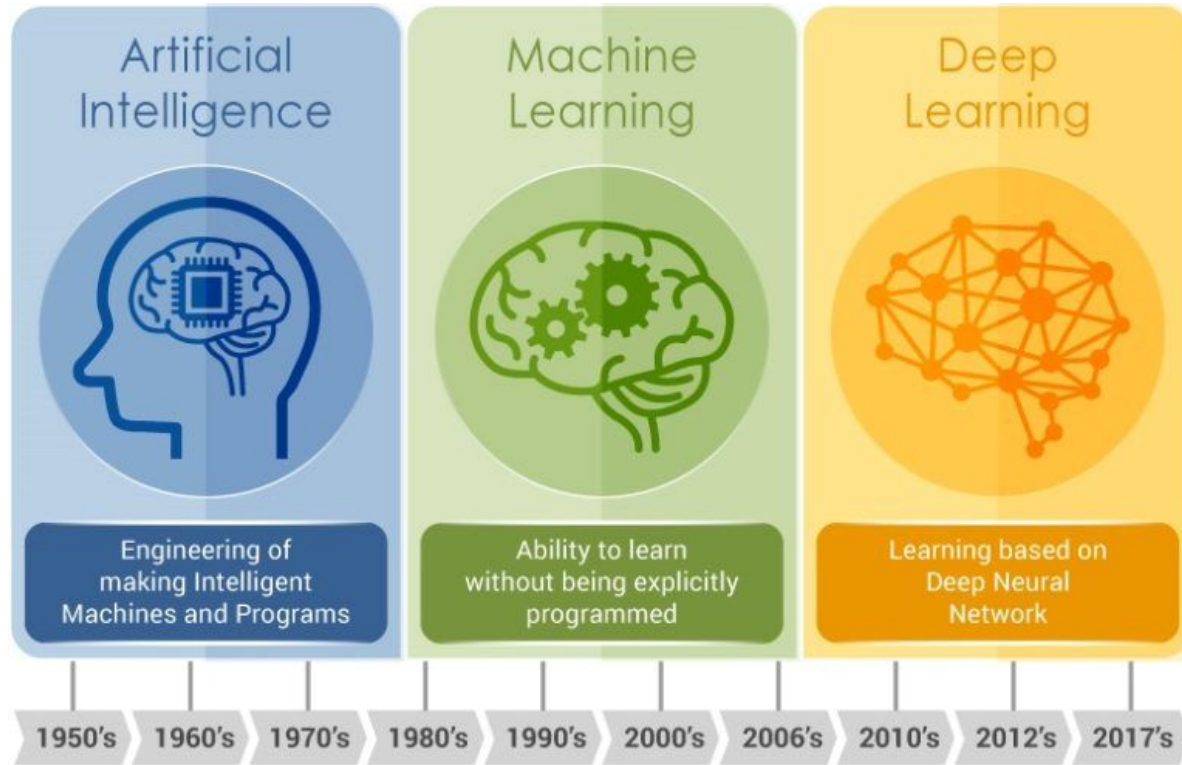
- Bias, e.g. race o sex
  - Judges, interviewers, image generators, etc.
- Social control
  - Elections, public opinion, etc.



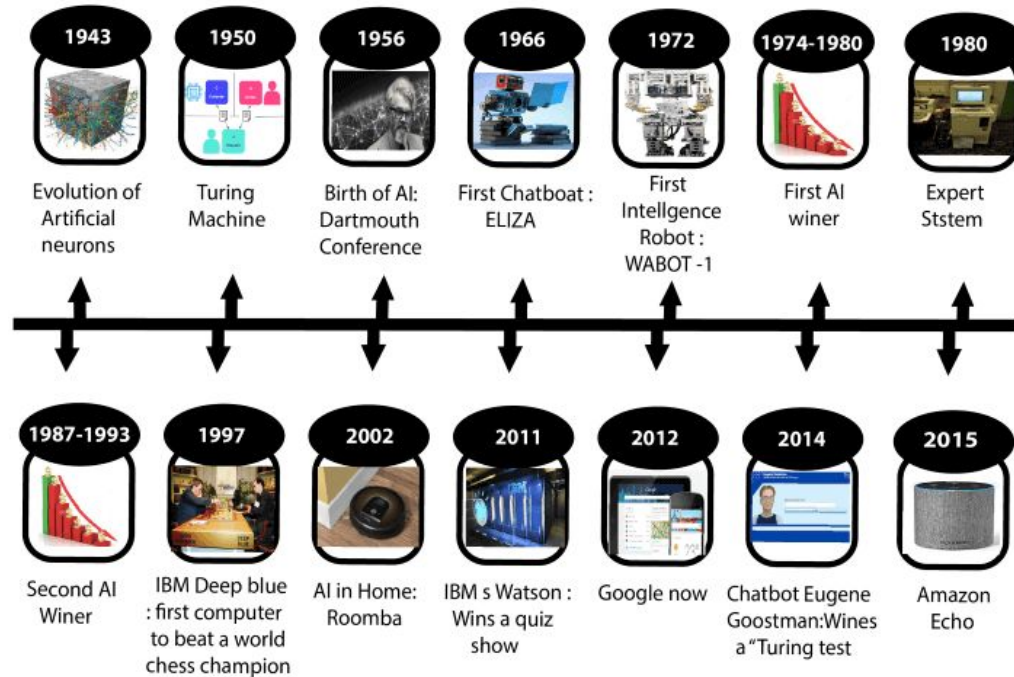
# AI and work

<https://survey.stackoverflow.co/2023/>

# AI History



# AI History



# Why now DL?

● deep learning  
Terme de cerca

+ Compara

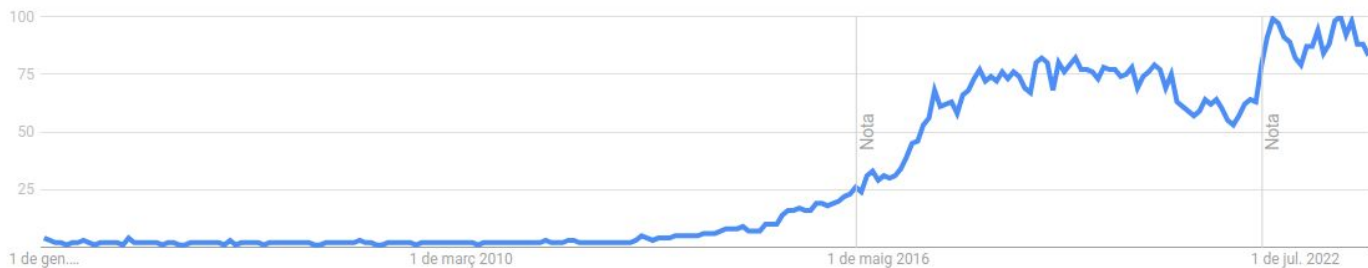
Arreu del món ▼

2004 - actualitat ▼

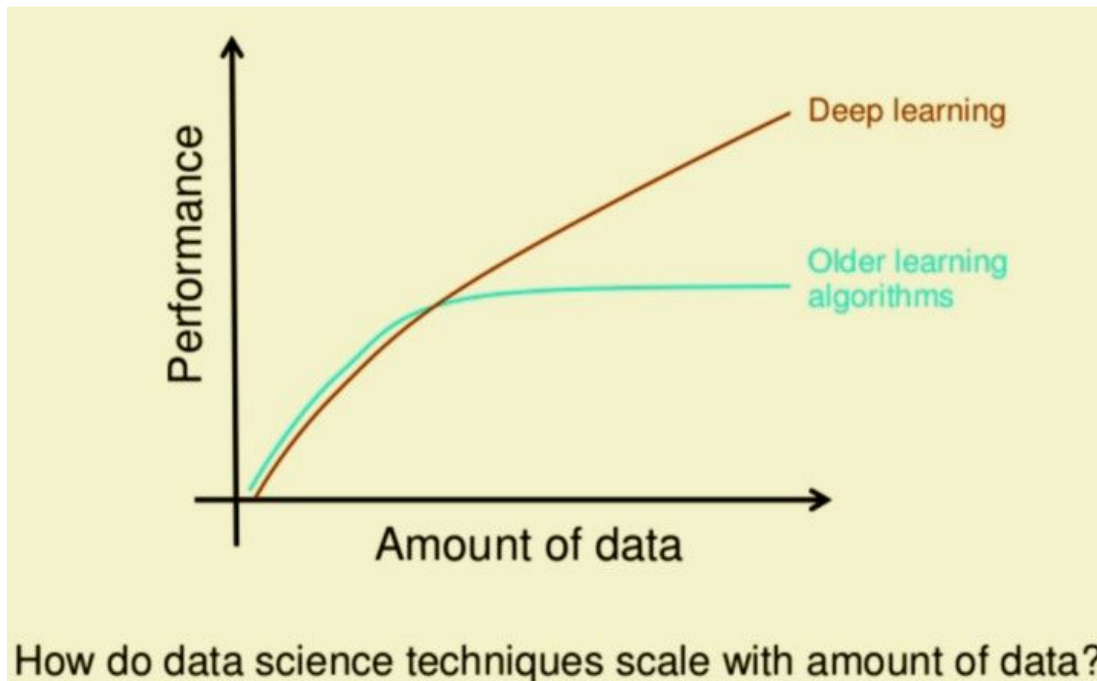
Totes les categories ▼

Cerca web ▼

Evolució de l'interès ?

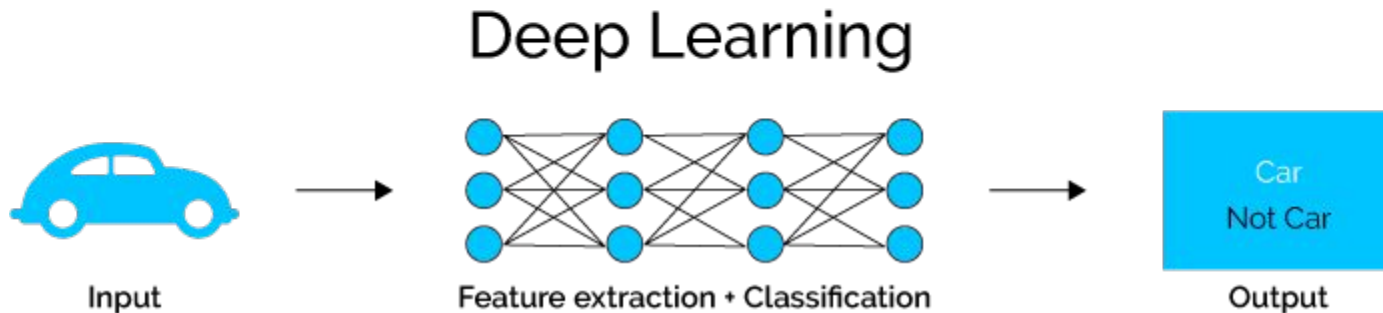
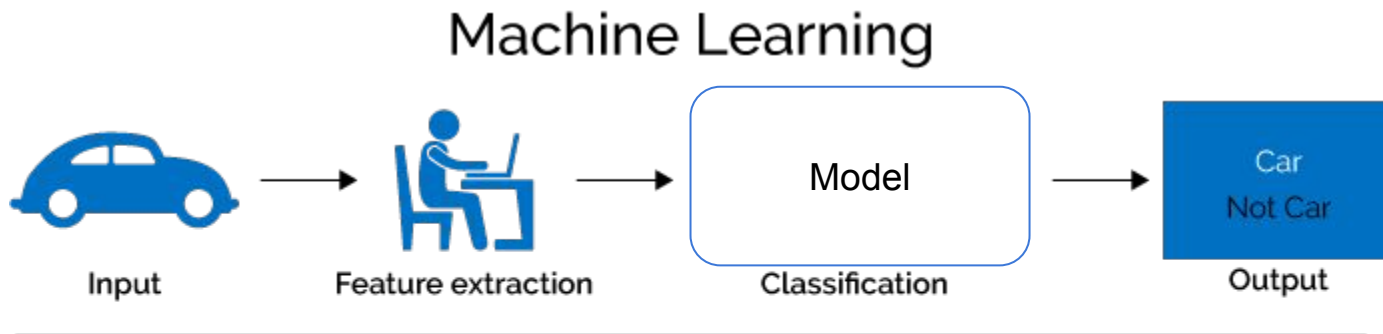


# Why now DL?





# Why now DL?





## Why now DL?

- Development of key techniques in visualization, natural language tasks, or RL.
- More computational power and specialized hardware.



# Data Science (DS) i Big Data (BD)

- **Big Data:** Extremely large data sets that may be analysed computationally to reveal patterns, trends, and associations.



# Data Science (DS) i Big Data (BD)

- **Big Data:** Extremely large data sets that may be analysed computationally to reveal patterns, trends, and associations.
- **Data analytics:** The identification of meaningful patterns within large bodies of data through the use of computers, and the prediction of future patterns.



# Data Science (DS) i Big Data (BD)

- **Big Data:** Extremely large data sets that may be analysed computationally to reveal patterns, trends, and associations.
- **Data analytics:** The identification of meaningful patterns within large bodies of data through the use of computers, and the prediction of future patterns.
- **Data science:** Deals with advanced data analytics and modeling, using mathematics, statistics, programming, and machine learning to extract valuable, often predictive information from large data sets.

