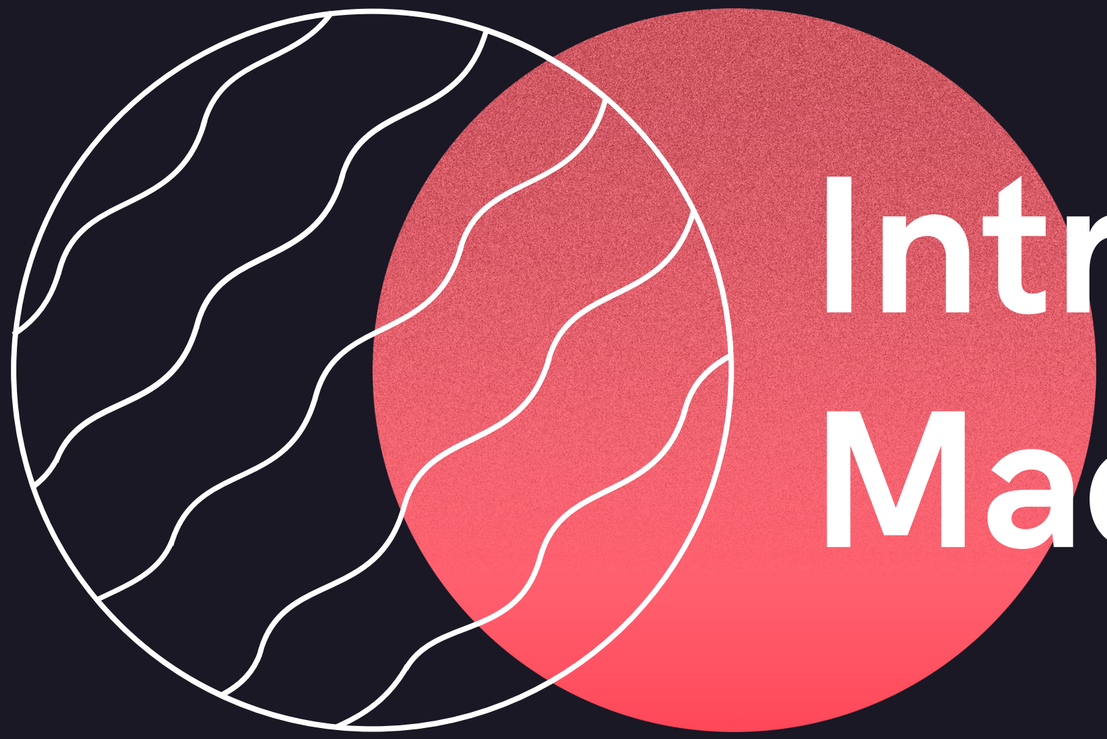
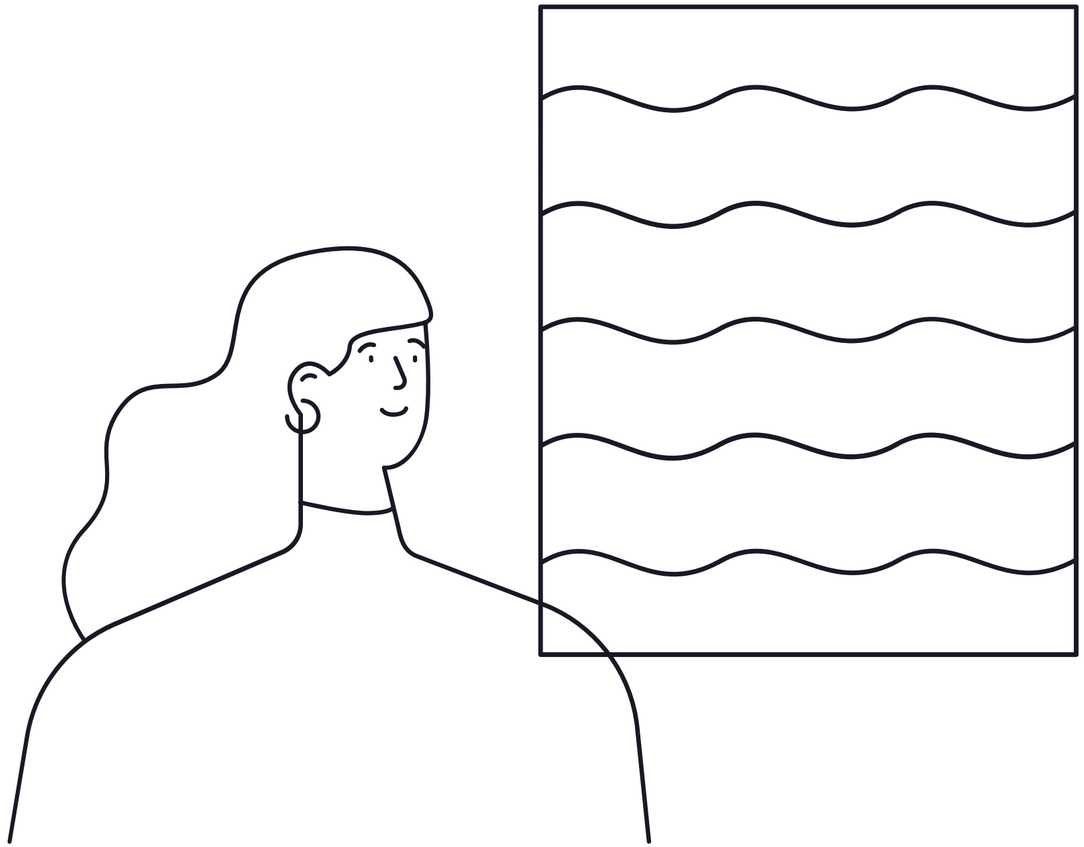


Introduction to Machine Learning

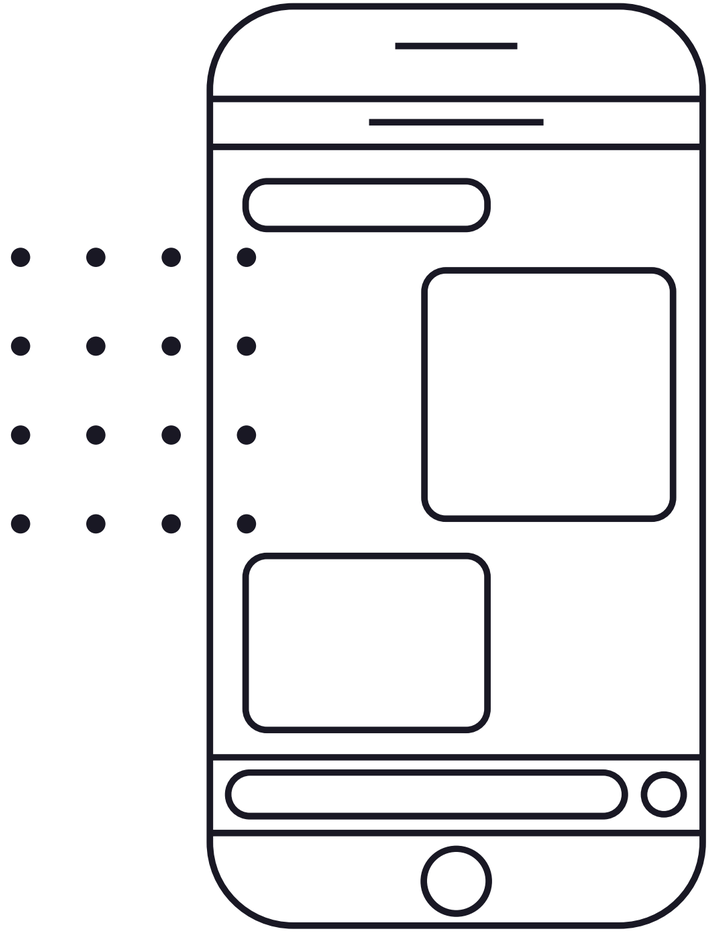
IRON HACK

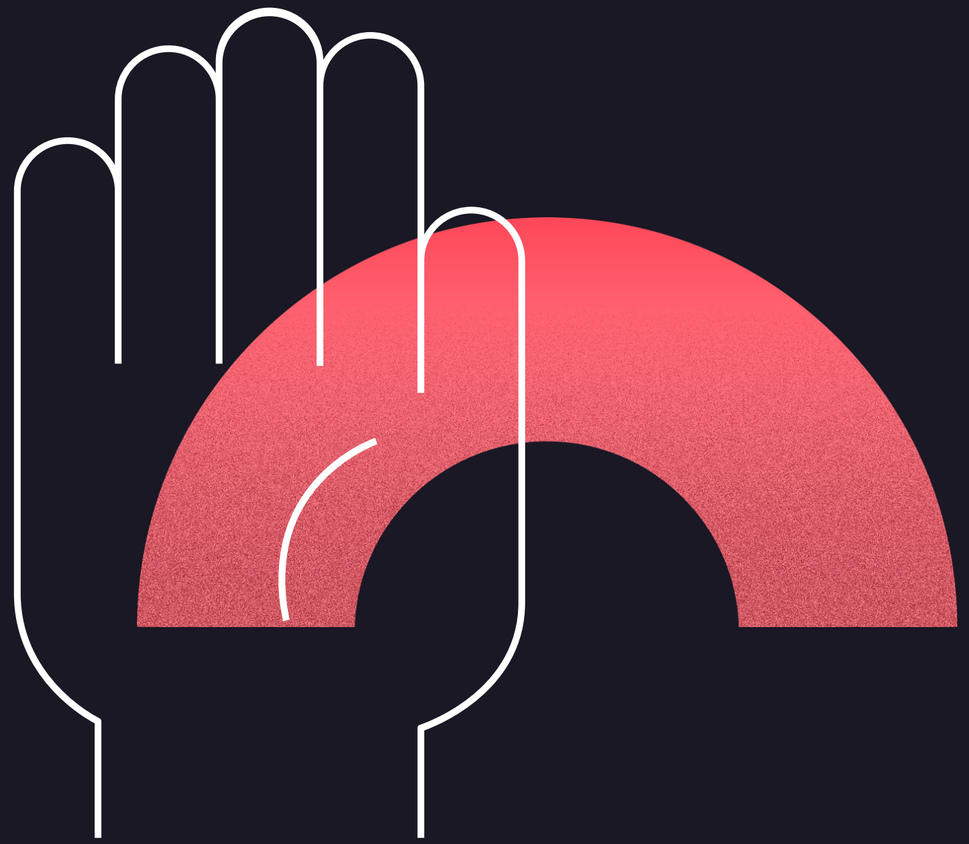
Is Machine Learning all around us?



ACTUALLY, IT IS!

- Automatic photo tagging / Image recognition
- Alexa, Siri, Voice and Text Recognition systems
- Fraud Detection
- Google Search
- Medical diagnostics
- Self-driving cars
- even Art…

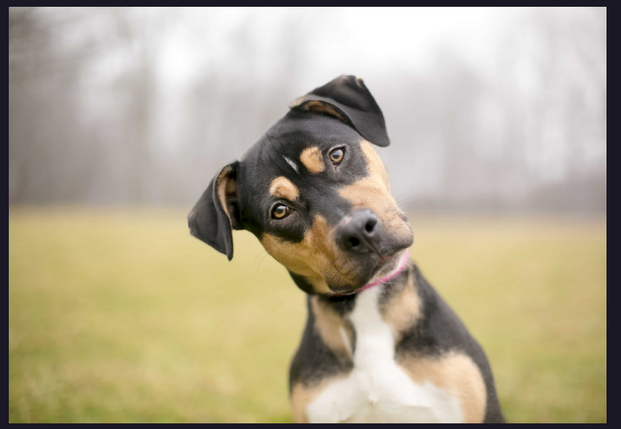


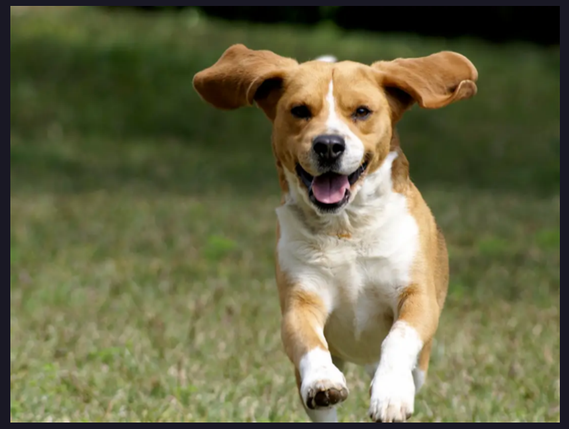
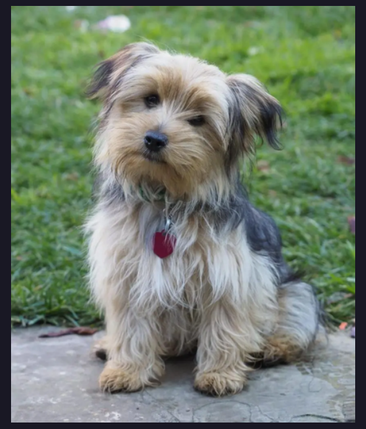
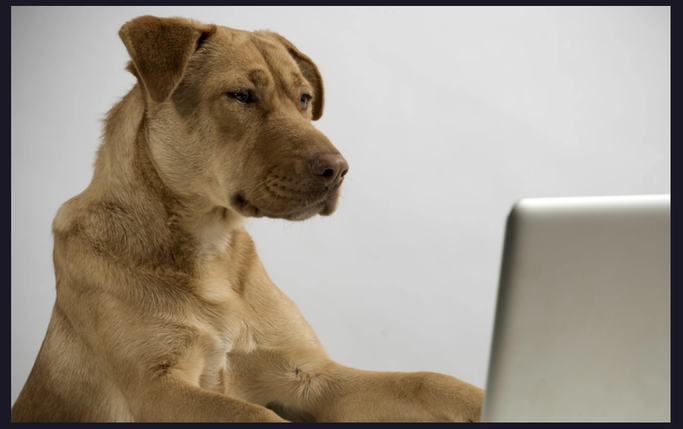
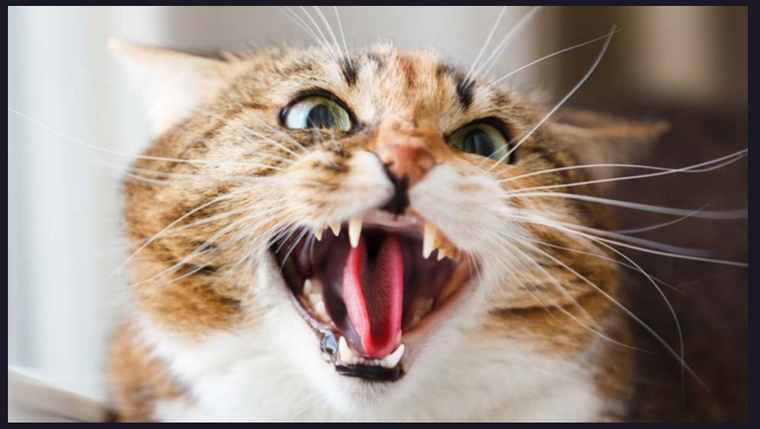


BUT WHAT IS IT?

What does it mean to say a computer learns?
What is learning anyway?





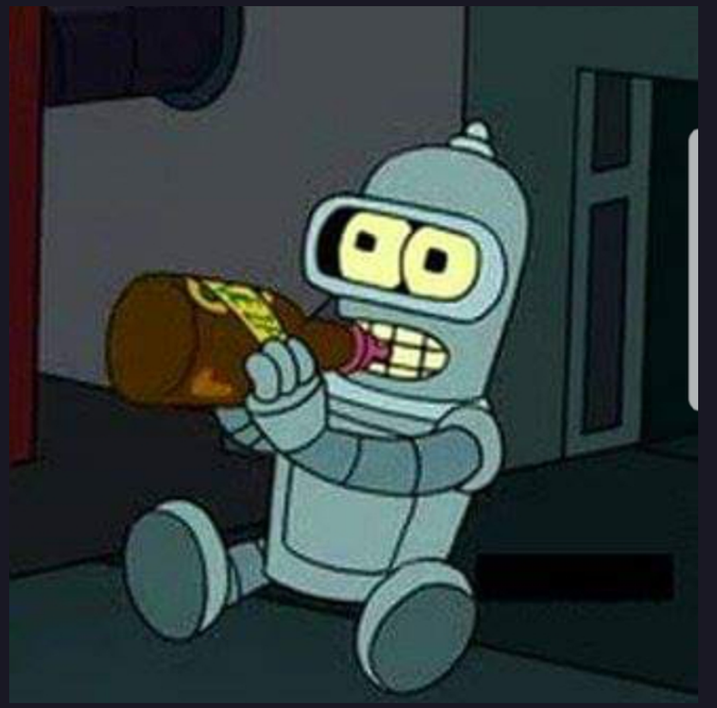







Cat or Dog?

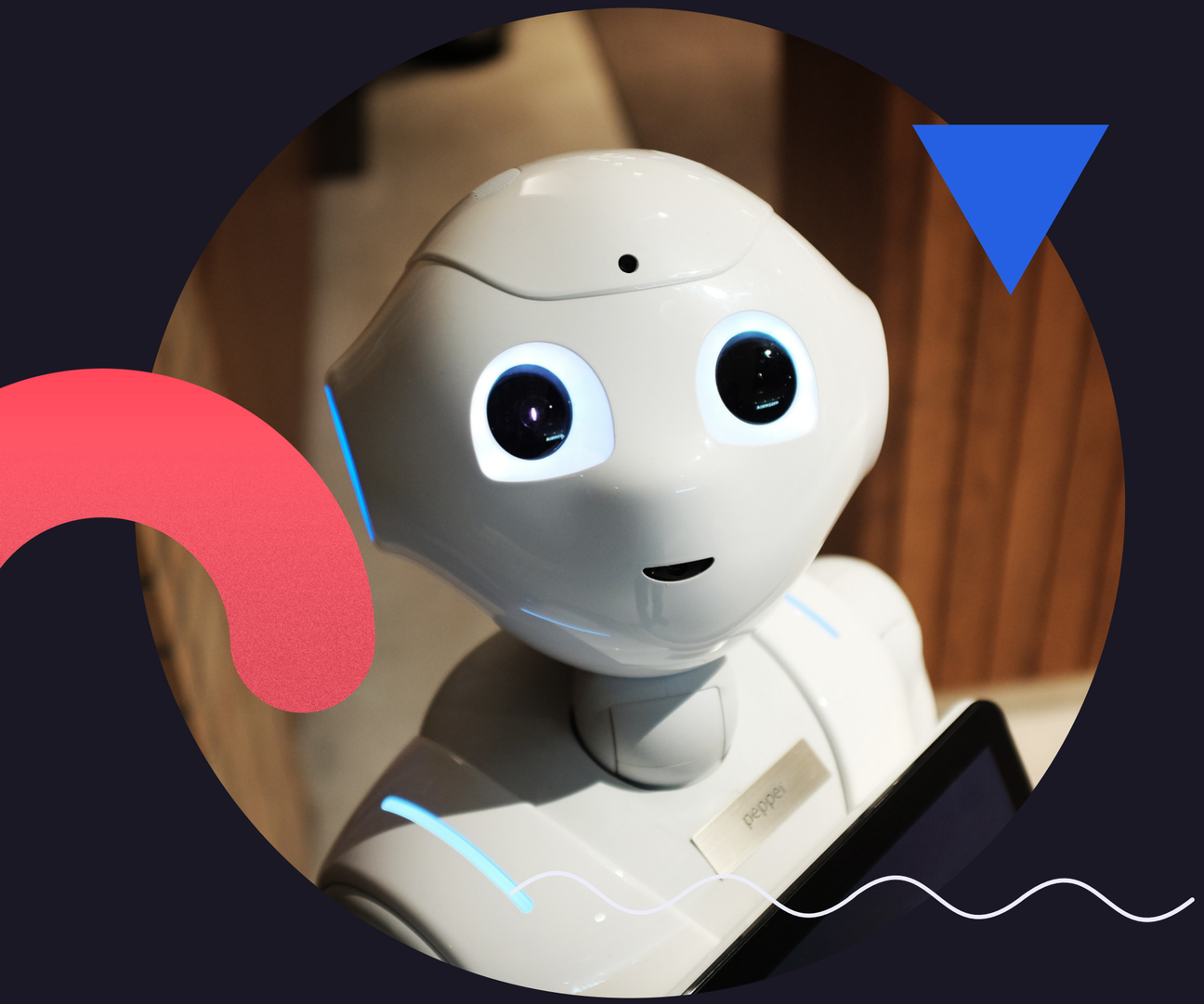
HOW WE LEARN *vs* HOW COMPUTERS LEARN

Cool Videos:



What is ML?

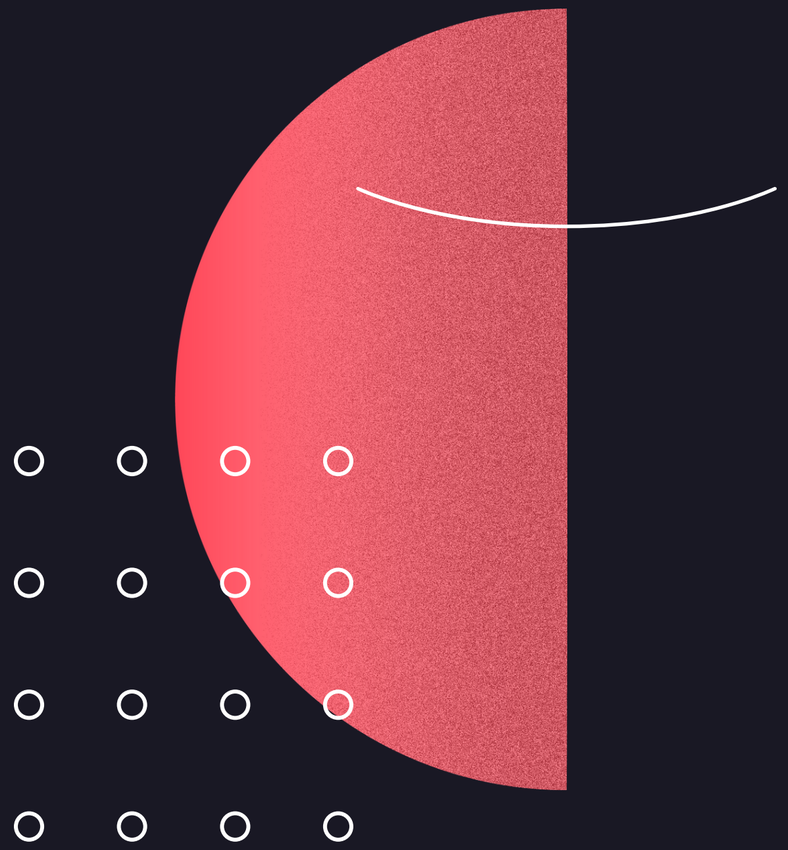
Teacher bot can't teach, teacher bot can test.



MACHINE LEARNING

"Algorithms that improve automatically through experience."

"Using data to anwer questions"

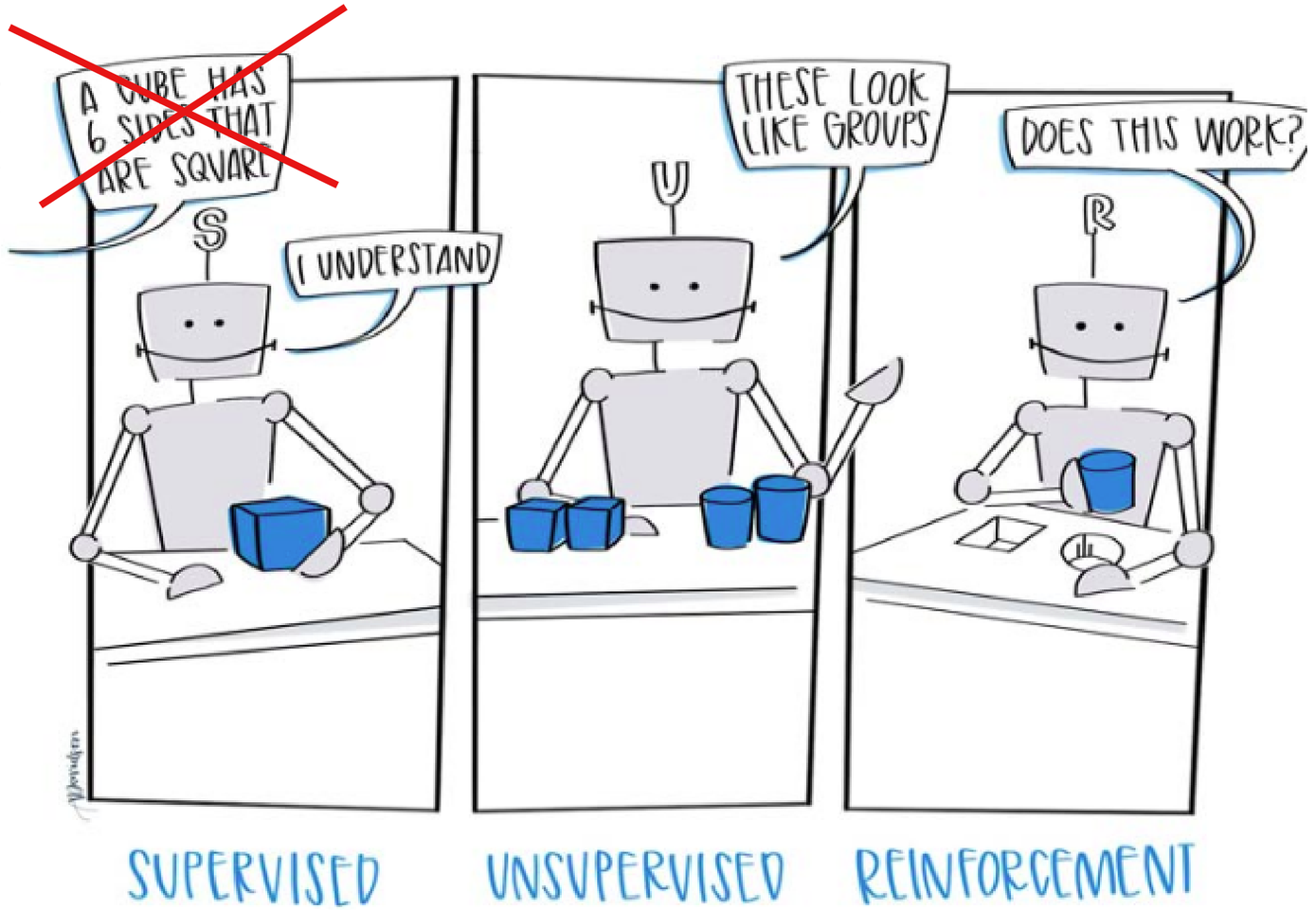


"A computer program is said to learn from experience E with respect to some class of tasks T and performance measure P if its performance at tasks in T, as measured by P, improves with experience E"

- Tom Mitchell, 1997

MACHINE LEARNING

THIS IS A CUBE



TYPES OF MACHINE LEARNING

Supervised

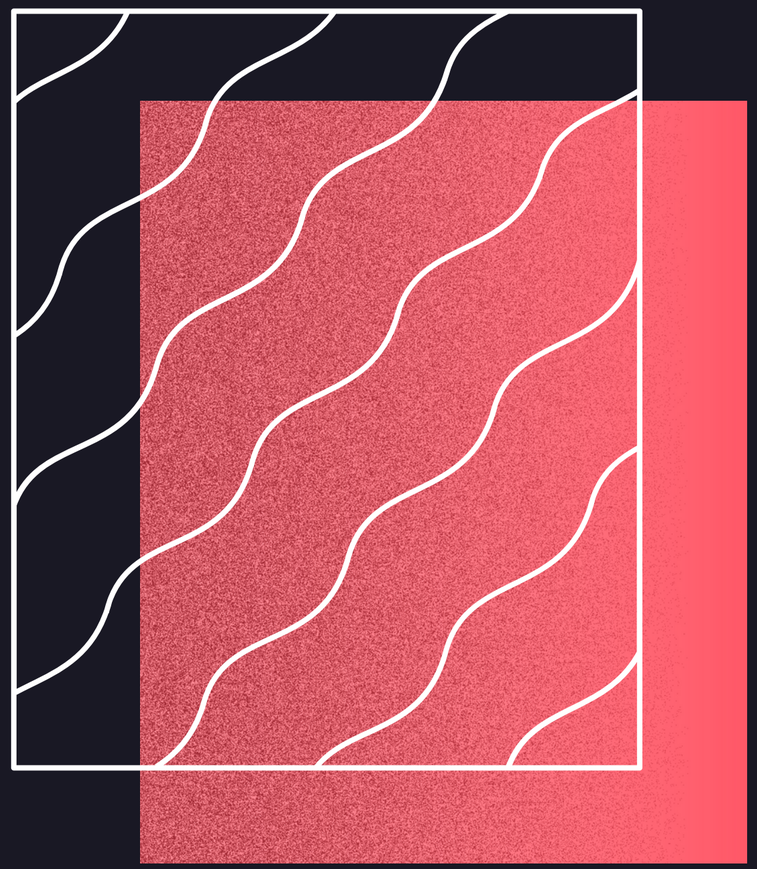
Model is trained against labeled data, that is, data to which the ground truth is known. When presented with data and a label, model infers patterns.

Unsupervised

There is no ground truth. Model looks for previously undetected patterns, with which to separate the different data points into different clusters.

Reinforcement

There is no ground truth either. Model action is valued and a reward or punishment is given accordingly. Model objective is getting the most rewards possible.



SUPERVISED LEARNING

- Regression

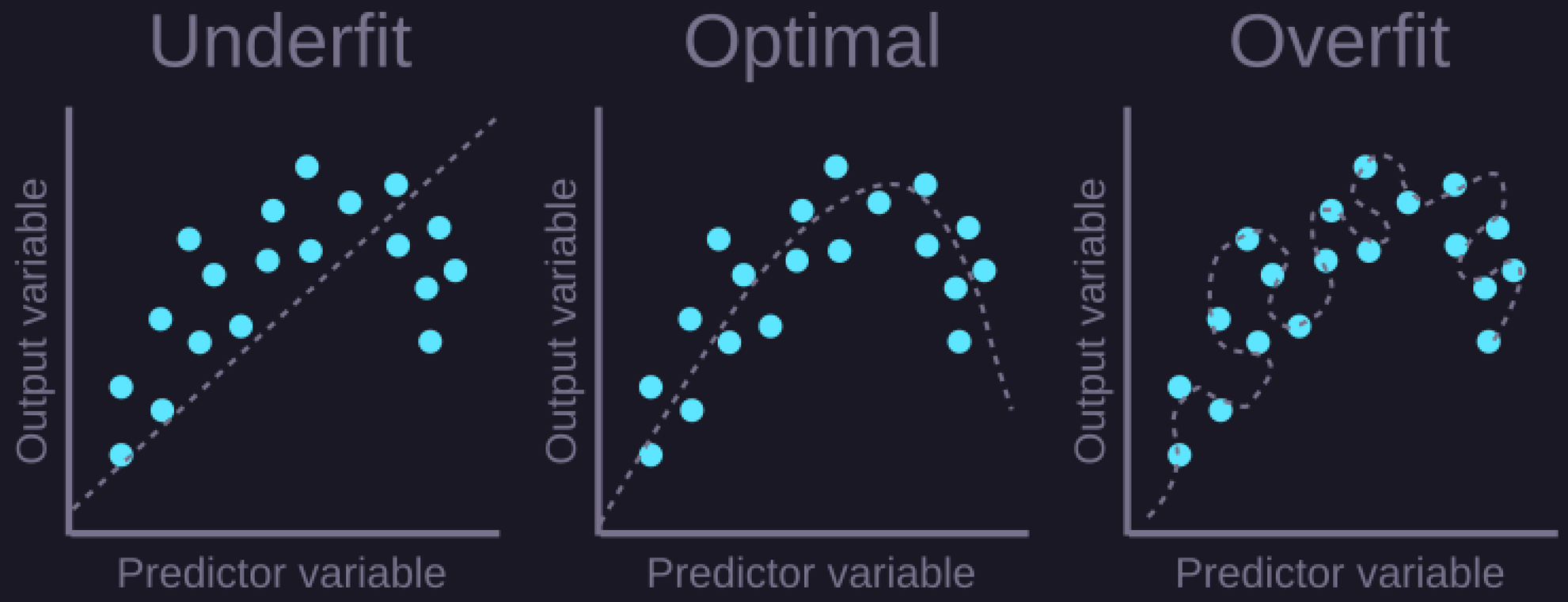
Predicting a quantity on a continuous scale.
May have real or discrete input variables.

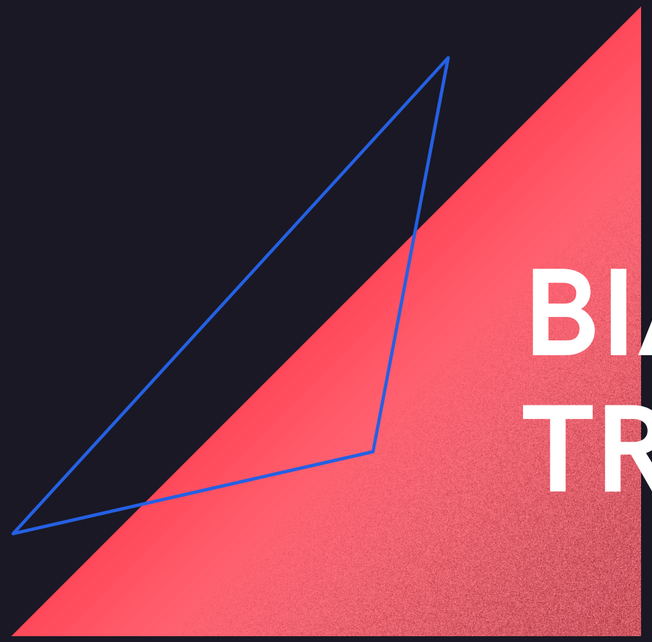
- Classification

Predicting a class or label.
May have real or discrete input variables.

  - Two-class / Binary
  - Multi-class
  - Multi-Label

How fit is my model?





BIAS VARIANCE TRADE-OFF

- Bias

Generalization error due to bad assumptions. High bias tend to underfit.

- Variance

Excessive sensitivity to small variations in data. High variance tend to overfit.

Error = Bias + Variance + Irreducible Error