

A futuristic blue robot hand is shown in a hovering position, reaching towards a glowing digital interface. The interface consists of a grid of data points and lines, with some points highlighted in yellow and red. The background is dark, emphasizing the blue and white light of the robot and the interface.

IT0030 - AI Foundations

Introduction to Artificial Intelligence

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AI is in everywhere



Why Should You Care About AI?

- AI is in your phone
- AI is in social media
- AI is in healthcare, banking, education
- AI is shaping jobs



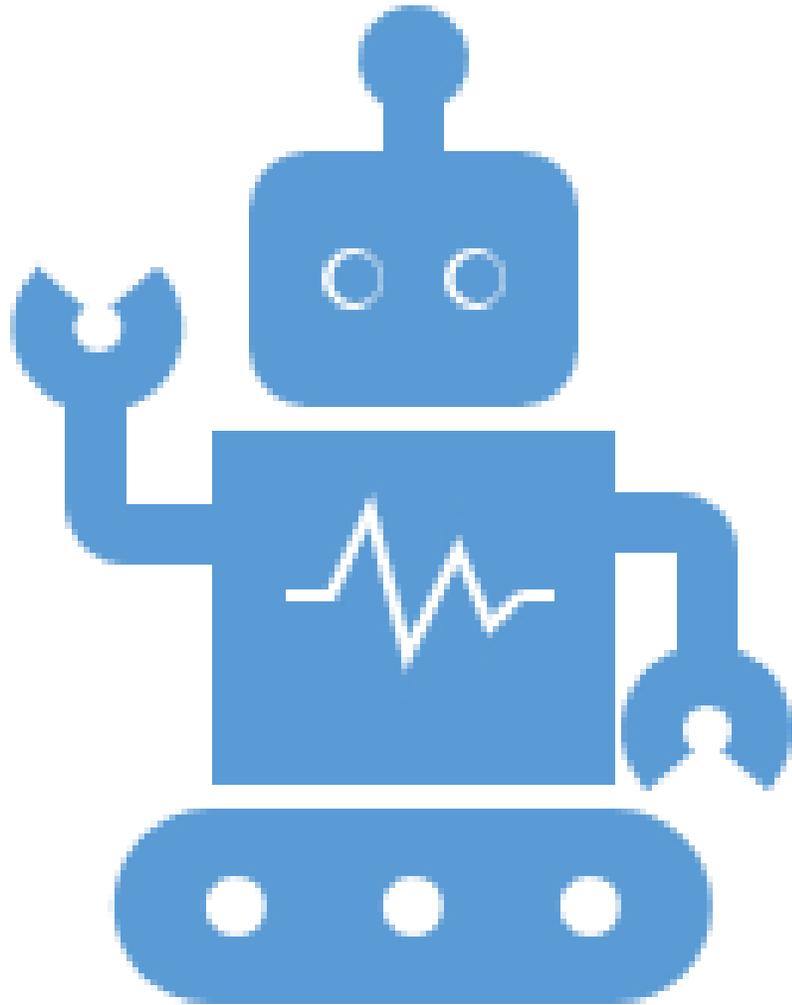
What is Artificial Intelligence?

The ability of machines to simulate human intelligence

Human Intelligence Includes

- Learning
- Reasoning
- Problem solving
- Perception
- Decision making





What is
Artificial
Intelligence?

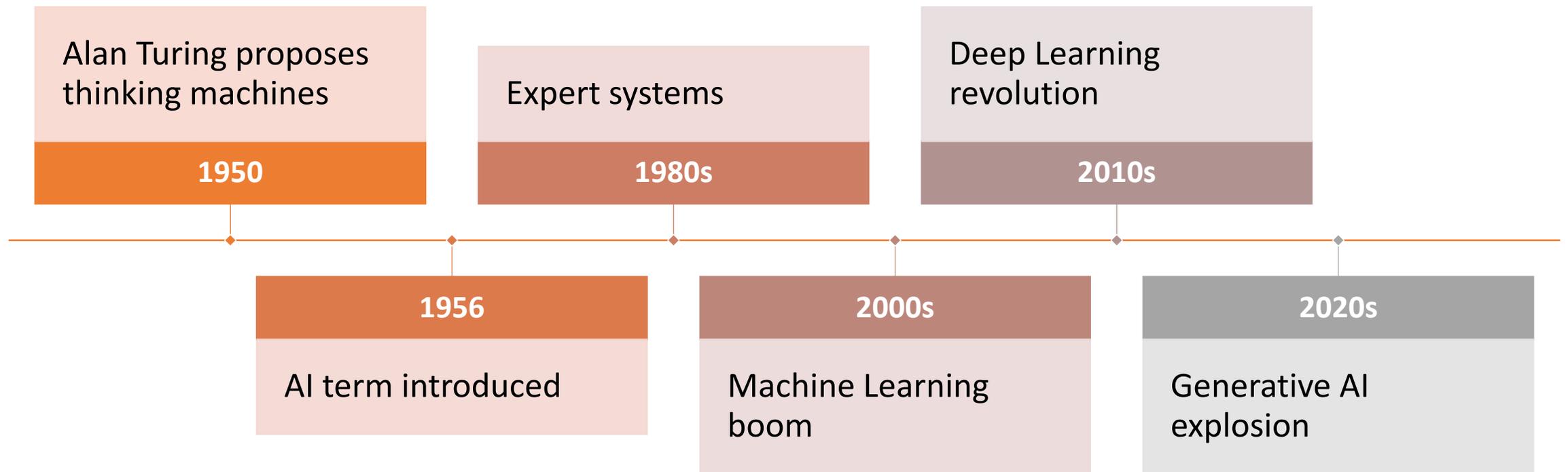
AI tries to
replicate these
abilities using
algorithms.

Human	AI
Learns from experience	Learns from data
Uses brain	Uses algorithms
Emotional	Logical computation
Limited memory	Massive storage

AI vs Human Intelligence



History of AI



Types of AI - Based on Capability

**Narrow
AI (ANI)**

**General
AI (AGI)**

**Super AI
(ASI)**

Types of AI - Based on Functionality



Reactive
Machines



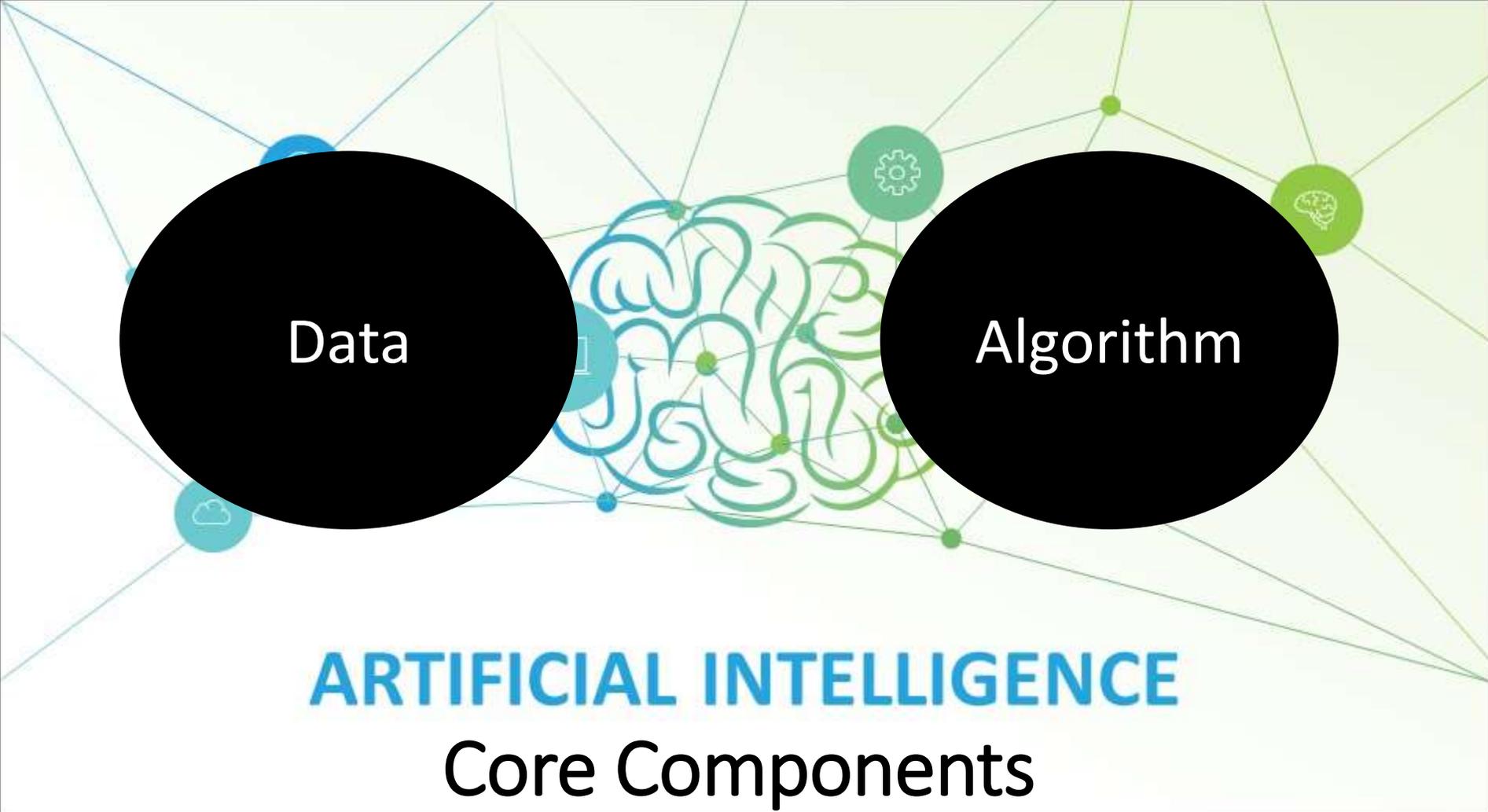
Limited Memory



Theory of Mind
(TOM)



Self-aware AI

A diagram illustrating the core components of Artificial Intelligence. It features a central stylized brain composed of blue and green lines. To the left of the brain is a large black circle containing the word "Data". To the right is another large black circle containing the word "Algorithm". The background is a light green and blue network of lines and nodes, with several circular icons: a gear, a brain, a cloud, and a document. The entire diagram is framed by a dark grey border.

Data

Algorithm

ARTIFICIAL INTELLIGENCE

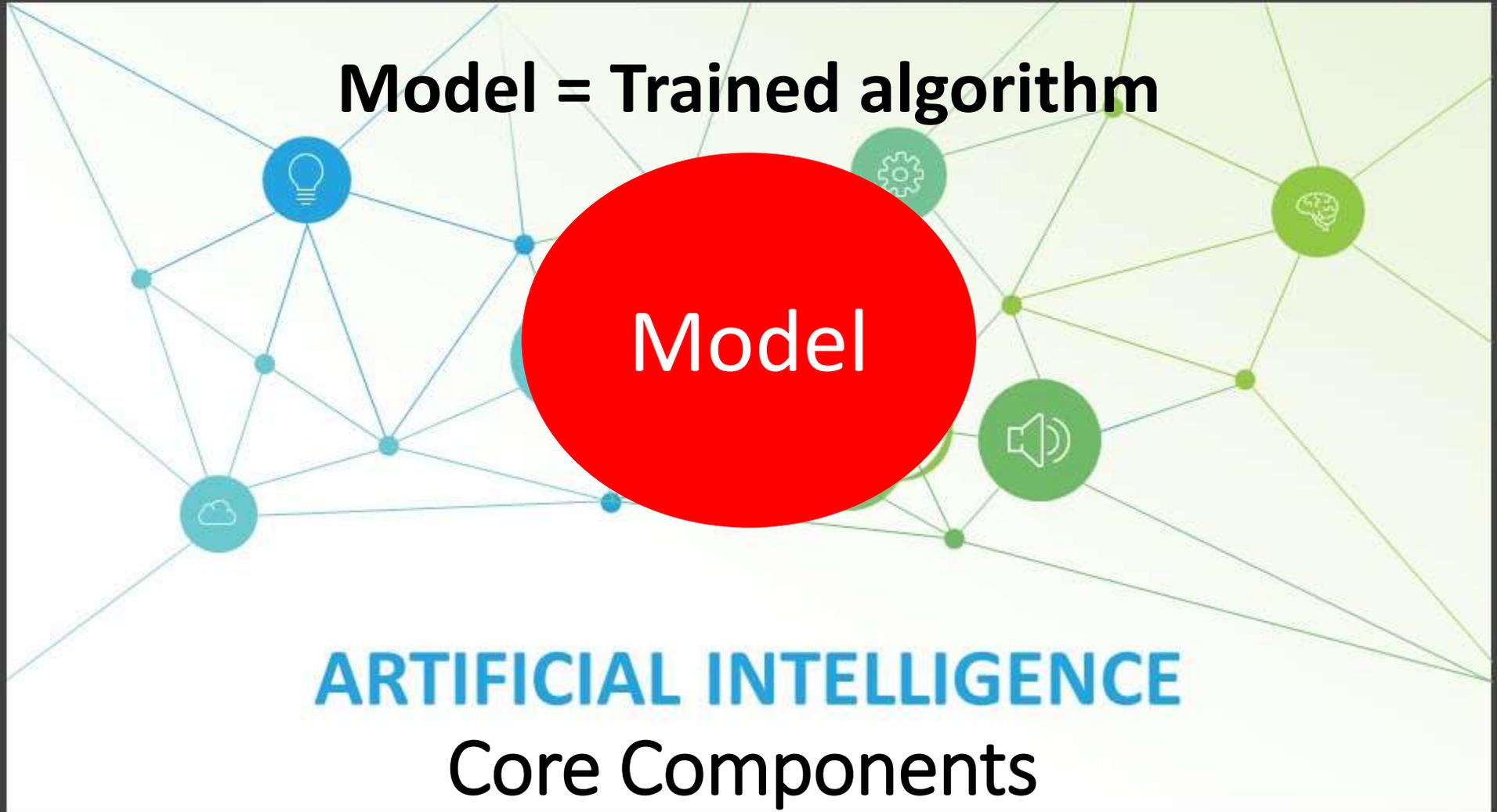
Core Components

Model = Trained algorithm

Model

ARTIFICIAL INTELLIGENCE

Core Components





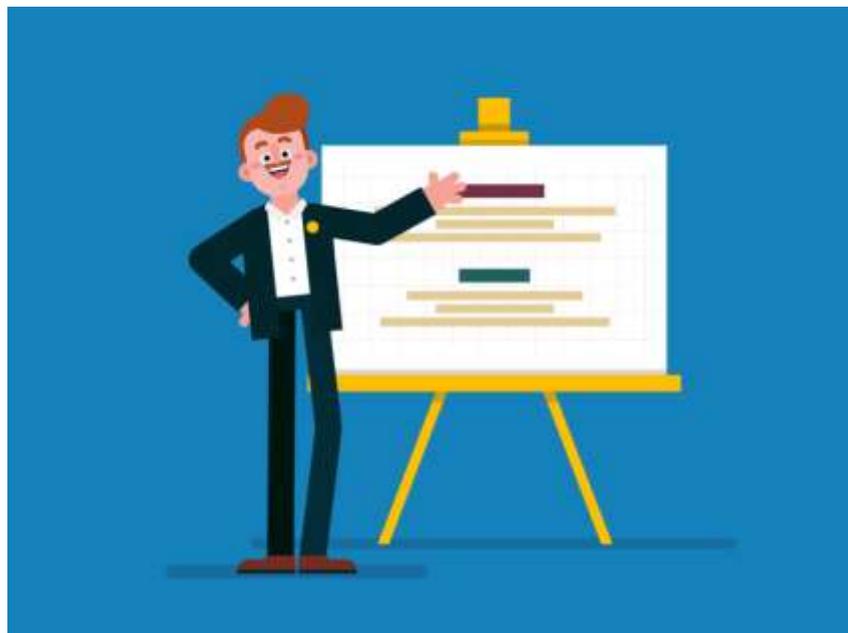
Machine Learning

Subfield of AI that enables systems to learn from data



Machine Learning

- Three types:
 - Supervised Learning
 - Unsupervised Learning
 - Reinforcement Learning



Supervised Learning

- In Supervised Learning, teacher shows how to do
- Students learn by understanding the inputs & outputs
- Same happens in AI too.
- Models are trained with inputs and outputs.

Supervised Learning



Cat

Supervised Learning



Dog

Supervised Learning



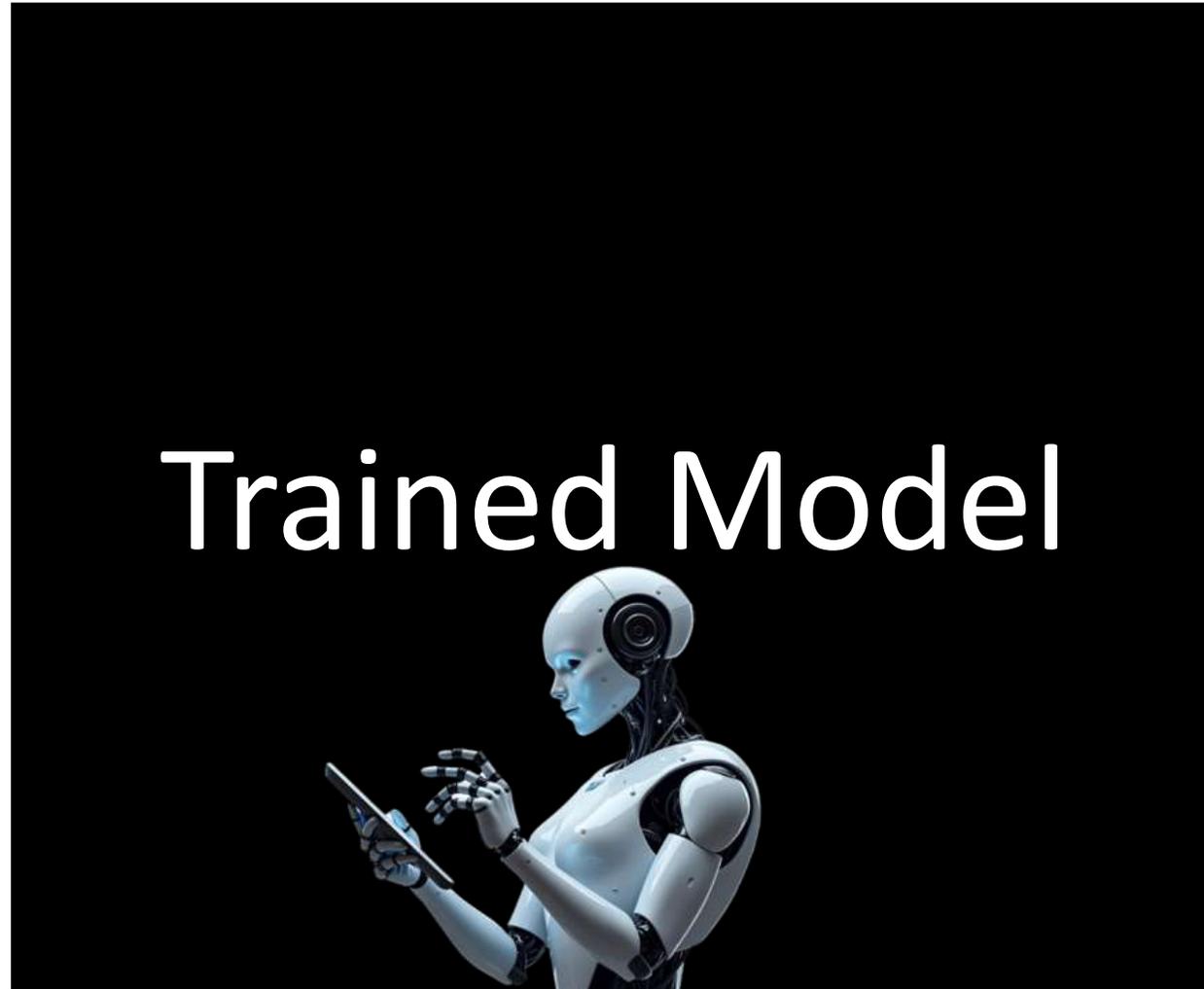
Dog

Supervised Learning



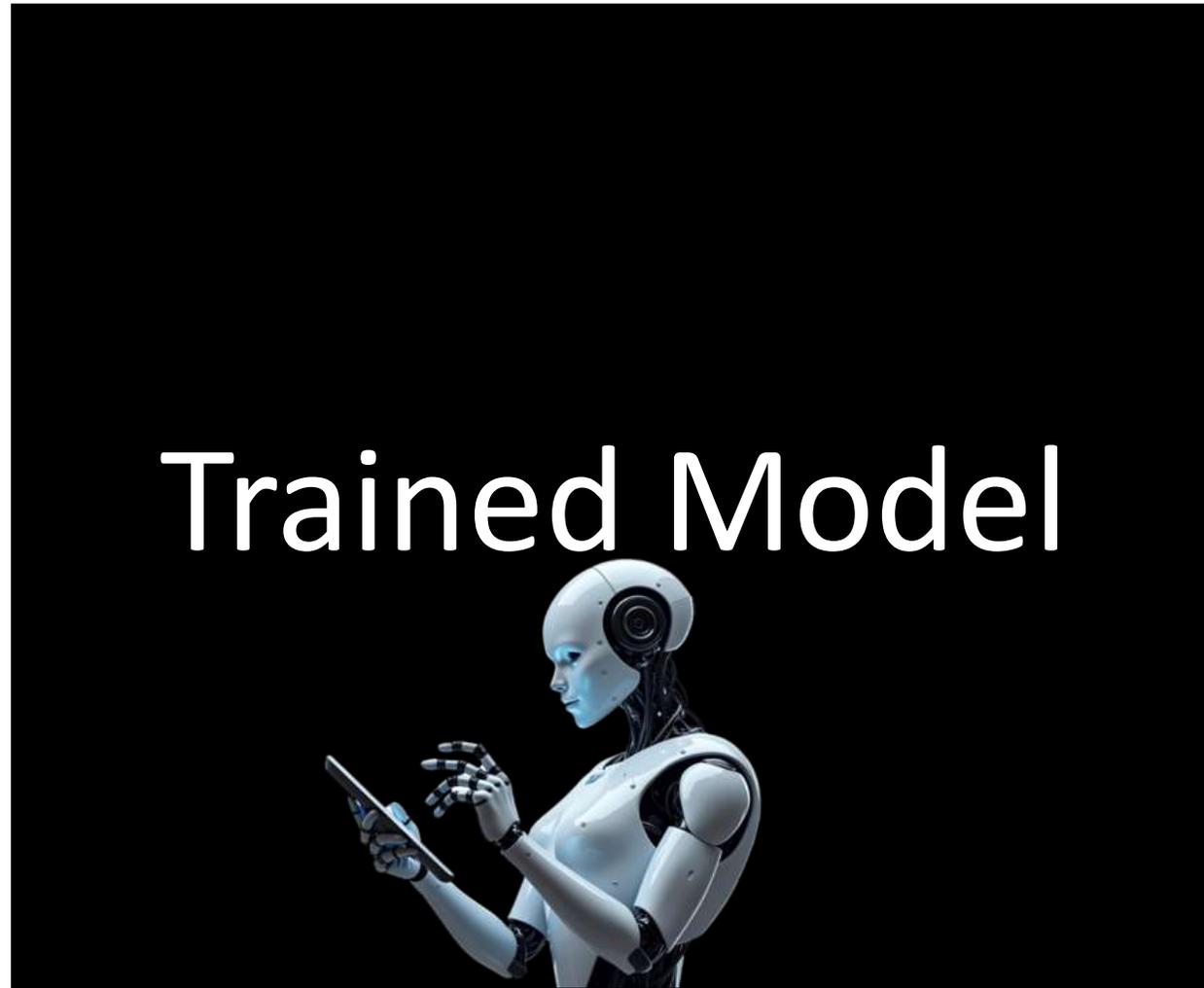
Cat

Supervised Learning



→ **Cat**

Supervised Learning



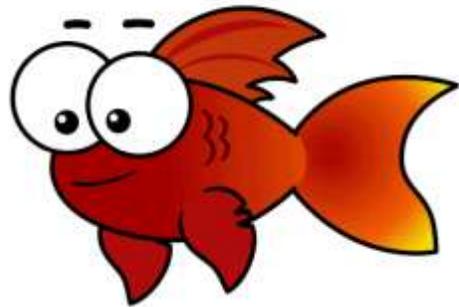
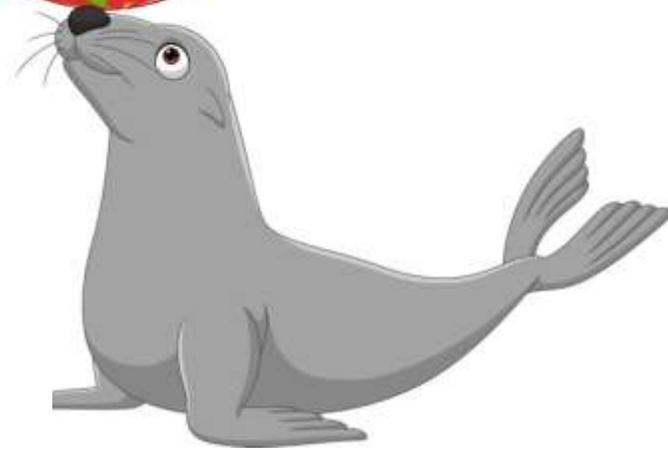
Cat





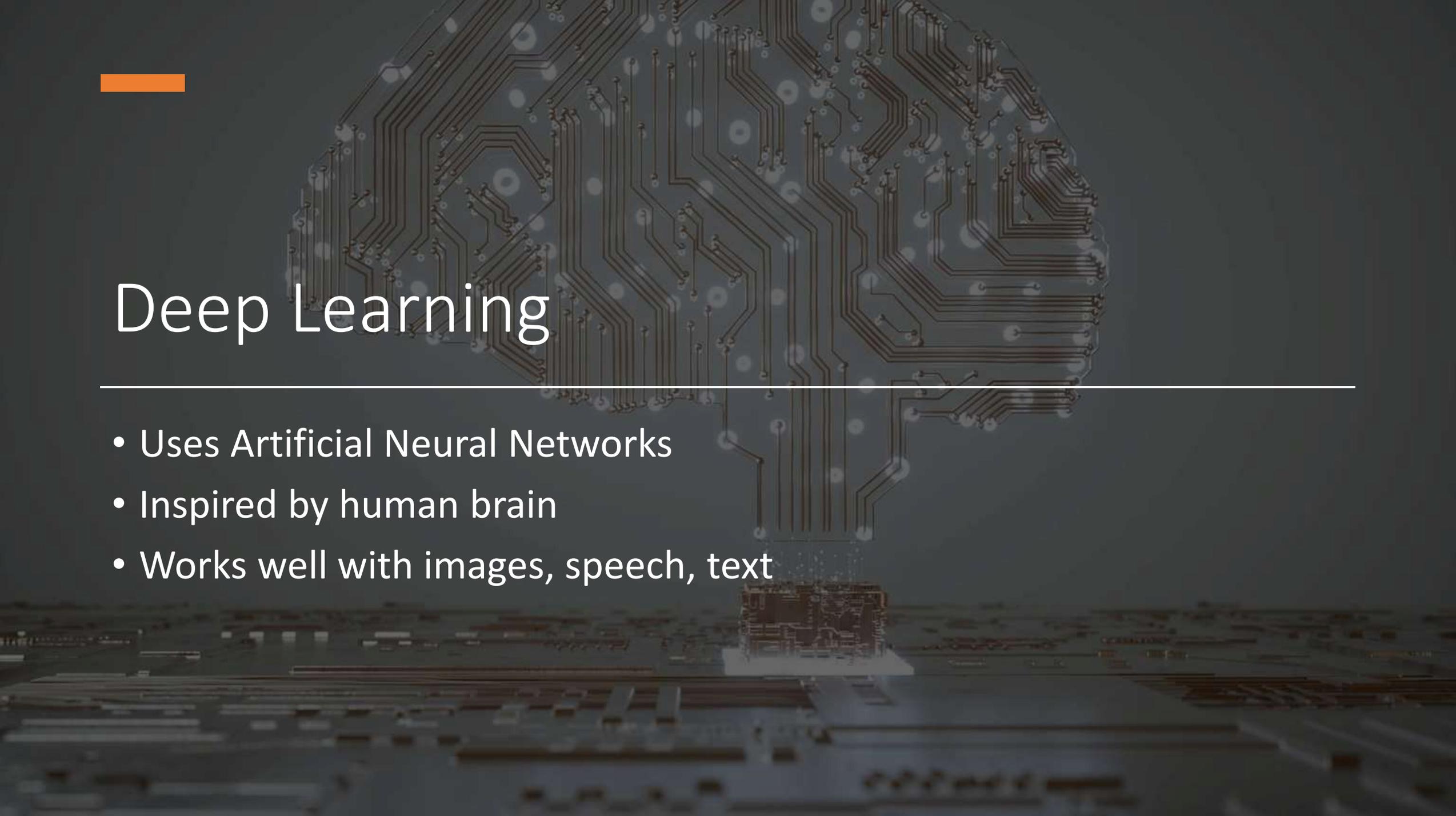
Unsupervised Learning

- Unsupervised learning, is where you only have input data (X) and no corresponding output variables.
- Derive some structure or pattern from the “unlabeled data” by just looking at the relationship between the data themselves.



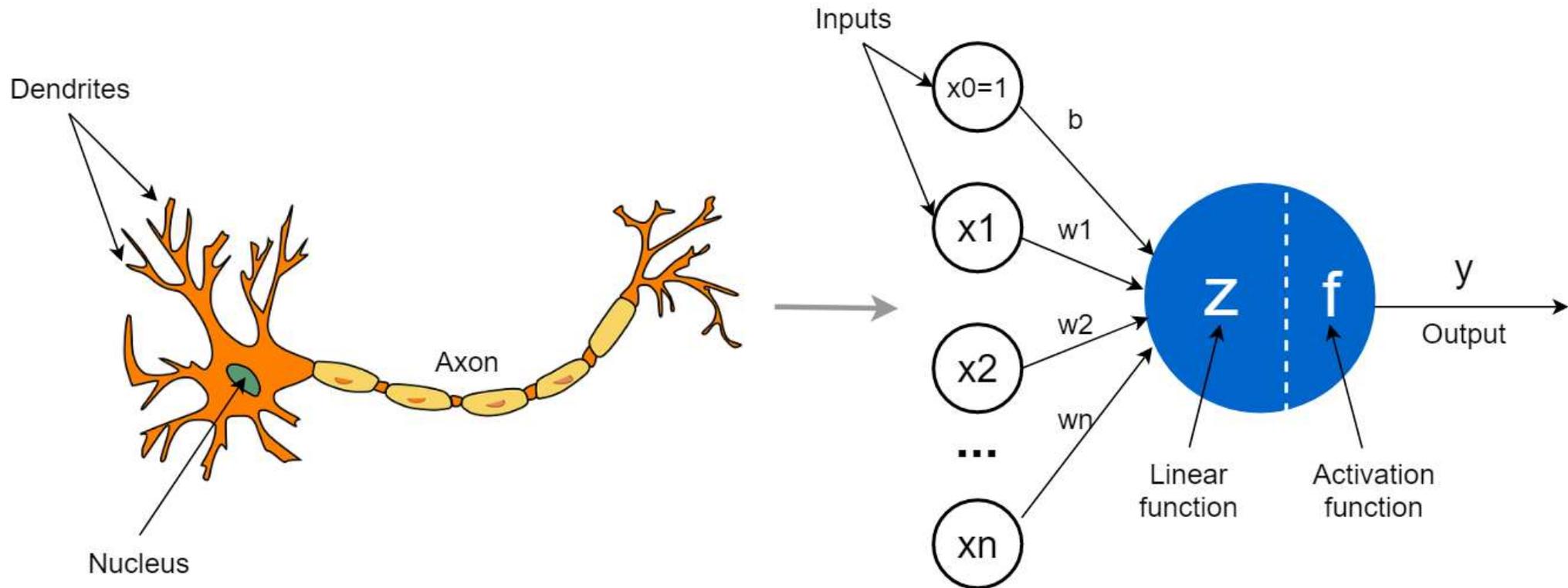
Reinforcement Learning

- It is about taking suitable action to maximize reward in a particular situation.
- It is employed by various software and machines to find the best possible behavior or path it should take in a specific situation.



Deep Learning

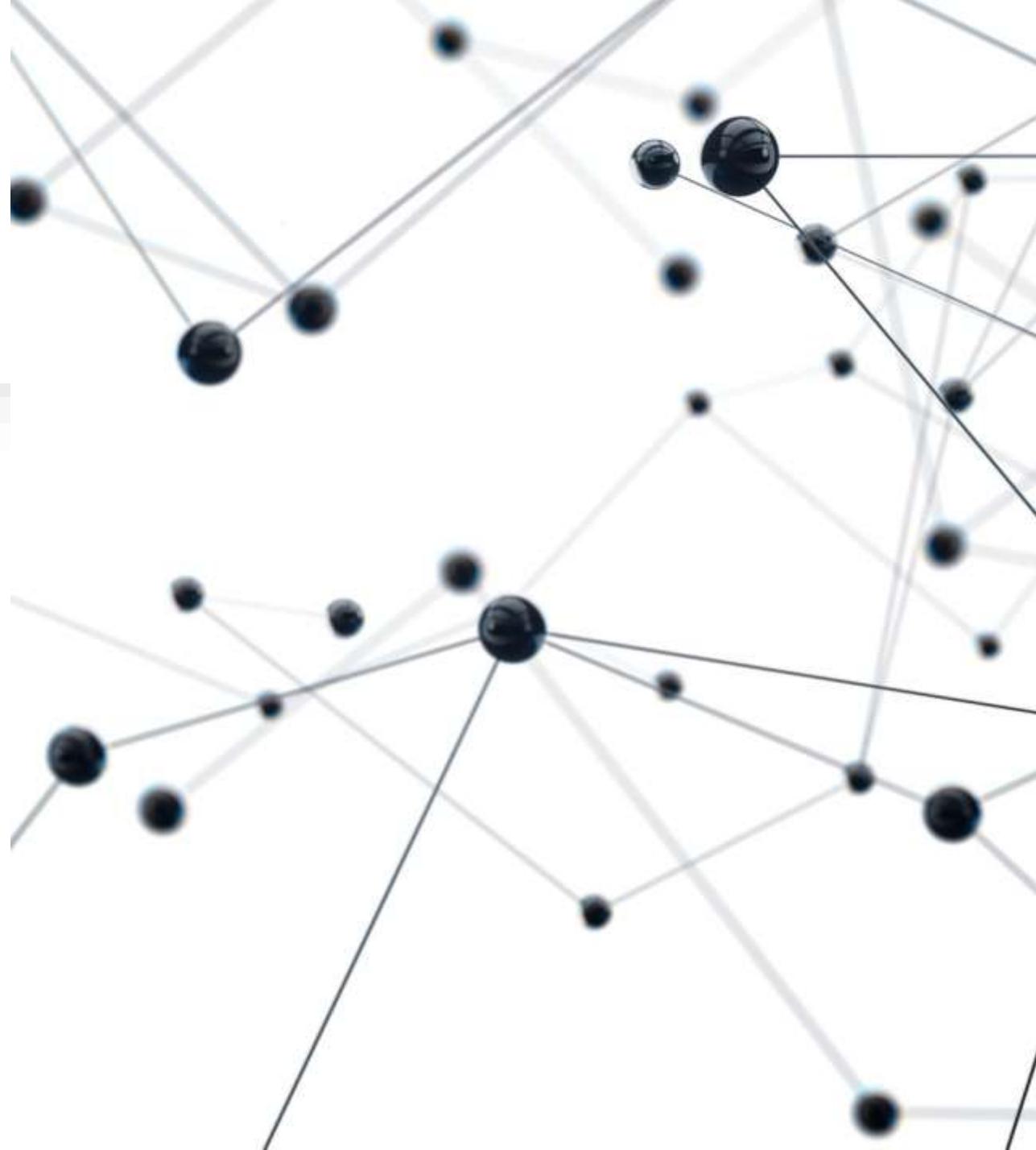
- Uses Artificial Neural Networks
- Inspired by human brain
- Works well with images, speech, text



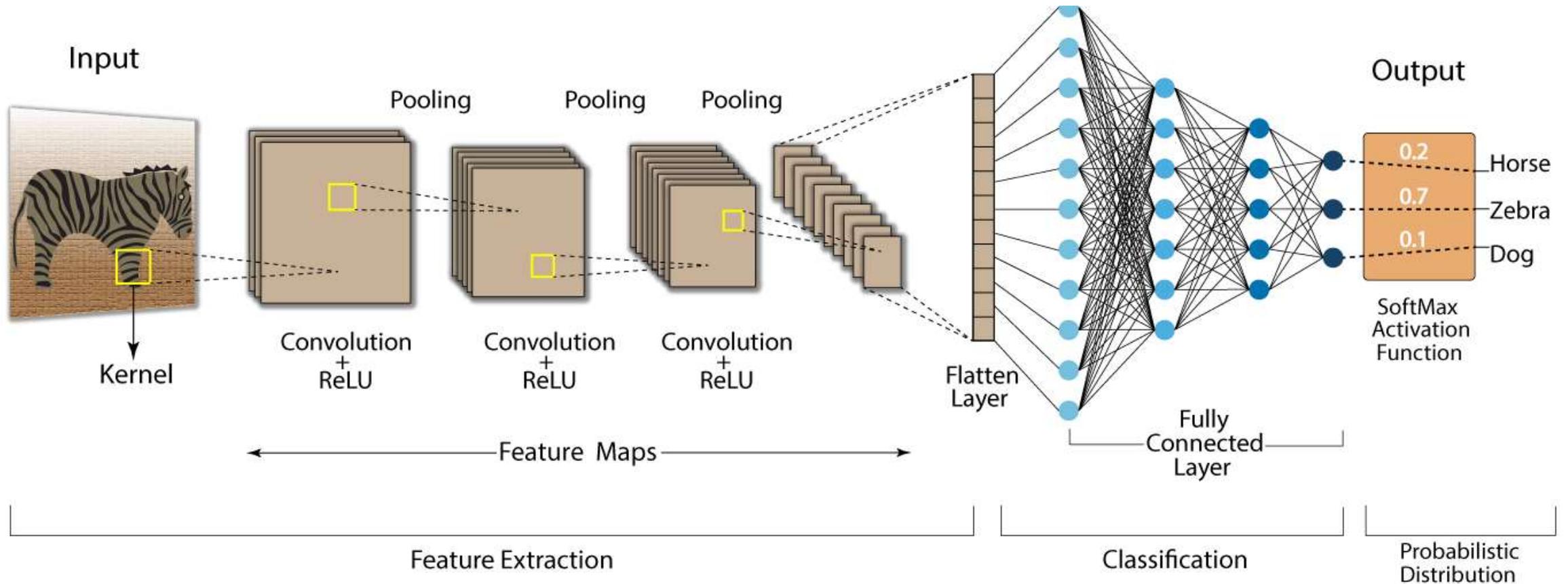
Artificial Neuron

Convolutional Neural Networks

- A Convolutional Neural Network (CNN) is a special type of neural network mainly used for image processing and computer vision tasks.
- It is very good at:
 - Image classification (Is this a cat or a dog?)
 - Object detection (Where is the car in this image?)
 - Face recognition



Convolutional Neural Networks



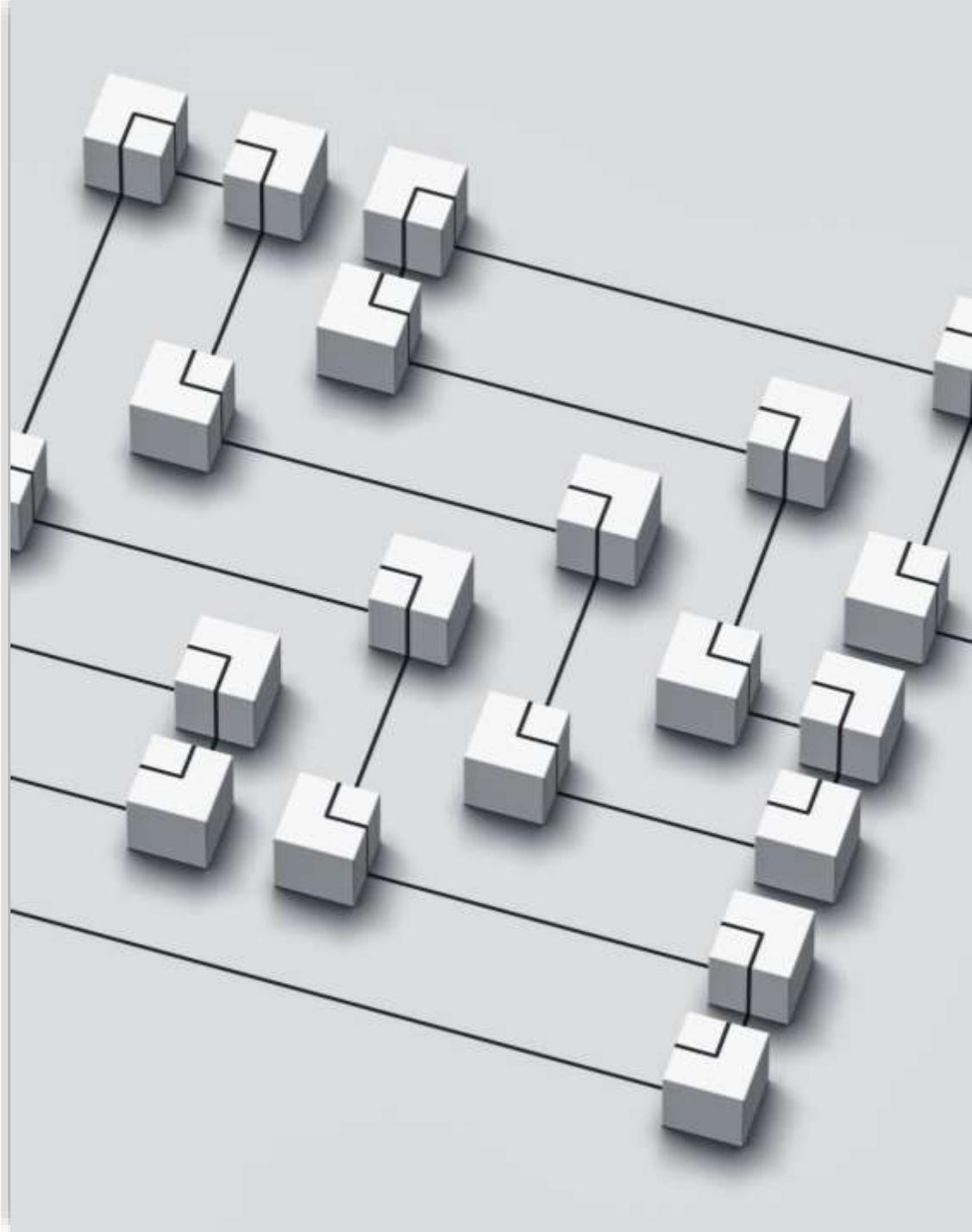


Recurrent Neural Networks

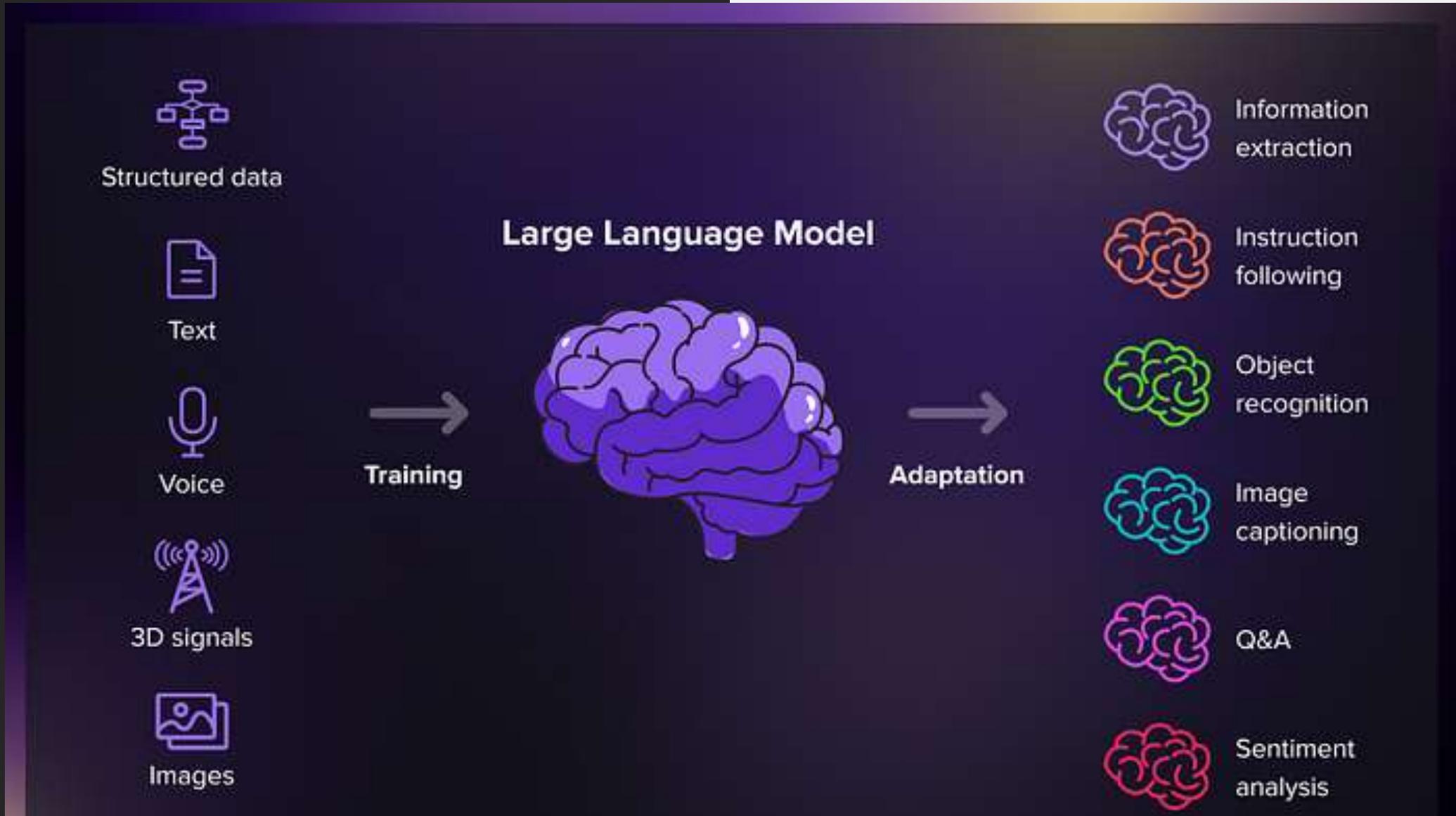
- A Recurrent Neural Network (RNN) is a type of neural network designed to work with sequential data.
- Sequential data means:
 - Sentences (words come in order)
 - Speech (audio comes over time)
 - Stock prices (values change over time)
 - Time series data

Transformers

- A Transformer is a deep learning model that understands language by using an attention mechanism to analyze relationships between all words in a sentence at the same time.
- Unlike RNNs, it processes data in parallel, making it faster and better at handling long-range dependencies.



Modern LLMs

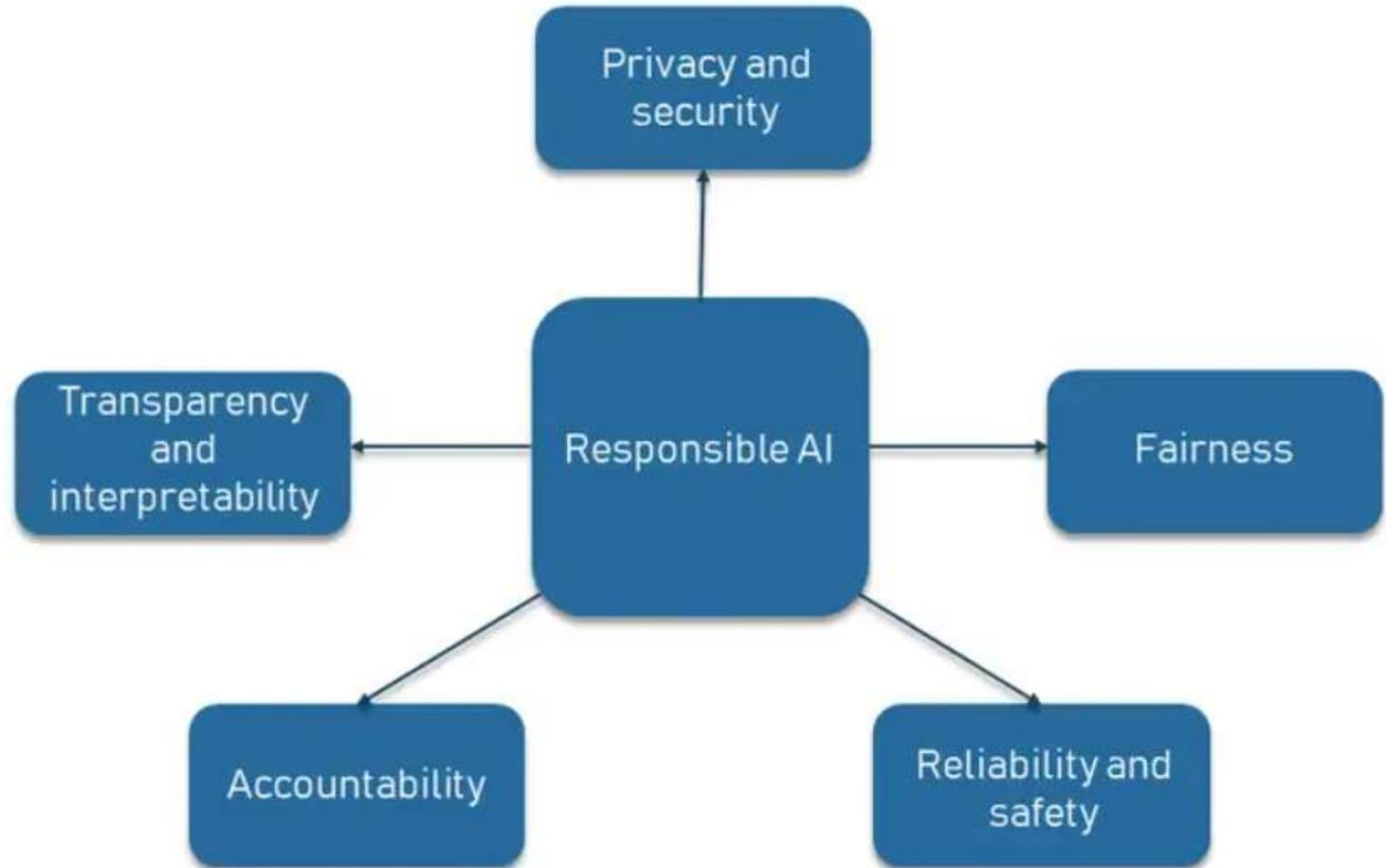


Generative AI

Generative AI is a type of artificial intelligence that creates new content such as text, images, audio, video, or code by learning patterns from large datasets.

It includes different types of models like Large Language Models (LLMs) for text generation, Diffusion Models and GANs (Generative Adversarial Networks) for image creation

Responsible AI



Humans with AI will
replace humans
without AI

Human Intelligence +
AI will be extremely
powerful

