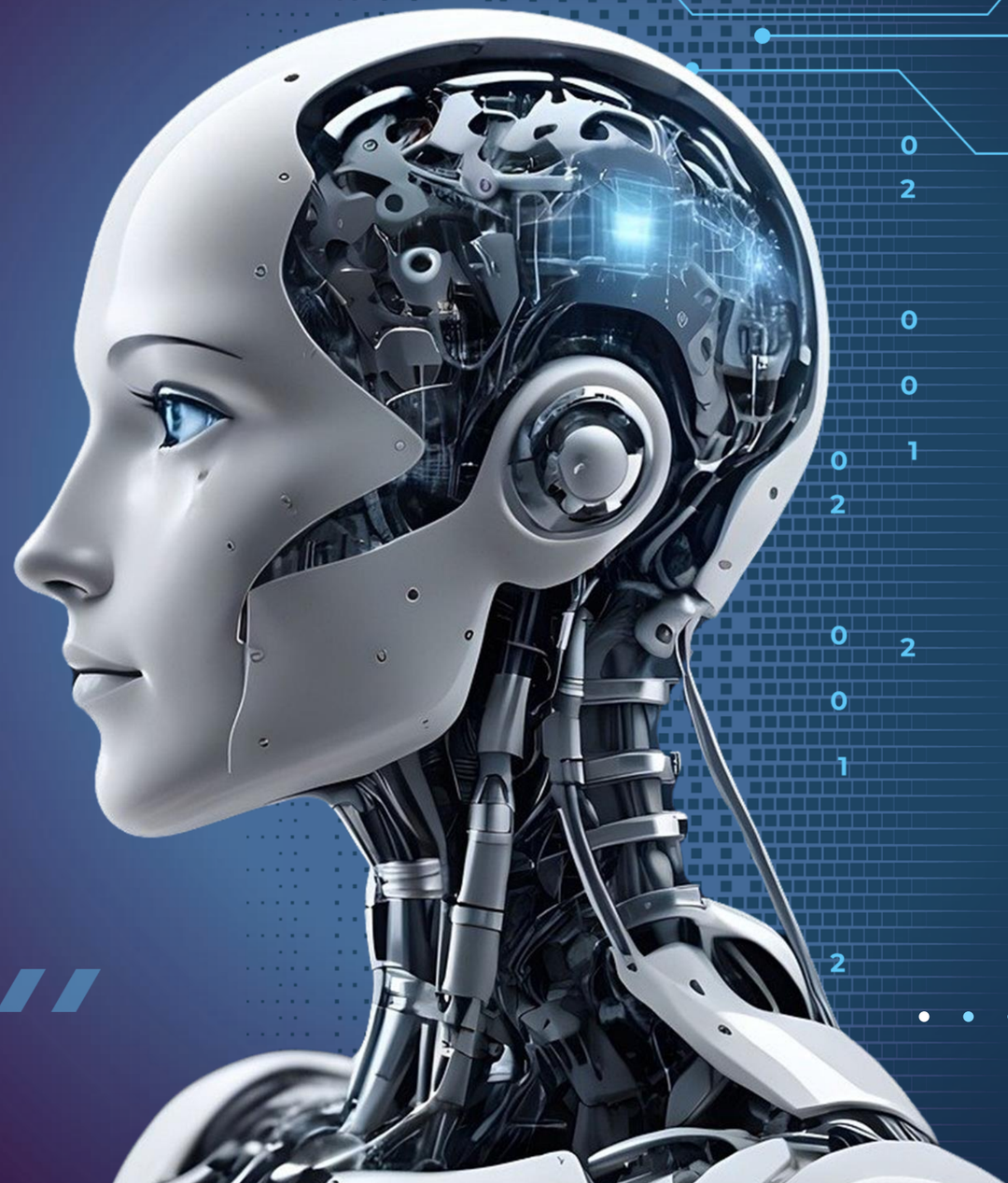
Urmia University

WHAT IS ARTIFICIAL INTELLIGENCE

Getting familiar with AI and its definitions, foundations, challenges, and opportunities.

PRESENTATION



Who Am I?

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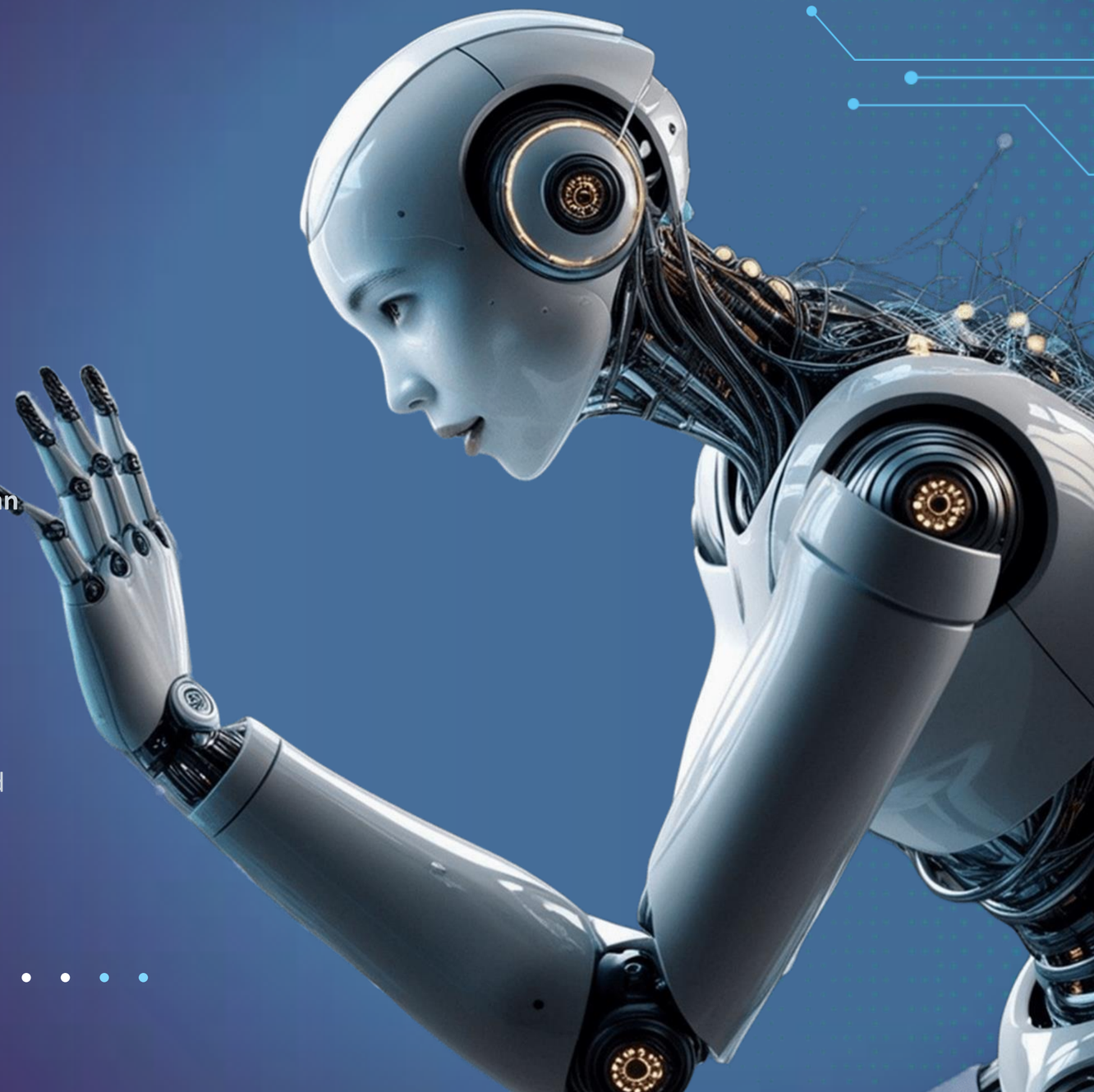
TABLE OF CONTENTS

TABLE OF CONTENTS

INTRODUCTION

Cognitive Abilities

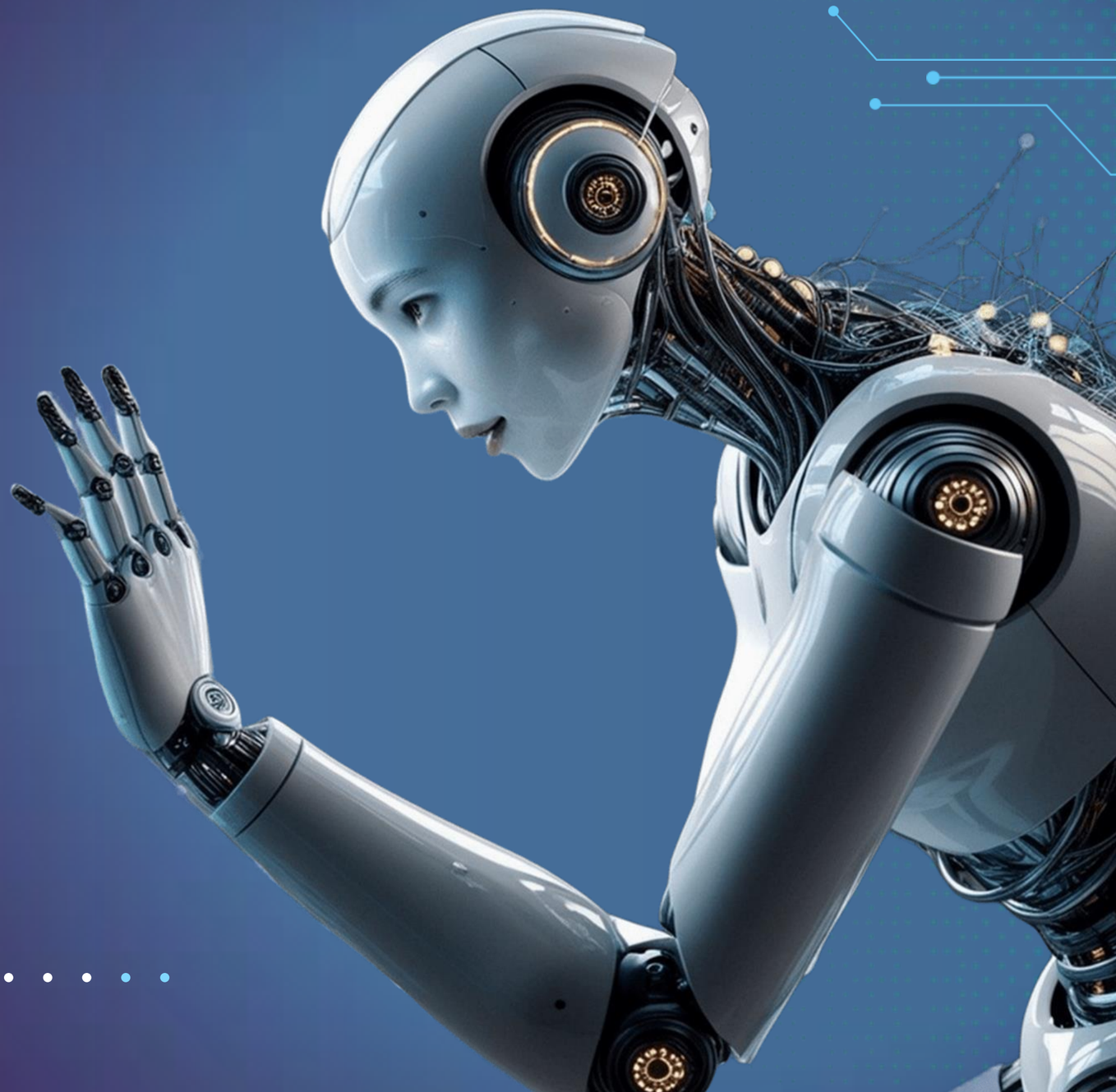
- **Reasoning and Problem Solving:**
  - Solving a **complex puzzle**, navigating a **new city**, figuring out how to fix a broken appliance.
- **Memory and Learning:**
  - **Example:** Remembering **names and faces**, learning a new skill like **playing an instrument**, adapting to changing situations.
- **Language and Communication:**
  - **Example:** Understanding and speaking **different languages**, writing effectively, interpreting nonverbal cues.
- **Creativity and Imagination:**
  - **Example: Composing music**, **writing stories**, inventing new products.
- **Emotional Intelligence:**
  - **Example:** Recognizing and managing our **own emotions**, understanding and empathizing with others, building and maintaining relationships.



INTRODUCTION

Sensory Perception

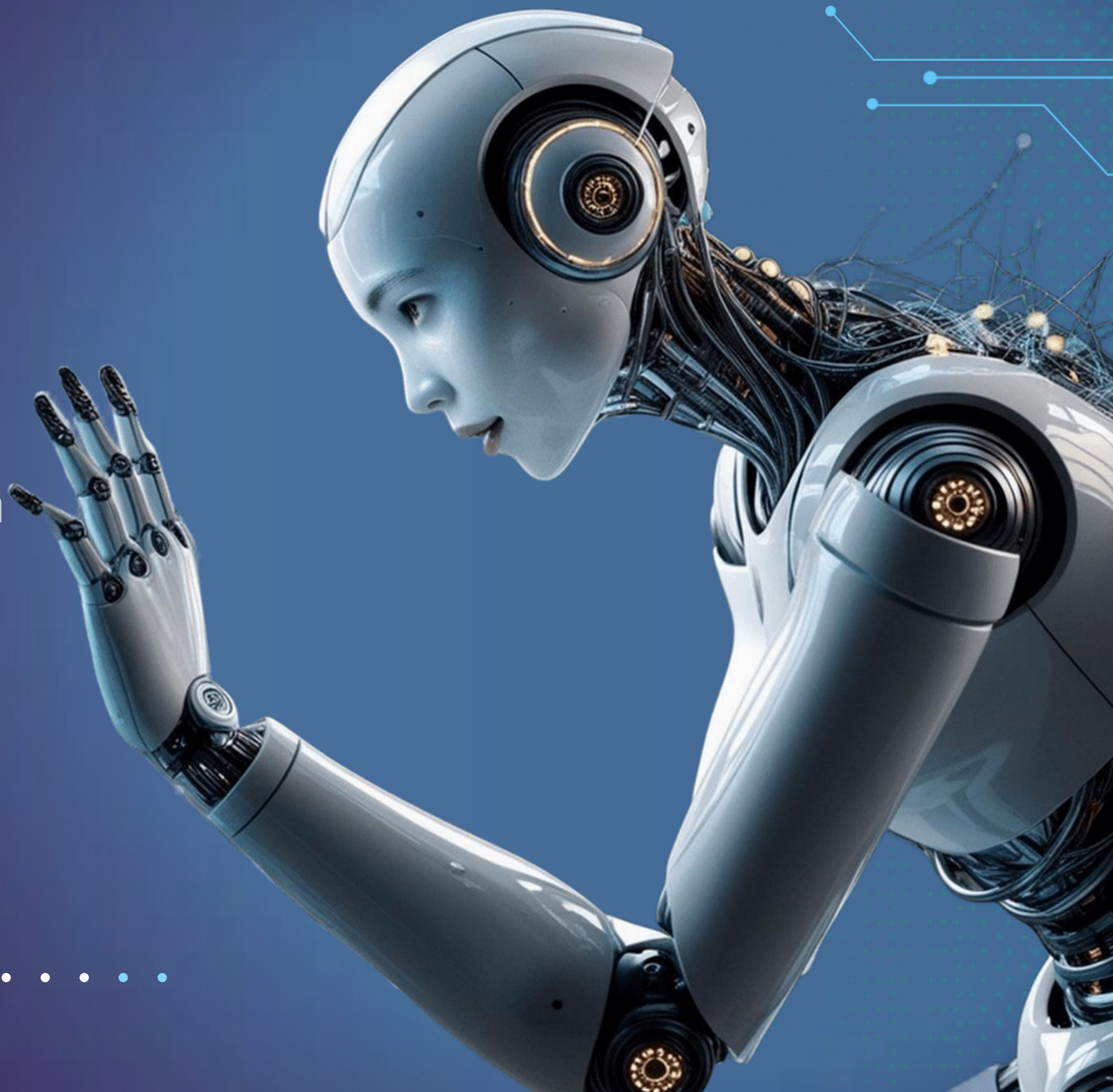
- Sight
- Hearing
- Touch
- Taste and Smell



INTRODUCTION

Motor Skills

- **Fine Motor Control:**
  - **Example:** Writing, drawing, playing a musical instrument, typing on a keyboard.
- **Gross Motor Control:**
  - **Example:** Walking, running, swimming, playing sports.



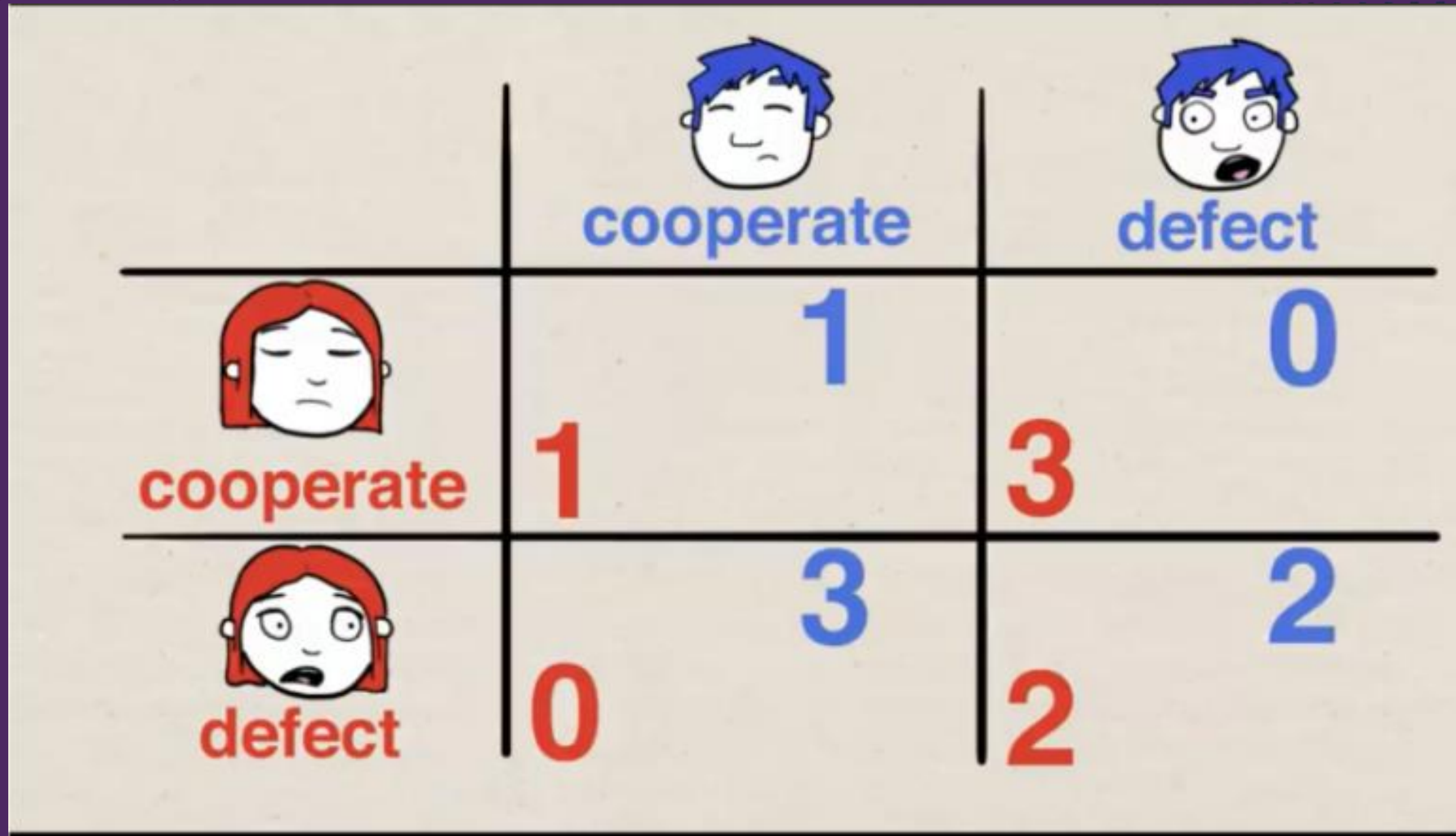
INTRODUCTION

Social Intelligence

- **Cooperation and Collaboration:**
  - **Example:** Working effectively in a team, contributing to a shared goal.
  - **Game Theory**
- **Empathy and Understanding:**
  - **Example:** Connecting with others, building meaningful relationships, resolving conflict.

Prisoner Dilemma

What would you do? Is human intelligent?



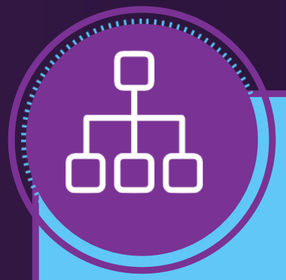
WHAT IS AI?

EVOLUTION OF AI

A brief history of AI development from its inception to the present day.

HOW MACHINES UNDERSTAND?

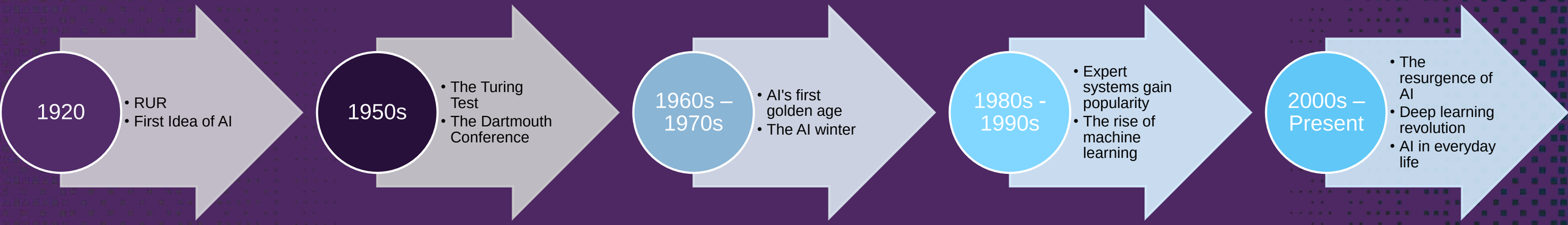
Machines don't understand the world in the same way humans do.



WHAT MACHINES DO?

Classification, Clustering, Prediction, Search Engines, Assistants (Siri, ...)

Evolution of AI

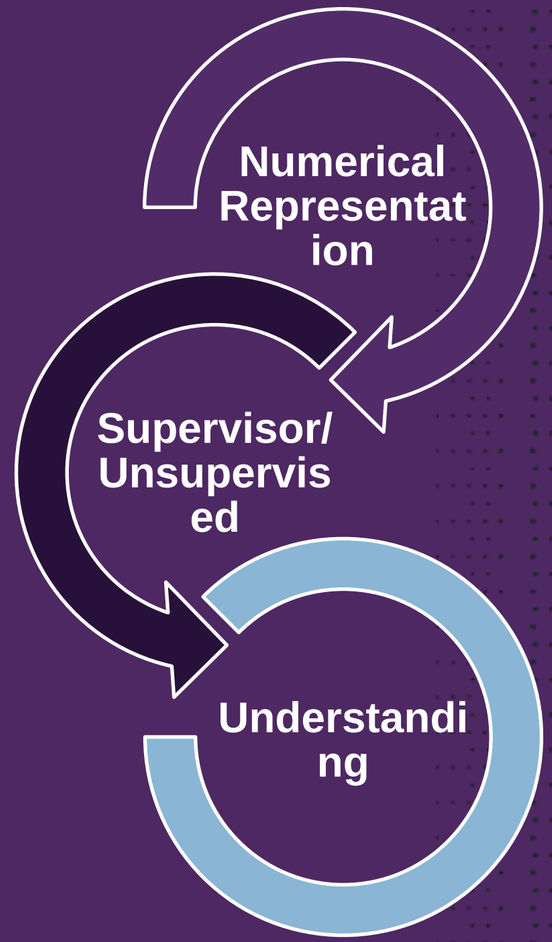


How Machines Understand?

Machines don't understand the world in the same way humans do. They rely on a process called numerical representation. This means all information, whether it's an image, a word, or a sound, needs to be converted into numbers.

These numbers are then fed into algorithms that can analyze and learn from the data.

Imagine a machine trying to understand a picture of a cat. It doesn't see the furry creature like we do. Instead, it sees a grid of pixels, each pixel represented by a number indicating its color and intensity. By analyzing the patterns in these numbers, the machine can learn to identify cats in other images. This numerical approach allows machines to process information quickly and efficiently. However, it also means that machines understand the world in a very different way than humans do. They can analyze data and identify patterns, but they don't have the same intuitive understanding of the world that comes from our senses and emotions.



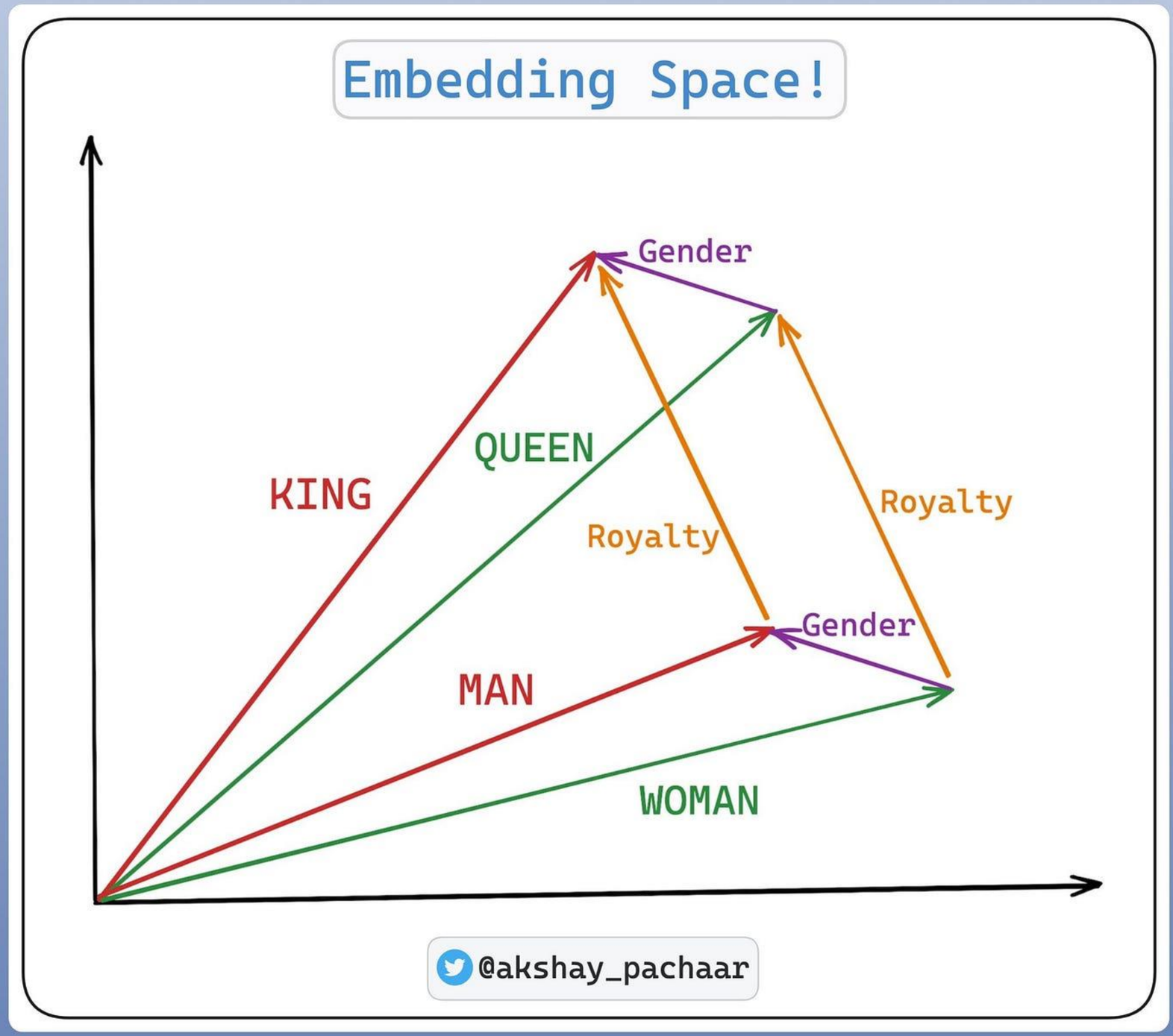
Boolean Retrieval

Machine Learning

	Anthony and Cleopatra	Julius Caesar	The Tempest	Hamlet	Othello	Macbeth
Anthony	1	1	0	0	0	1
Brutus	1	1	0	1	0	0
Caesar	1	1	0	1	1	1
Calpurnia	0	1	0	0	0	0
Cleopatra	1	0	0	0	0	0
Mercy	1	0	1	1	1	1
Worser	1	0	1	1	1	0

BERT Idea

Machine Understanding



Gradient Descent

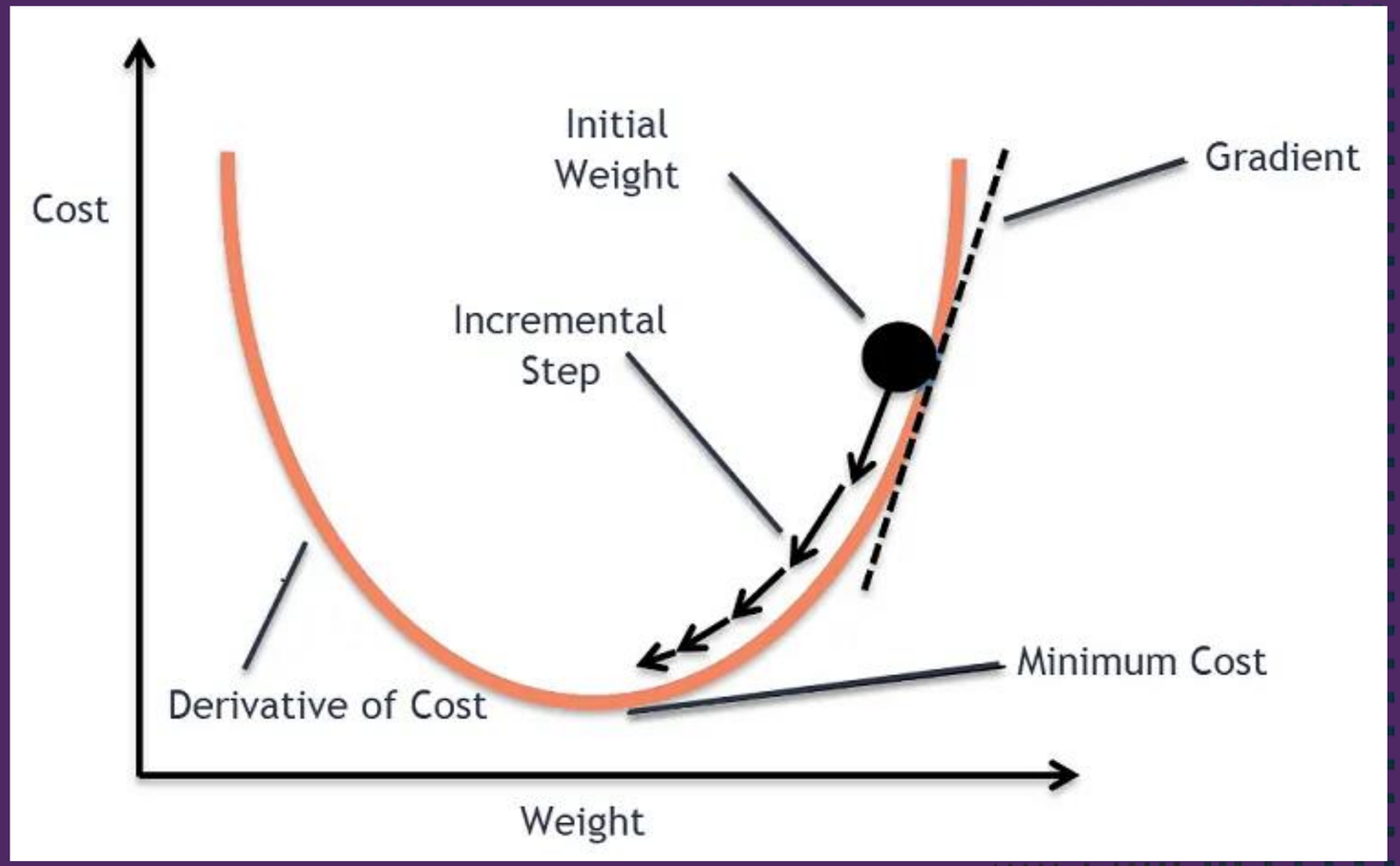
Find Optimum Value (Optimization)

$$Error = Real\ Value - Prediction$$

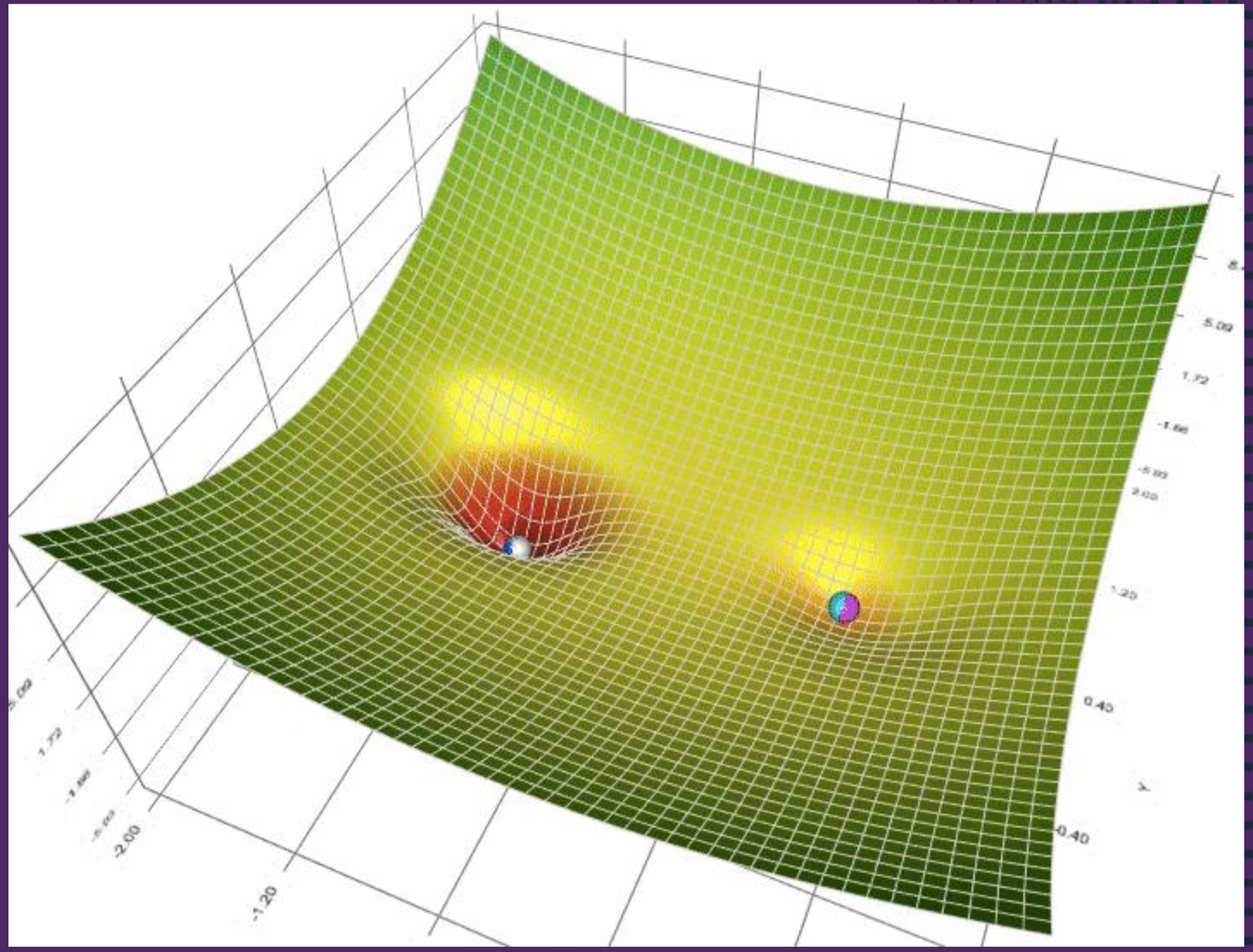
Learning!

$$Min(Error) =$$

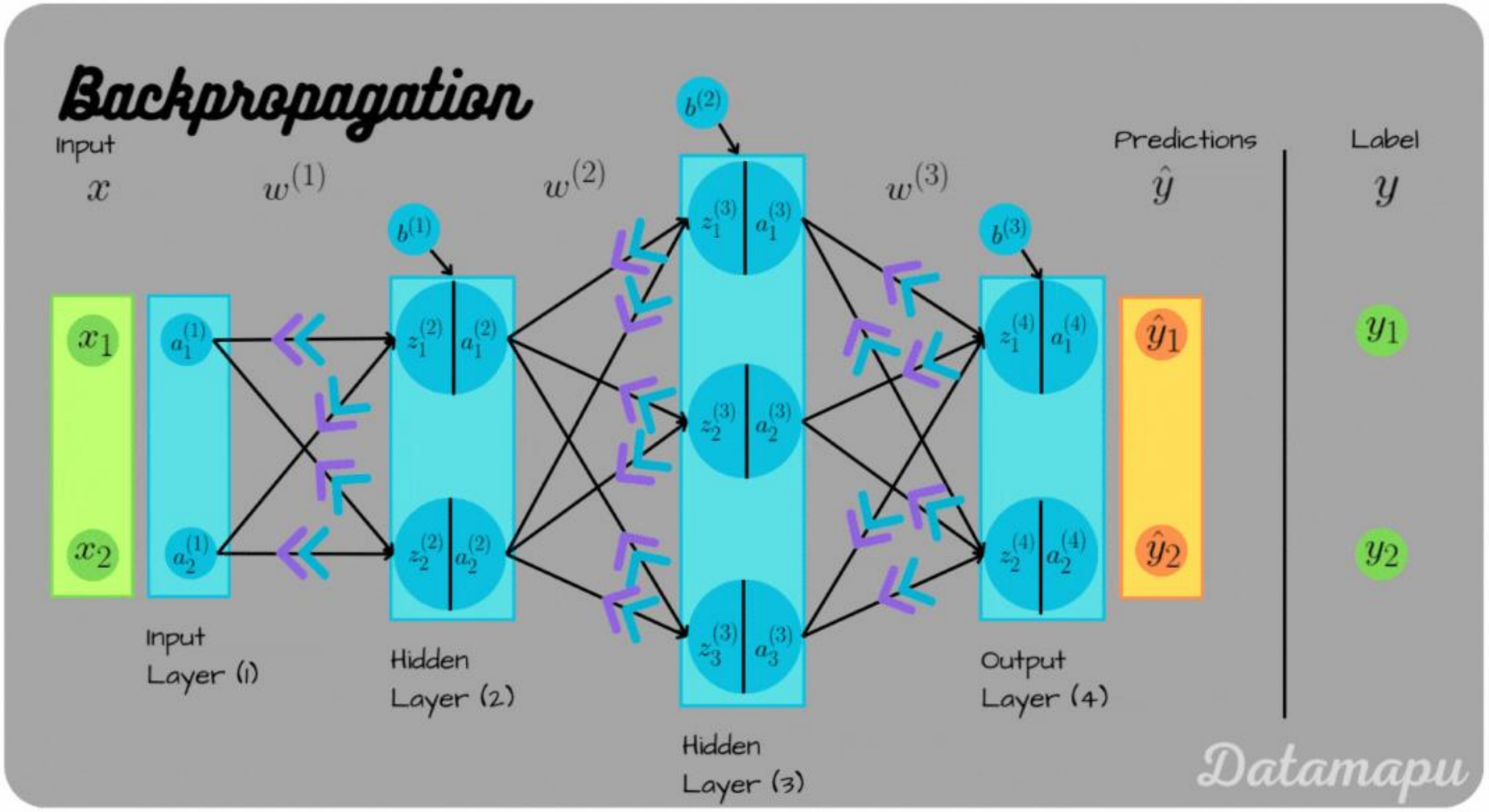
$$\sum_{for\ all\ learning\ data} RV - P$$



Gradient Descent



NN and Back Propagation



Overfitting

- Learning too much!
- 100% is not always good!

Applications

- Image Processing
- Price Prediction
- Cancer Detection
- Chemical Reactions

Machine Learning Techniques

Classification

Data has labels. Machine can know if the learn process is successful or not!

Clustering

Machine does have a source of trust! It can learn be data similarity! **Numericalize The DATA**!

Smart Home/City/...

- Being smart is not only in text!
- It can be in image!
- It can be in video (deep fake)!
- Machine can learn human behaviour!

Demo

- Some Tools
- Ollama
- LM Studio
- Hugging Face

THANKS FOR YOUR ATTENSION

Any Questions?