



UCL ARTIFICIAL
INTELLIGENCE SOCIETY

TUTORIAL #1

Session 1

Introduction to Artificial Intelligence



LECTURE OVERVIEW

01

Introduction

What is AI? Why should we care about it?

02

Practice

We will train our first AI without coding.

02

Theory

Categorisation of AI.
How does AI learn.

03

Questions

It's your first lecture, so ask questions about anything!

Introduction

WHAT IS AI?

Any Ideas?

Introduction

WHAT IS AI?

"The simulation of human intelligence by machines, especially computer systems"

-Do you agree with this?



Introduction

WHAT IS AI?

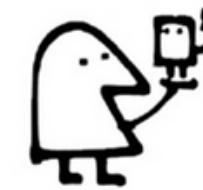
"The ability of a computer or a robot controlled by a computer to do tasks that are usually done by humans because they require human intelligence and discernment."

- Learning, reasoning, problem solving, perception, and using language

Introduction

GENERAL V. NARROW AI

3 stages of AI



Narrow AI

Dedicated to assist with or take over specific tasks



General AI

Takes knowledge from one domain, transfers to other domain



Super AI

Machines that are an order of magnitude smarter than humans

Credit: Chris Noessel

**WHY SHOULD WE
CARE ABOUT IT?**

Introduction

WHY SHOULD WE CARE ABOUT IT?



Evolution

2011



Evolution

2016



A L P H A G O

Evolution 2019



Evolution
2020



Evolution

2020

"Using the writing style of Harry Potter books, write an excerpt where Professor Snape explains artificial intelligence to Harry Potter."

Evolution

2020

"So, Mr. Potter," said Snape, his voice dripping with condescension. "You wish to know about artificial intelligence?,,

Harry nodded eagerly, his eyes shining with interest.

"Very well," Snape continued. "Artificial intelligence is the process of creating machines that can think and learn for themselves. It is a field of computer science that is constantly evolving, as researchers strive to create ever more sophisticated machines." He paused, looking at Harry intently. "I take it you understand so far, Mr. Potter?,, Harry nodded again.

"Good," Snape said. "Now, artificial intelligence has a wide range of applications, from helping humans to solve complex problems, to providing companionship for the elderly or disabled. In your case, Mr. Potter, I believe there is a particular application that might be of interest to you.,,

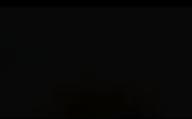
Harry looked at him expectantly. "You are familiar, I presume, with the game of chess?" Snape asked..

Evolution

2022

DALL·E 2

DALL·E 2 is a new AI system that can create realistic images and art from a description in natural language.



Evolution

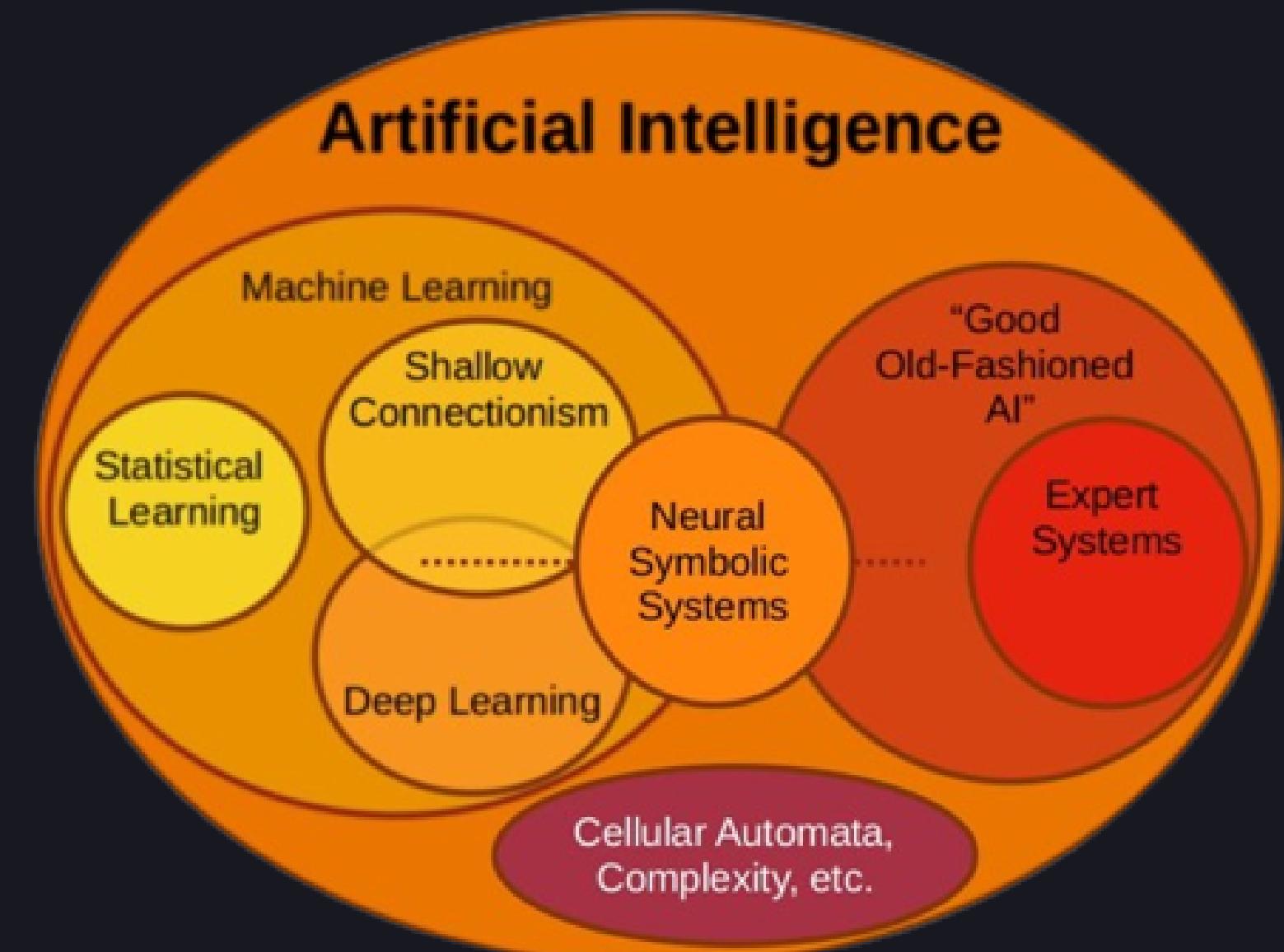
2022

**“robot dressed in wizard robes and casting a
spell, cosmos behind him, digital art”**

Evolution 2022



MACHINE LEARNING



MACHINE LEARNING

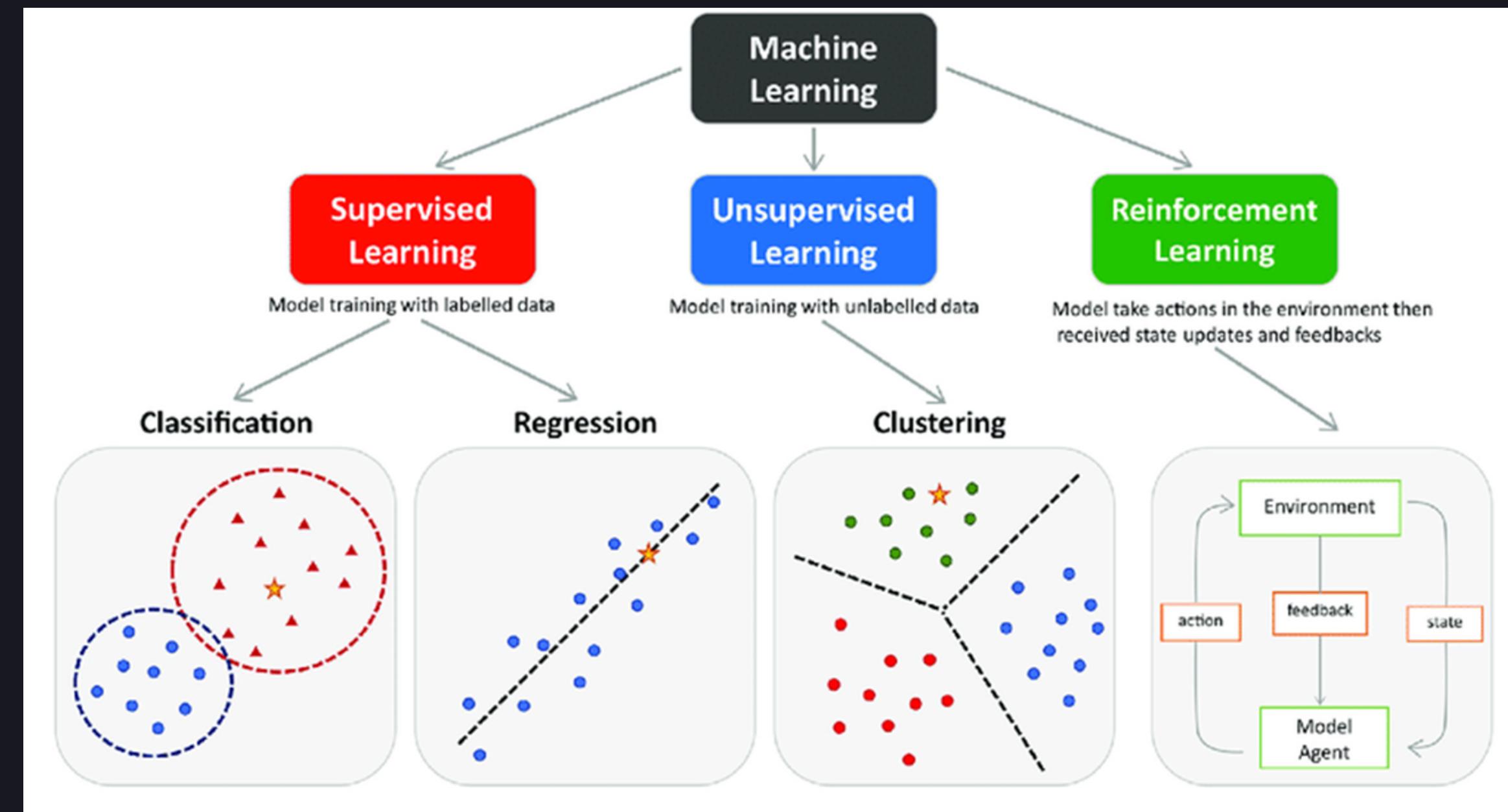
Discipline concerned with the implementation of computer software that can learn autonomously

We define 3 main types of ML

- Supervised Learning
- Unsupervised Learning
- Reinforcement Learning (Semi-supervised)

Types of ML

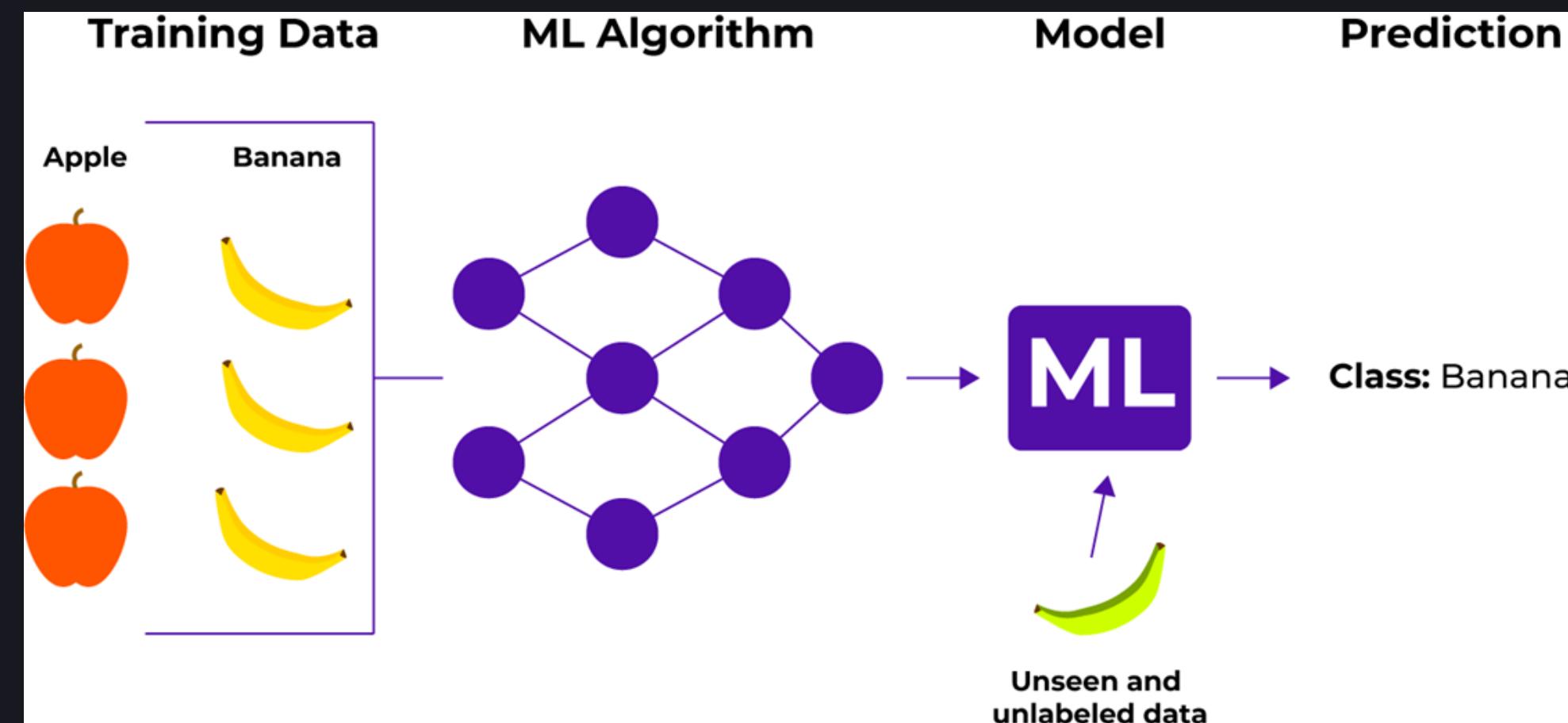
MACHINE LEARNING



Types of ML

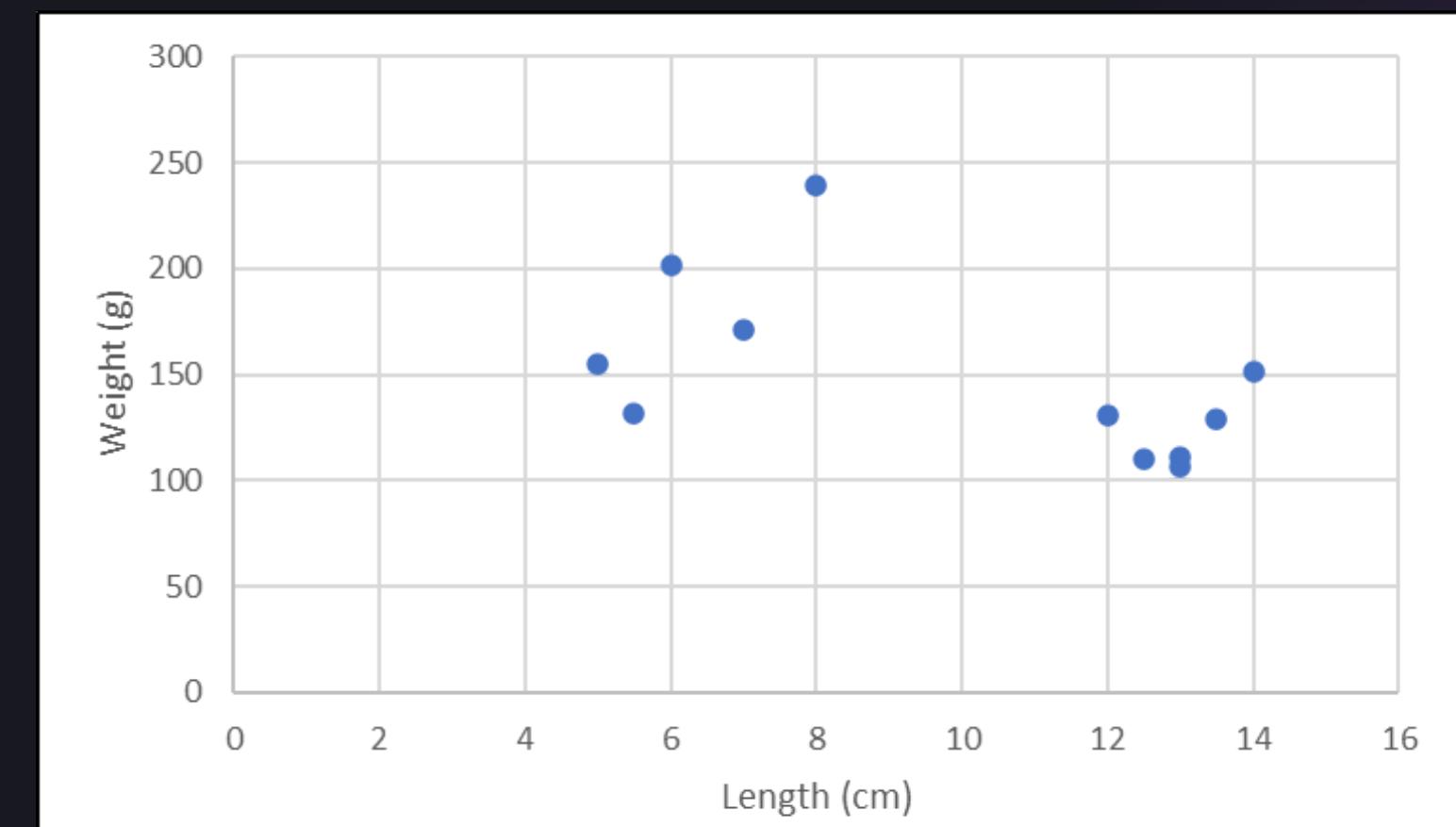
SUPERVISED LEARNING

- It learns using data X and labels Y
- Learns $X \rightarrow Y$



UNSUPERVISED LEARNING

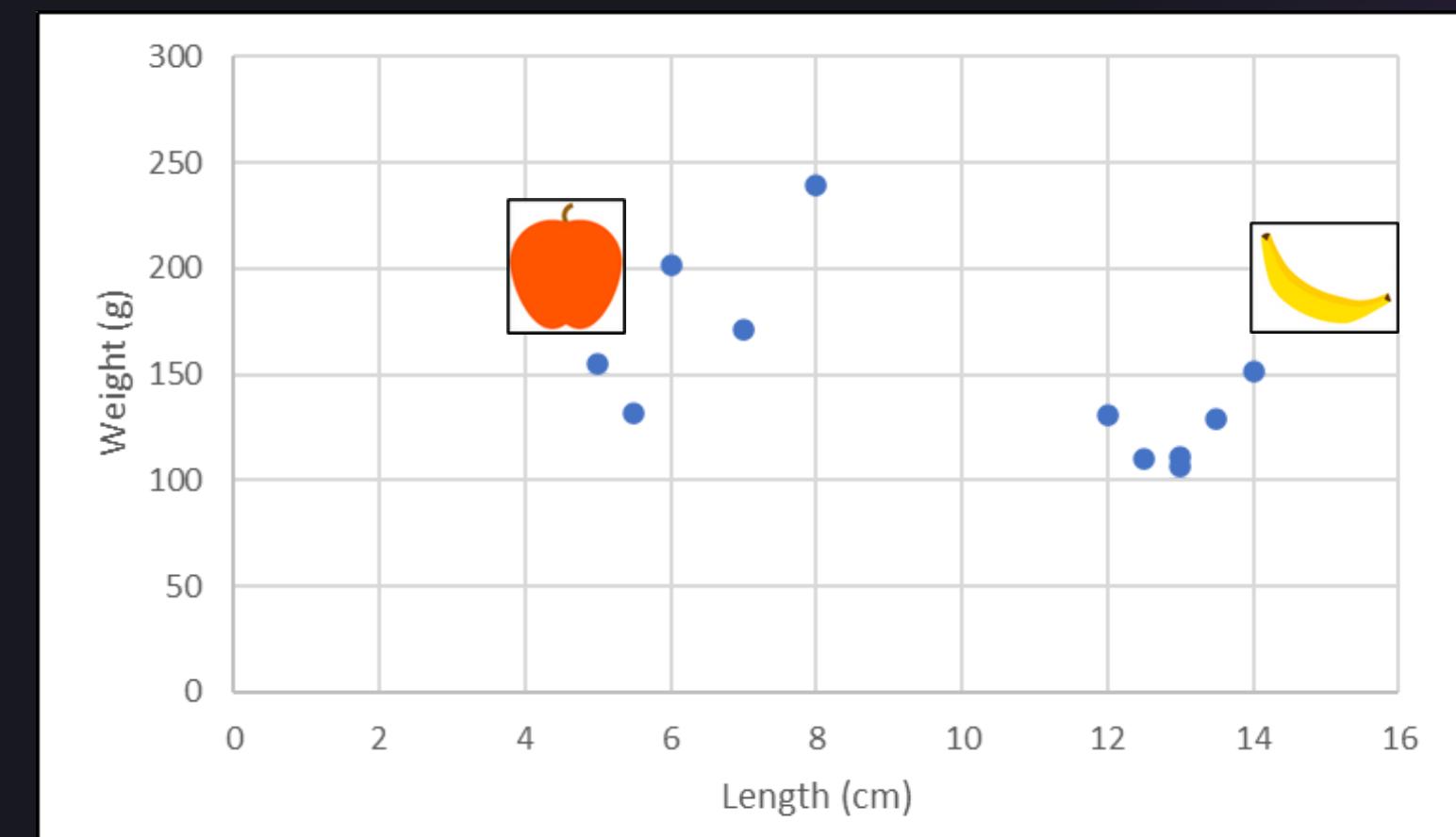
- It learns using just data X
- Learns underlying structures
- Can detect anomalies and clusters



Types of ML

UNSUPERVISED LEARNING

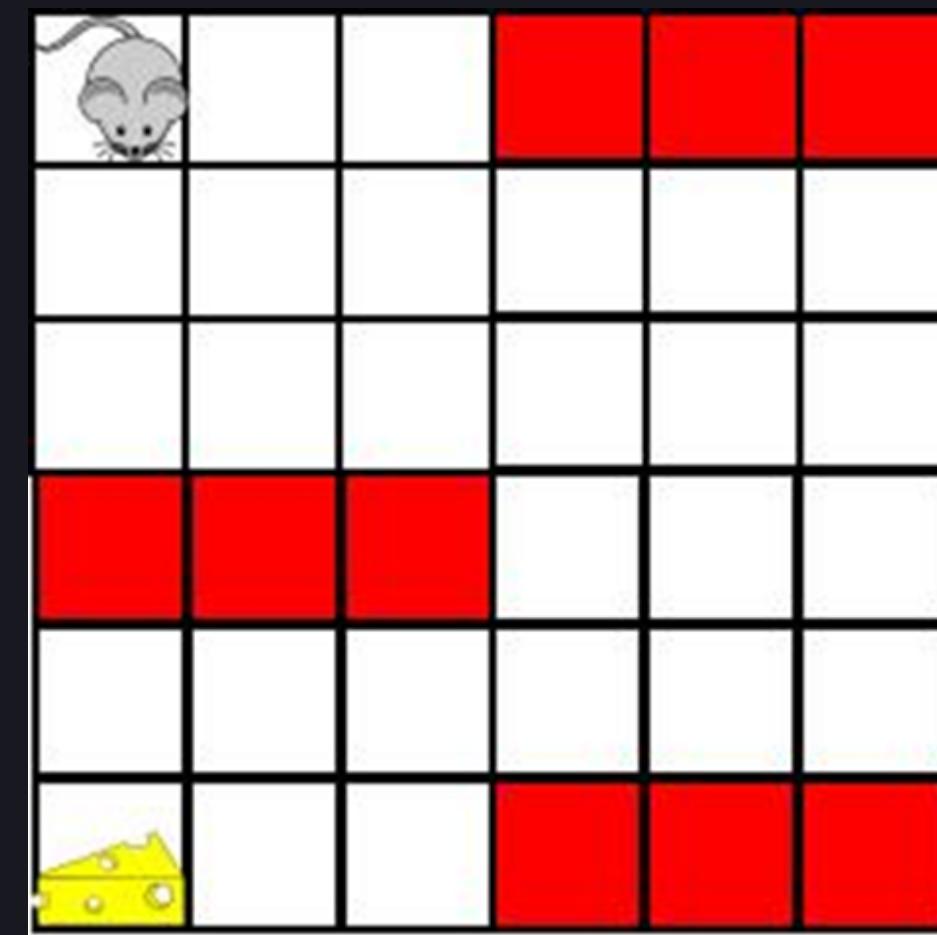
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Types of ML

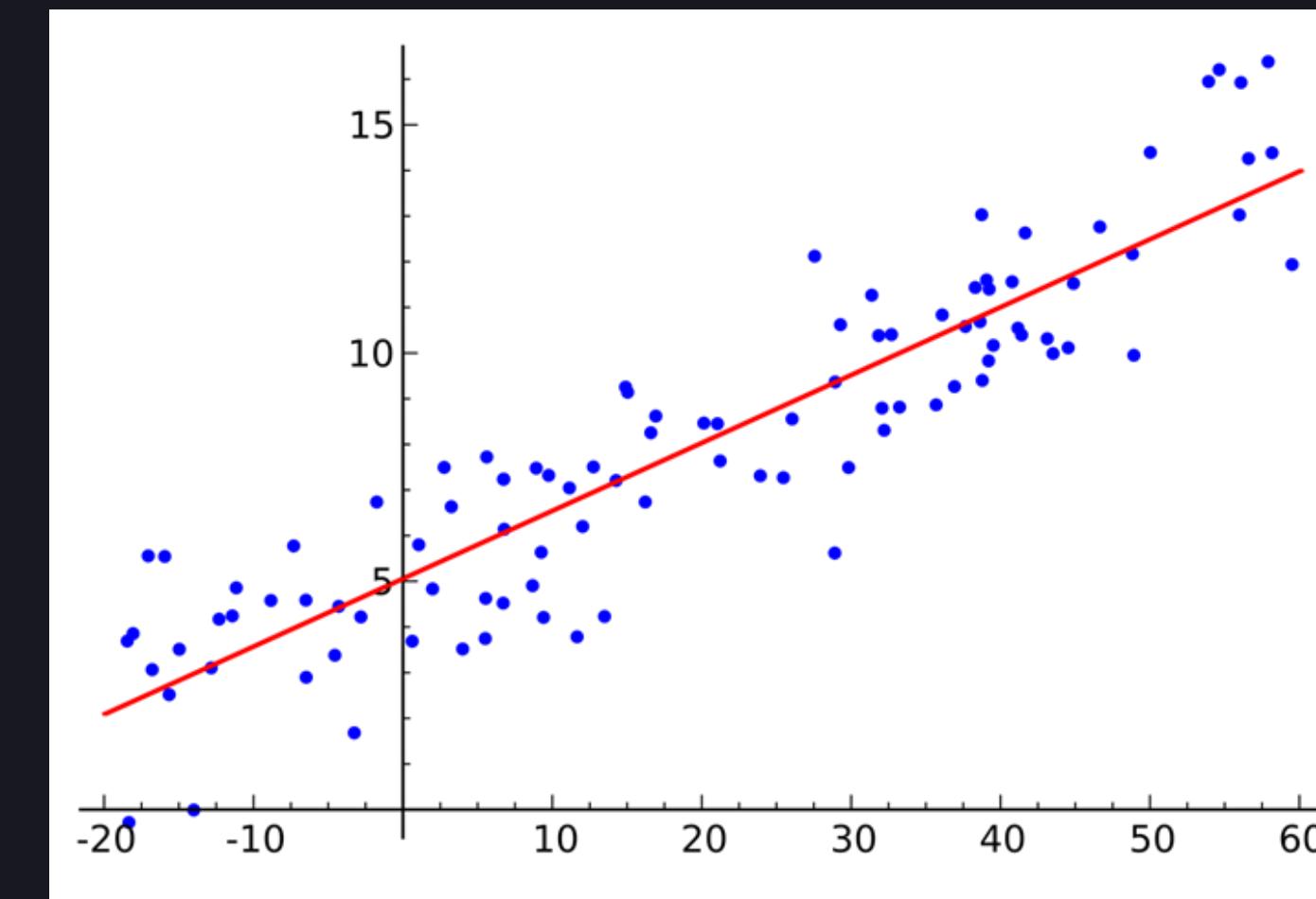
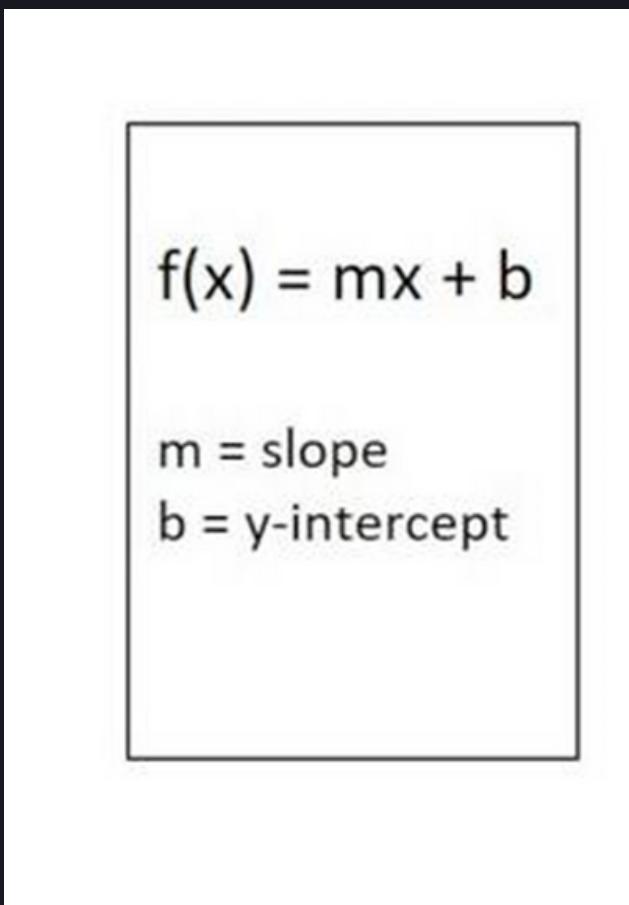
REINFORCEMENT LEARNING

- Learns how to take actions in an environment to obtain reward
- Maximises future reward



Exercise

PRACTICAL SHOWCASE

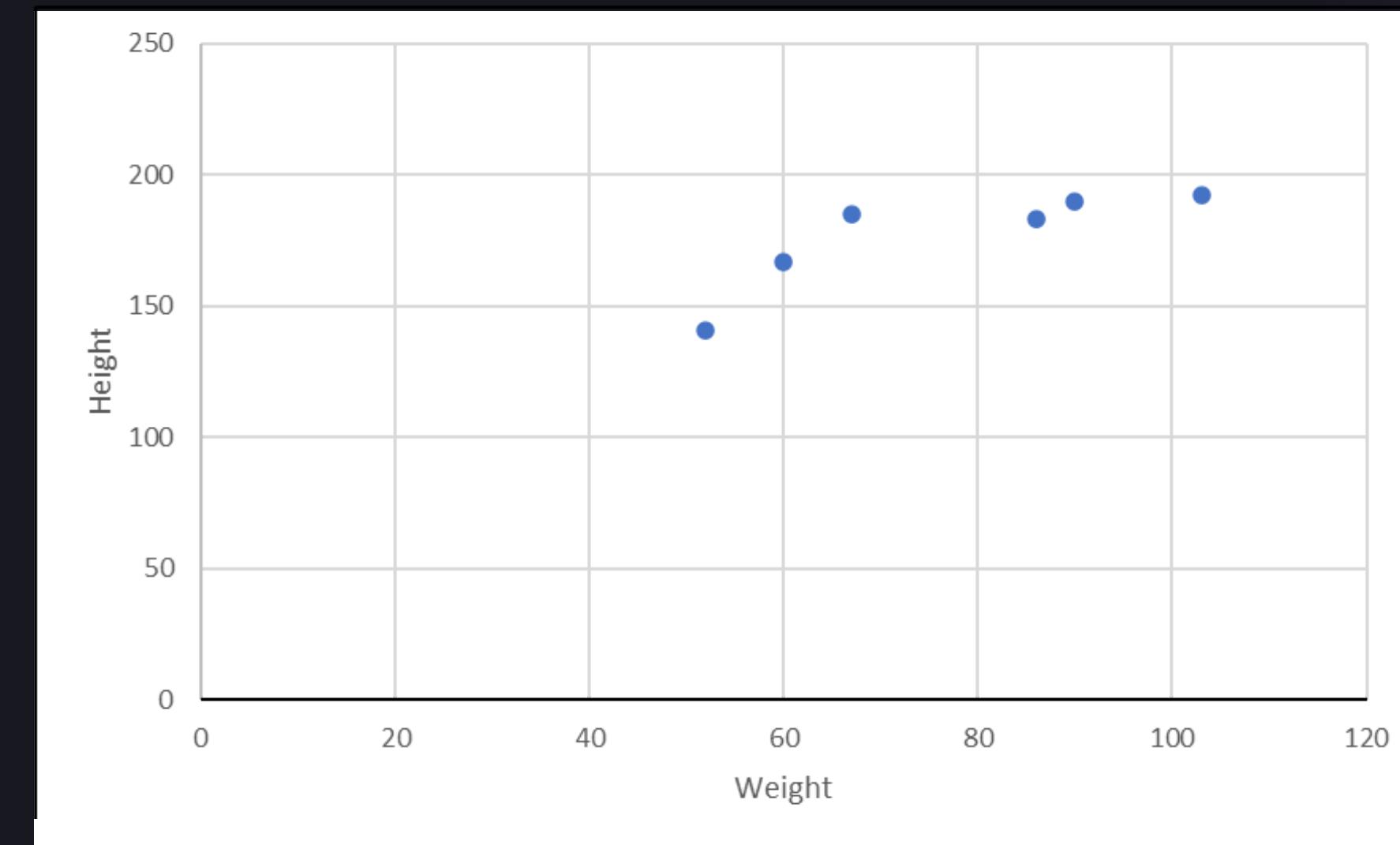


Exercise

PRACTICAL SHOWCASE

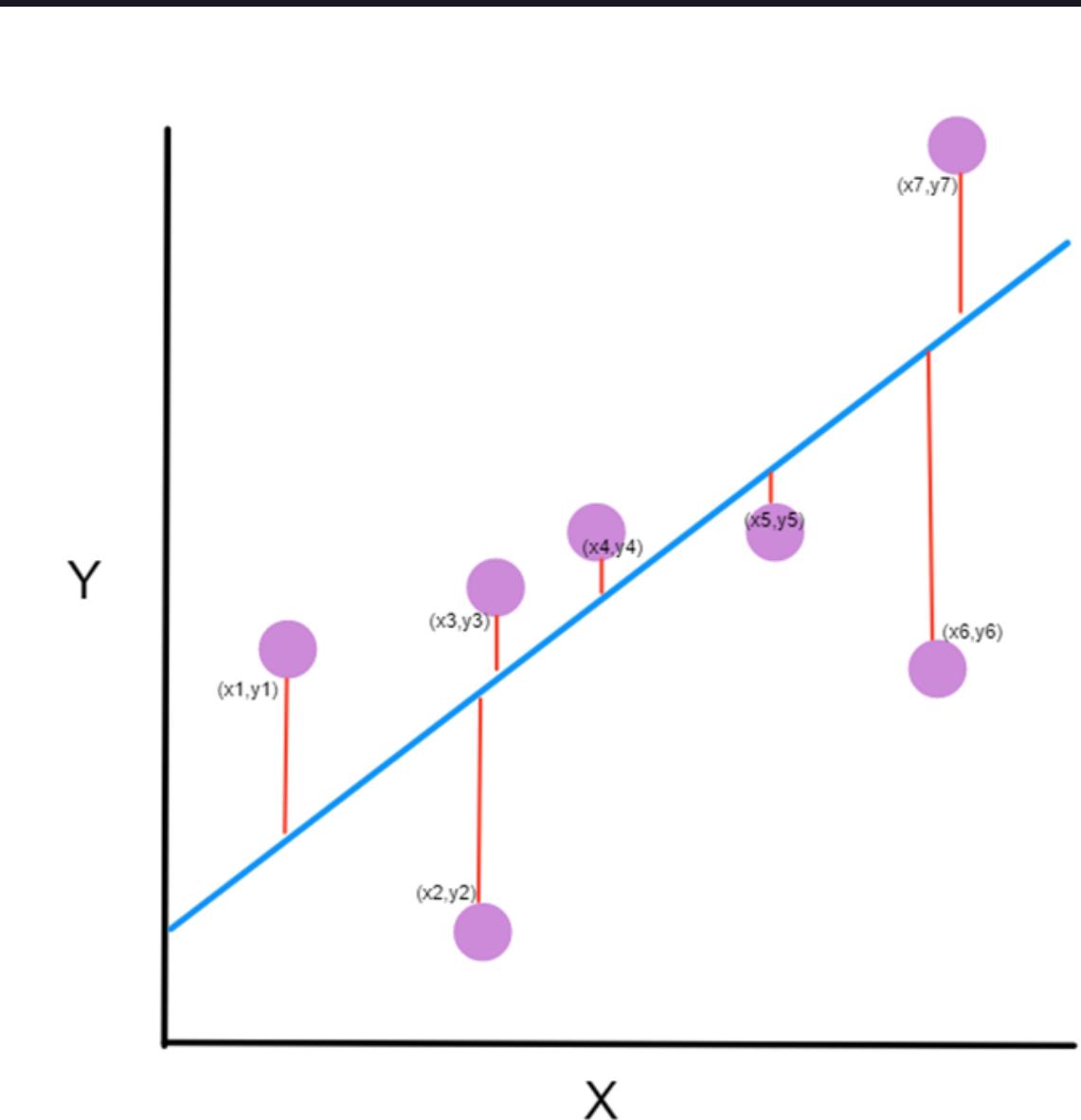
-We need some data

Height	Weight
185	67
190	90
167	60
183	86
192	103
141	52



Exercise

PRACTICAL SHOWCASE



Slope $a = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sum (x_i - \bar{x})^2}$

intercept $b = \bar{y} - a\bar{x}$

— where overbar denotes average

$$\text{MSE} = \frac{1}{n} \sum_{i=1}^n (Y_i - \hat{Y}_i)^2$$

MSE = mean squared error

n = number of data points

Y_i = observed values

\hat{Y}_i = predicted values

Exercise

PRACTICAL SHOWCASE

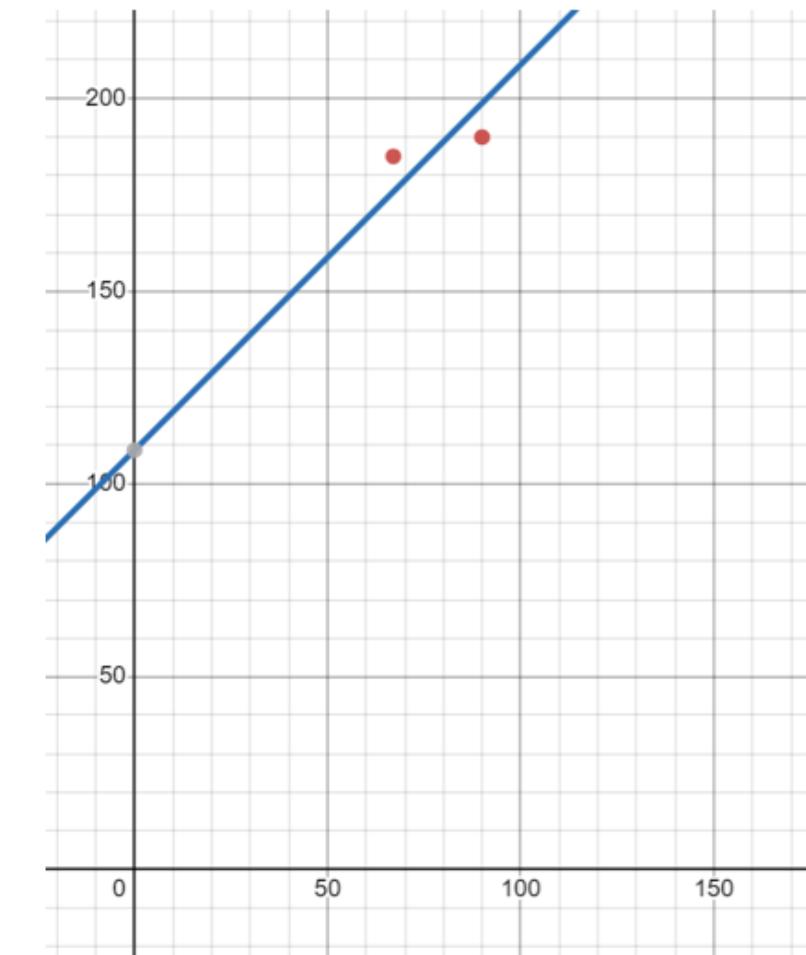
	y	x	0	0 xp	yp	(x-xp)	(y-yp)	(x-xp)*(y-yp)	(x-xp) ²	(y-yp) ²
1	185	67	185	67	67	185	-9,3333	8,66667	-80,889	87,1111
2	190	90	375	157	78,5	187,5	13,6667	2,5	34,1667	186,778
3	167	60	542	217	72,3333	180,667	-16,3333	-9,3333	152,444	266,778
4	183	86	725	303	75,75	181,25	9,66667	6,66667	64,4444	93,4444
5	192	103	917	406	81,2	183,4	26,6667	15,6667	417,778	711,111
6	141	52	1058	458	76,3333	176,333	-24,333	-35,333	859,778	592,111
									241,287	322,889
									1447,72	1937,33
										1706,81
r	Sy	Sx	b	a						
0,79614	18,476	19,6842	0,74728	119,291						
			0,74728	119,291						

Exercise

PRACTICAL SHOWCASE

$$f(x) = 1.0 * x + 108.8$$

Height	Weight
185	67
190	90
167	60
183	86
192	103
141	52

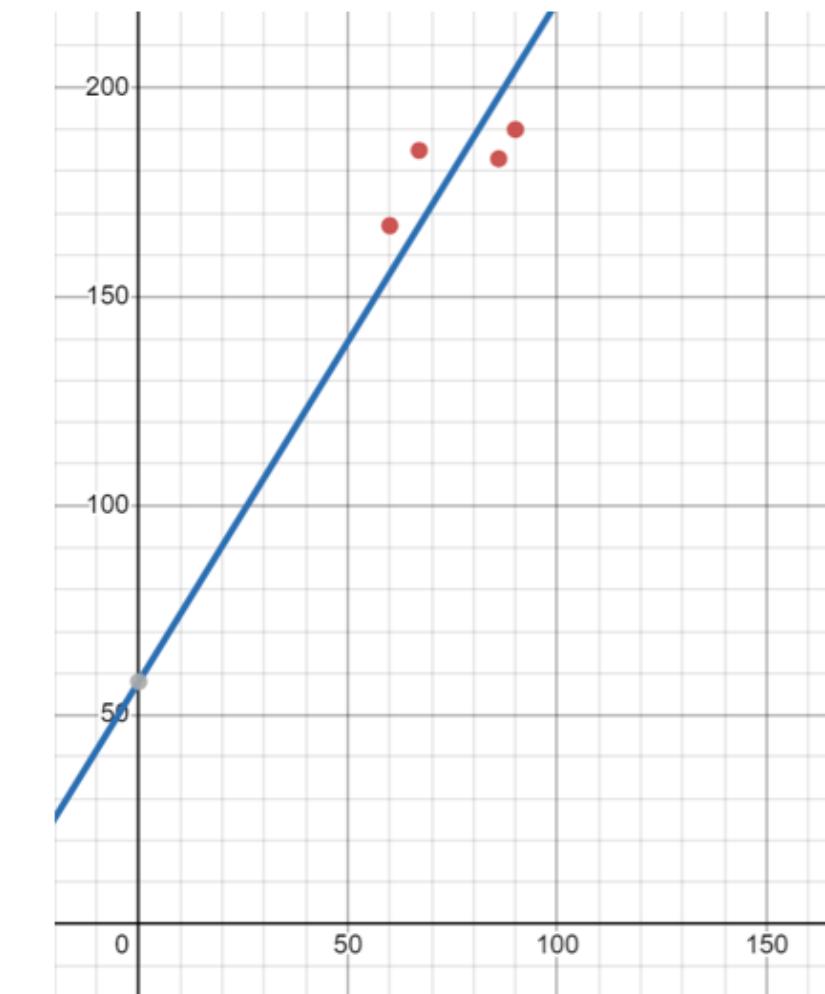


Exercise

PRACTICAL SHOWCASE

$$f(x) = 1.63x + 58$$

Height	Weight
185	67
190	90
167	60
183	86
192	103
141	52

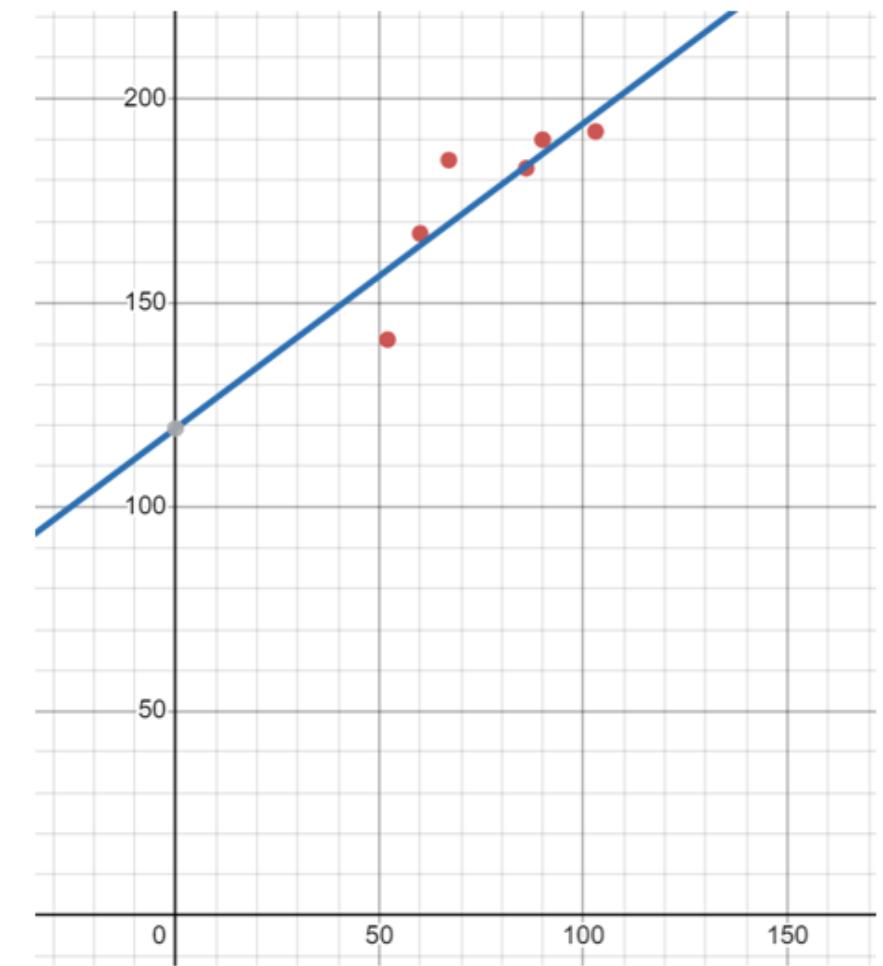


Exercise

PRACTICAL SHOWCASE

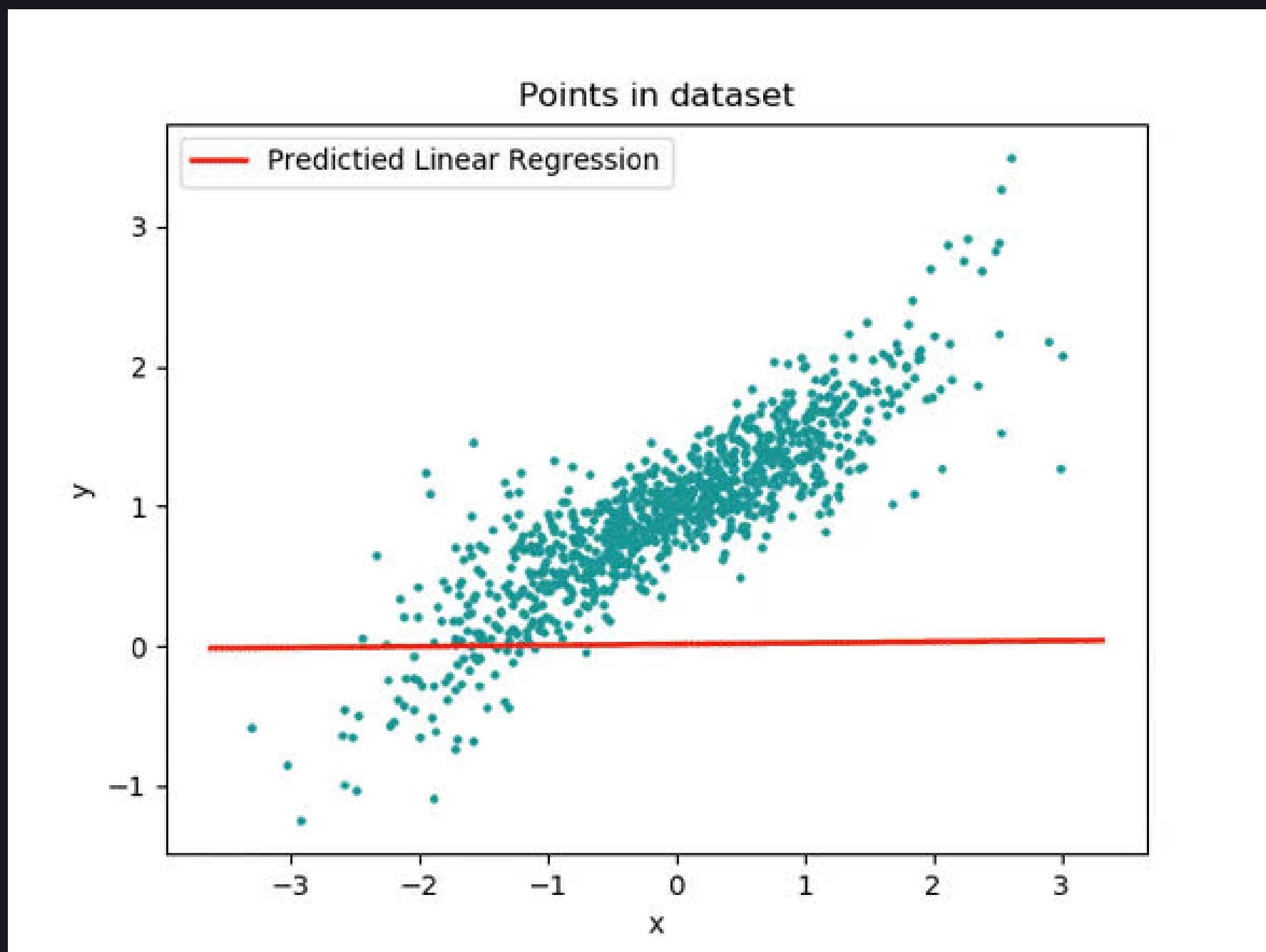
$$f(x) = 0.547x + 119.3$$

Height	Weight
185	67
190	90
167	60
183	86
192	103
141	52



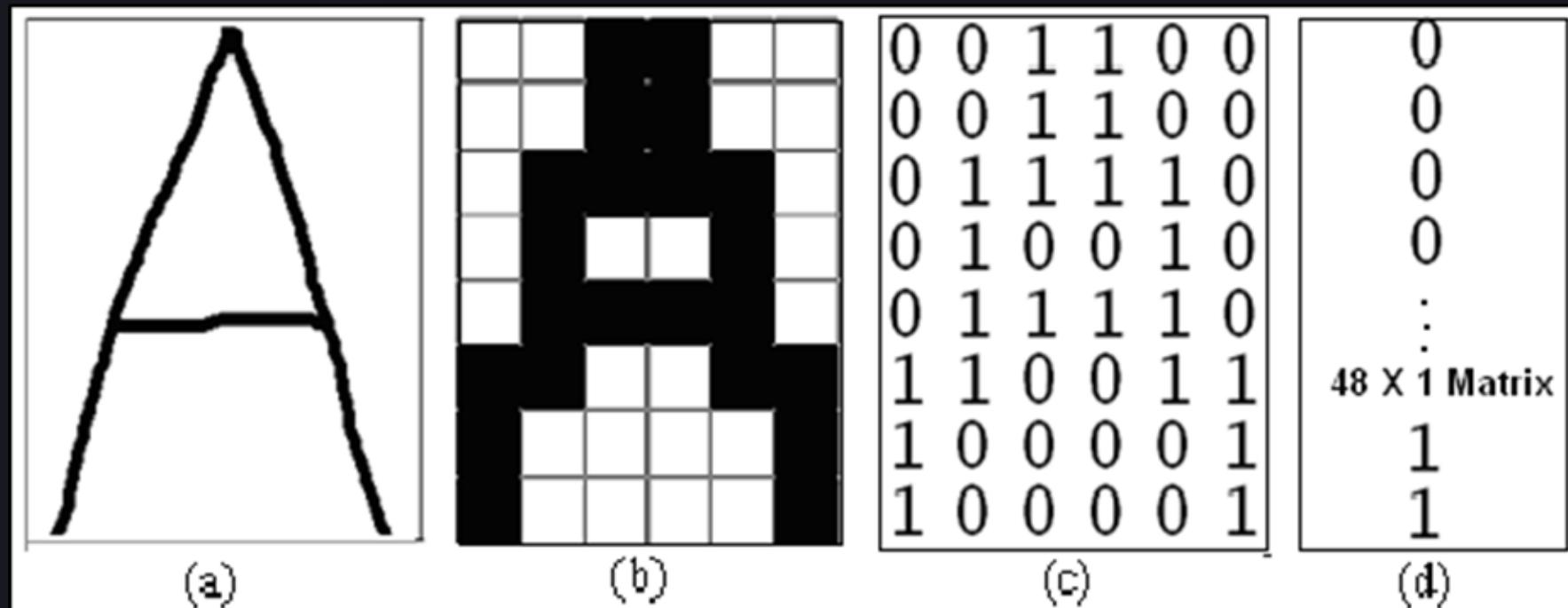
Exercise

PRACTICAL SHOWCASE



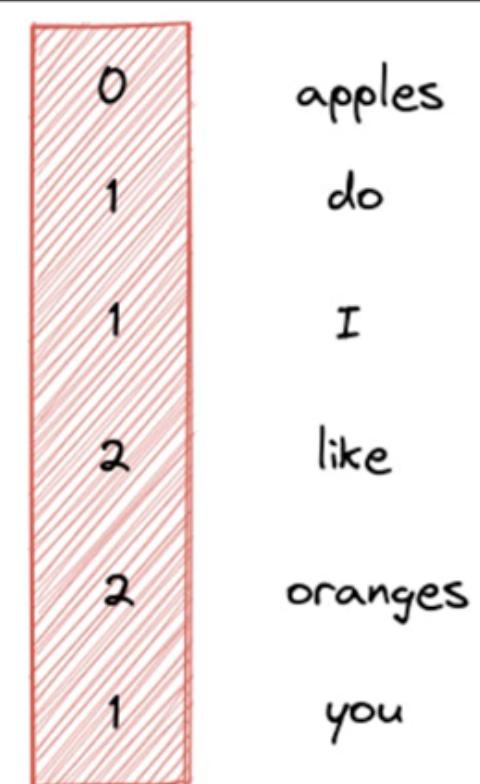
Exercise

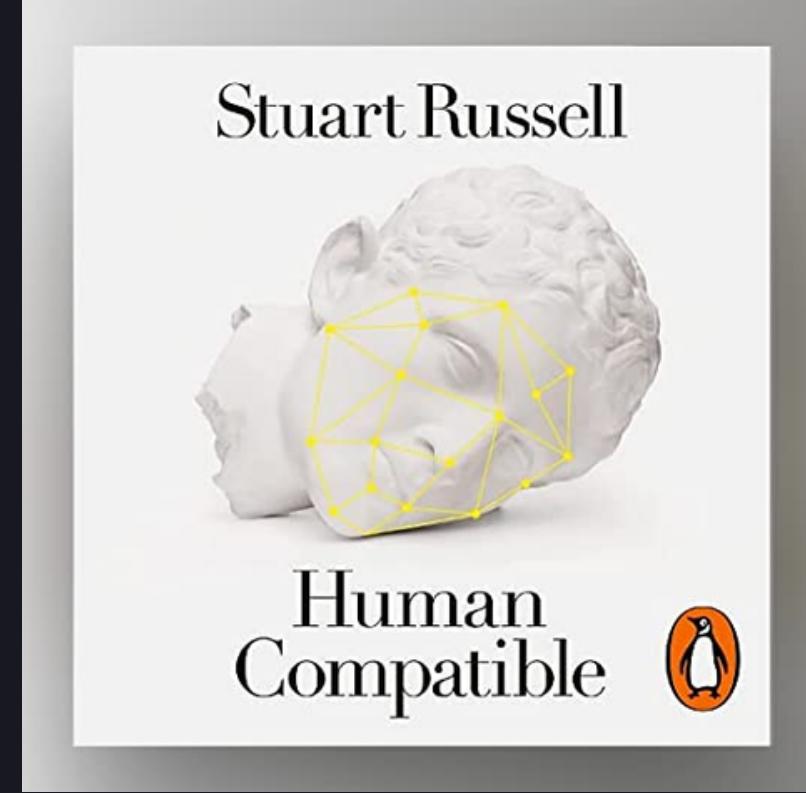
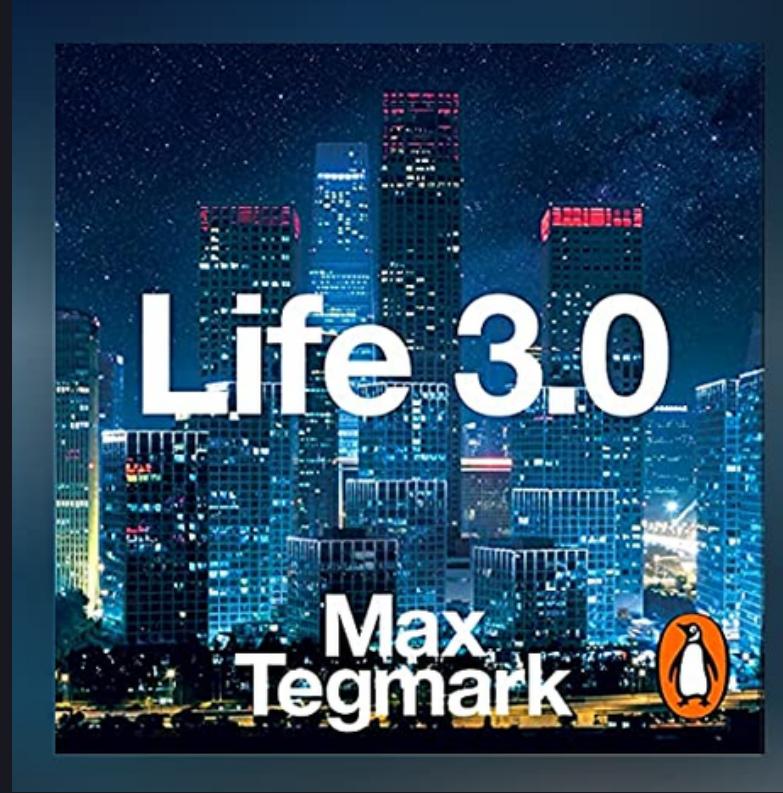
PRACTICAL SHOWCASE



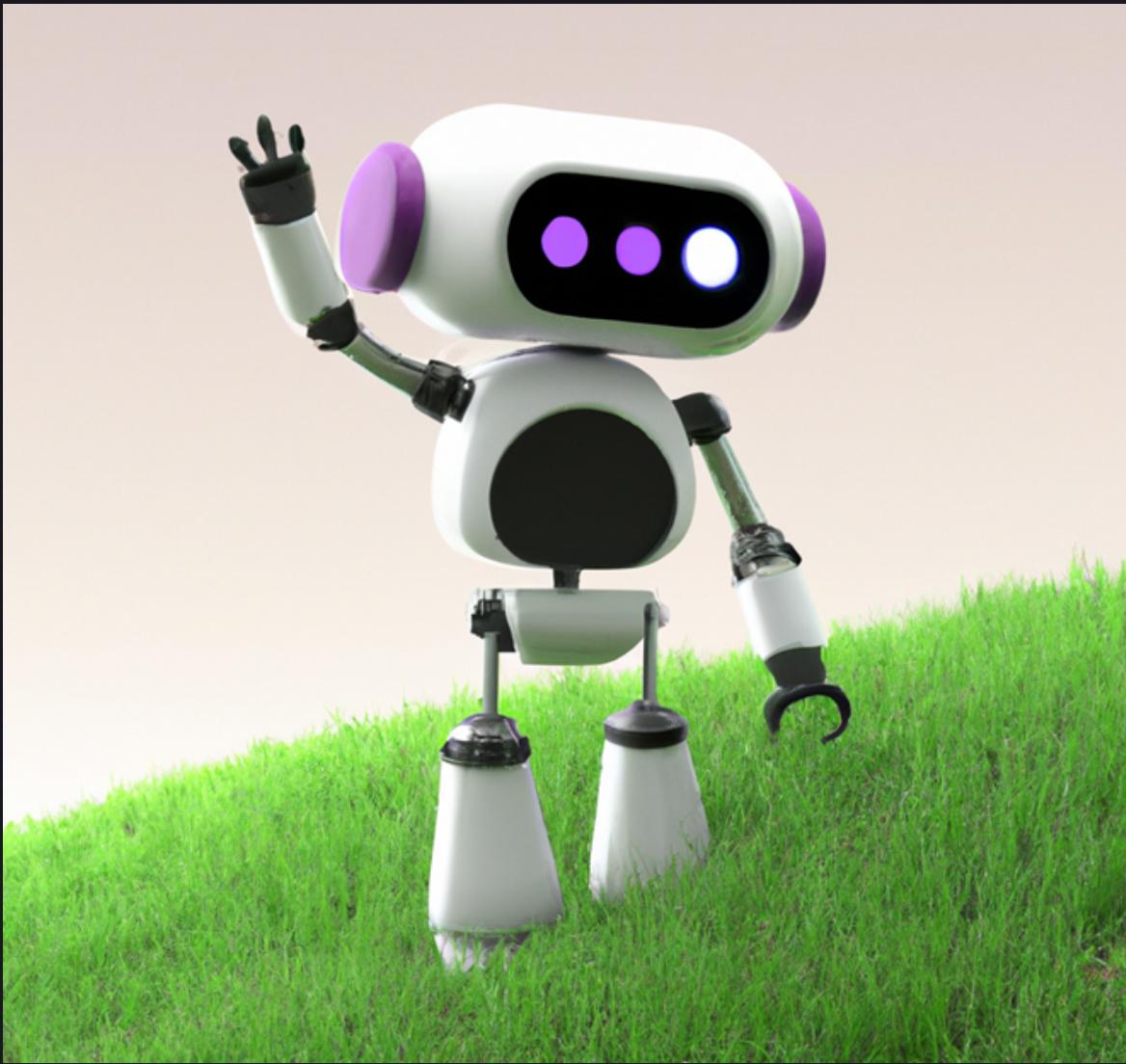
"I like oranges, do you like oranges?" →

Bow text vector





QUESTIONS?



SEE YOU NEXT TIME