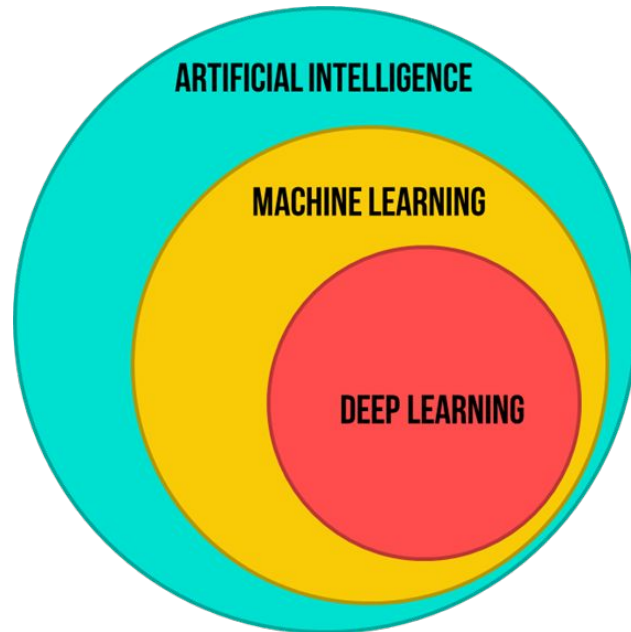




ML Overview



AI / ML / DL





Intro ML

- Prediction based on data:
 - How much does this house cost?
 - Disease identification.
 - Bitcoin price next week?
 - Is this image a dog or a cat?
 - Tomorrow's temperature?
 - Client will pay mortgage?
 - Are there any bird in the image?
 - ...



Types of ML

- Supervised.
- Unsupervised.
- Reinforcement Learning.
- ~~• Semi-supervised.~~
- ~~• Self-supervised.~~



Supervised

- Learning from labeled data.



Supervised

Student	X(Input)			Y(Output)
	Test1 marks	Test2 Marks	Study hours	Final result
1	30	35	4	Pass
2	42	45	6	Pass
3	20	17	1	Fail
4	45	48	6	Pass
5	25	22	2	Pass
6	34	40	2	Pass
7	49	47	6	Pass
8	17	10	0	Fail
9	25	20	1	Fail
10	35	38	3	Pass



Supervised - Regression and Classification

- **Regression:** Quantitative variable (numbers).



Supervised - Regression and Classification

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 - Cannot be numerically measured.
 - Typically, there is no order.
 - Expresses a condition, a quality or a characteristic.



Supervised - Regression and Classification

?

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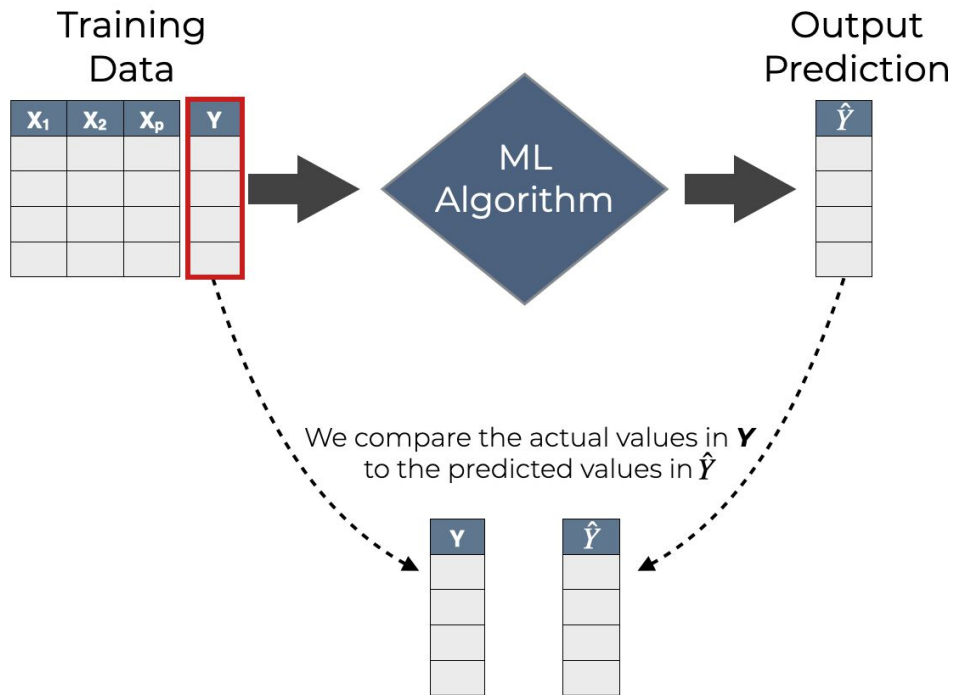
Supervised

X_1	X_2	X_3	X_p	Y



Here, the target variable Y can "supervise" how the algorithm builds the model

Supervised





Unsupervised (clustering)

In unsupervised learning,
there *is* a set of input variables



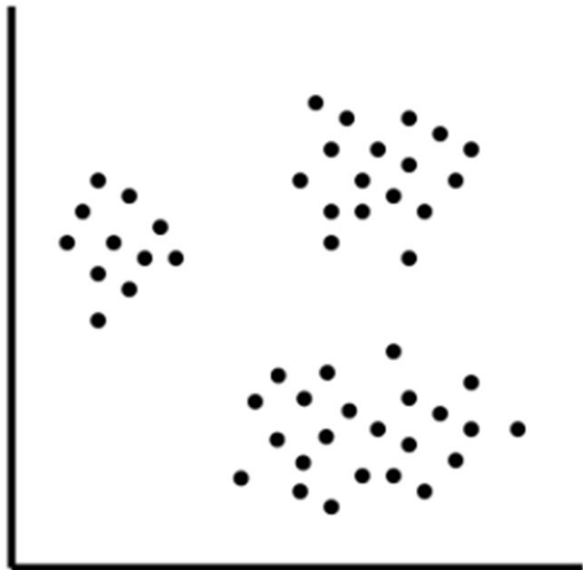
X_1	X_2	X_3	X_p	Y



But, there's no target
variable, Y .

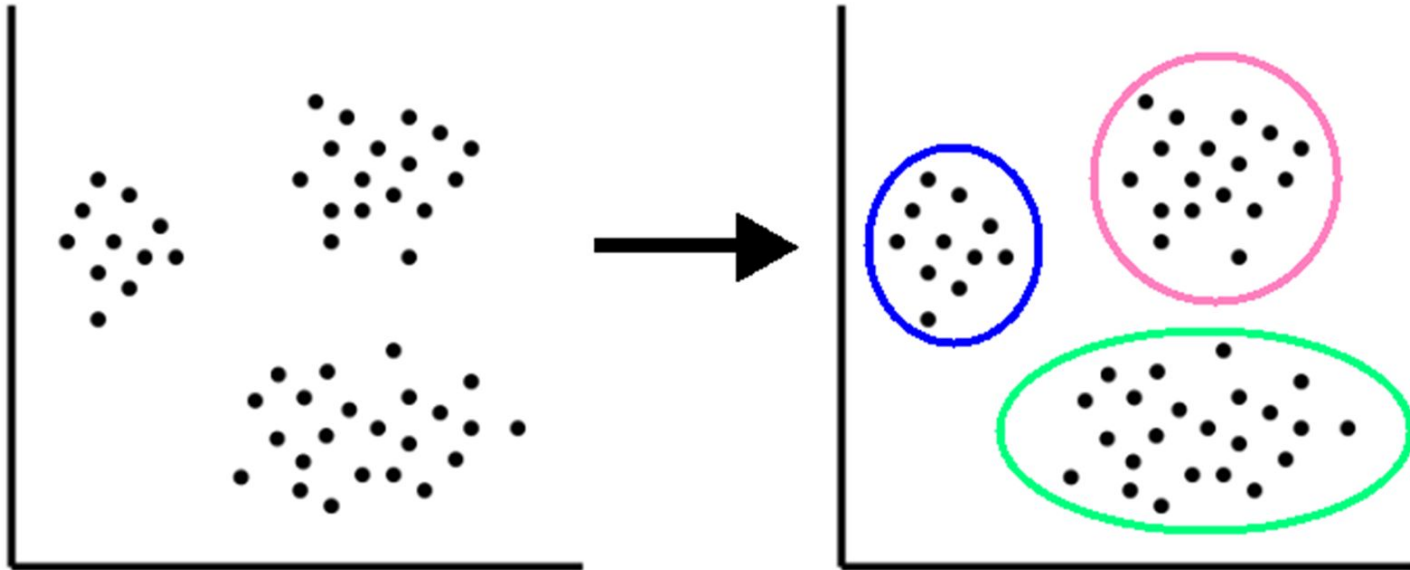


Unsupervised (clustering)

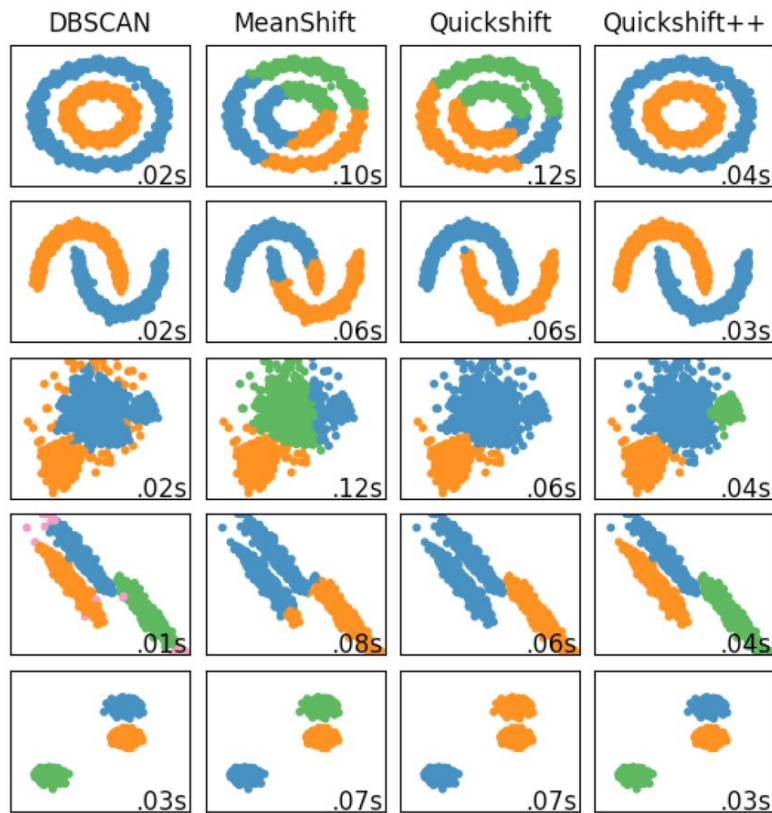


How many groups are
in the chart?

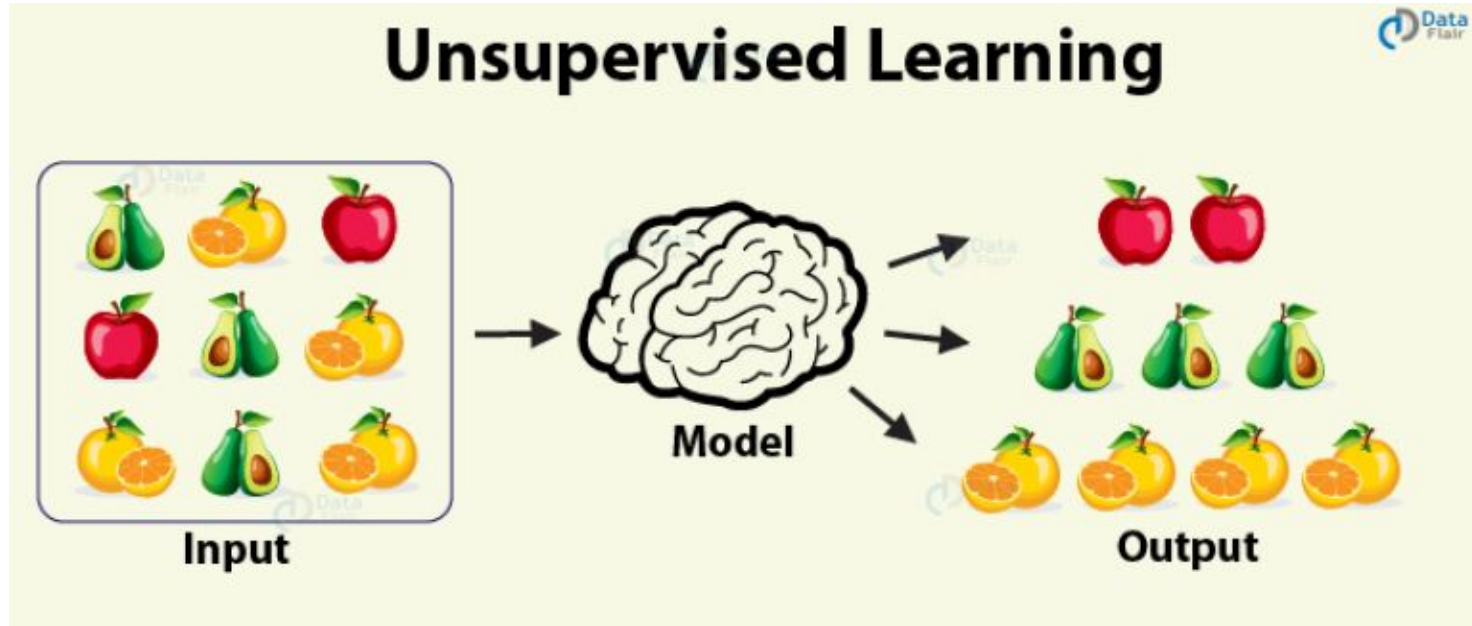
Unsupervised (clustering)



Unsupervised



Unsupervised





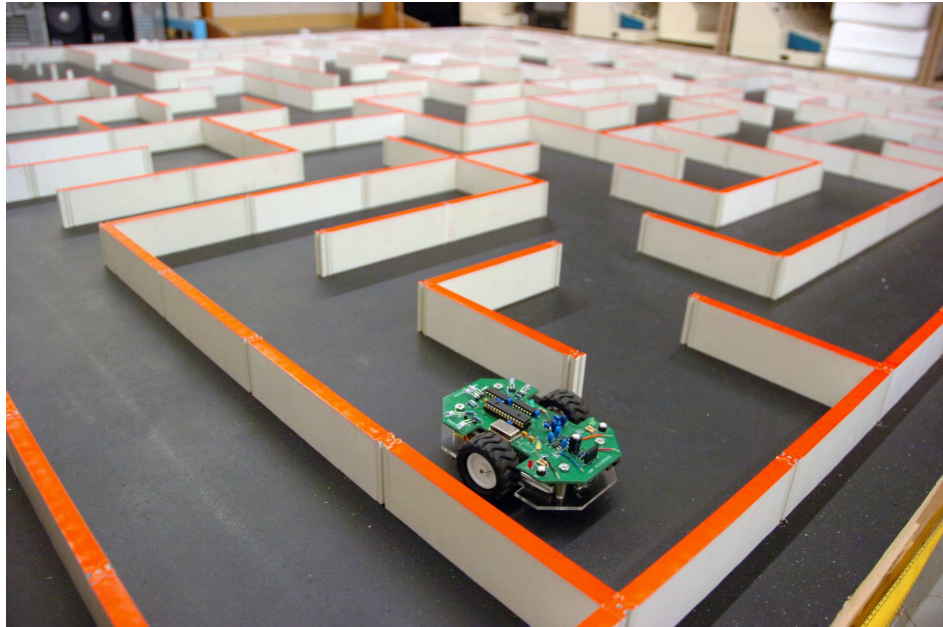
Reinforcement Learning

- State.
- Actions.
- Learning by trial and error.

Reinforcement Learning



Reinforcement Learning



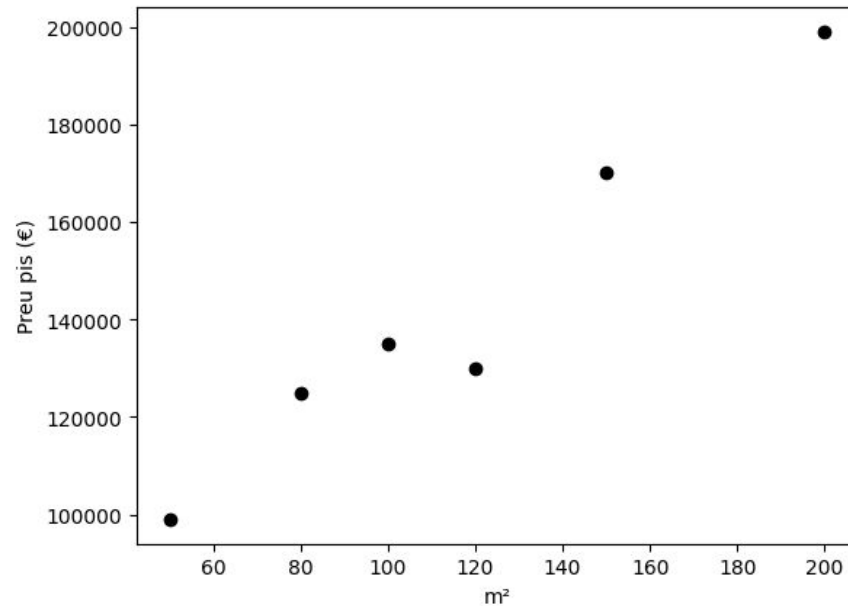


Types of ML – Summary

- Supervised
 - Regression
 - Classification
- Unsupervised
- Reinforcement Learning

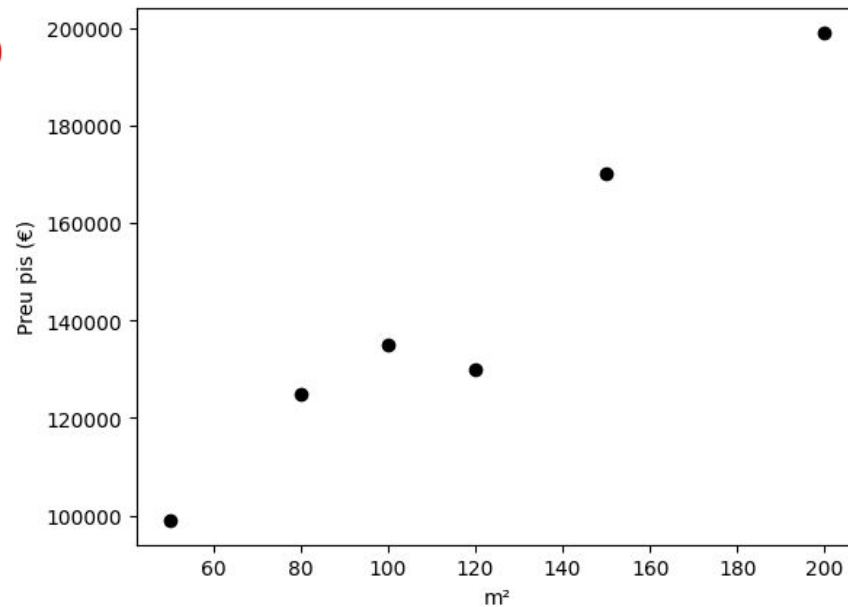


Humans also apply ML!



Data

y
(target)

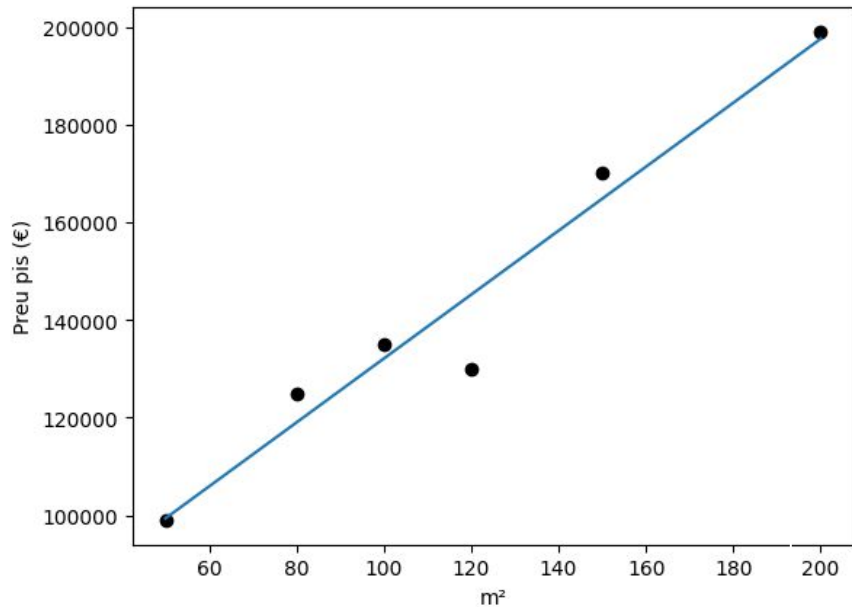


$$y = f(X) + e$$

X (features)

ML

y
(selling price)



$$\hat{y} = f(x_1) = w_0 + w_1 * x_1$$

x1 (m²)