A brief Introduction to machine learning

By Rahel Stewart

What is machine learning?

- Machine learning is the practice of using algorithms to analyze data, learn from that data, and then make a determination or prediction about new data.
- What is Artificial Intelligence : is an Intelligent agent that perceives its environment and makes decisions to maximize chances of achieving its goal.

How does it differ from a traditional algorithm?

- Traditional Algorithm: Input + program = output
- Machine Learning: input + output = program

The Machine learning process

- Preparing that data
- Choosing a model
- Training
- Evaluation
- Parameter tuning
- Prediction

ice-cream-cone tree giraffe
kangaroo satellite dish camel carrot
lobster flower with stem chandelier
santa claus chair dog rooster person sitting
fan windmill diamond parachute standing bird

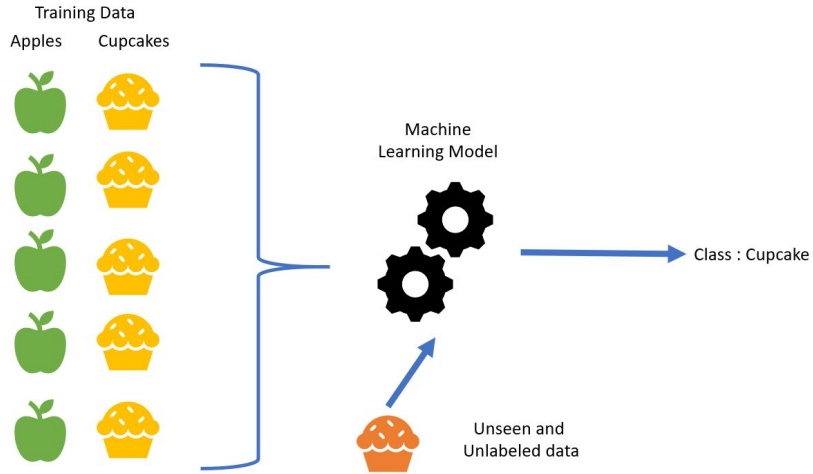
Types of machine learning

- Supervised Learning
- Unsupervised Learning
- Reinforcement Learning

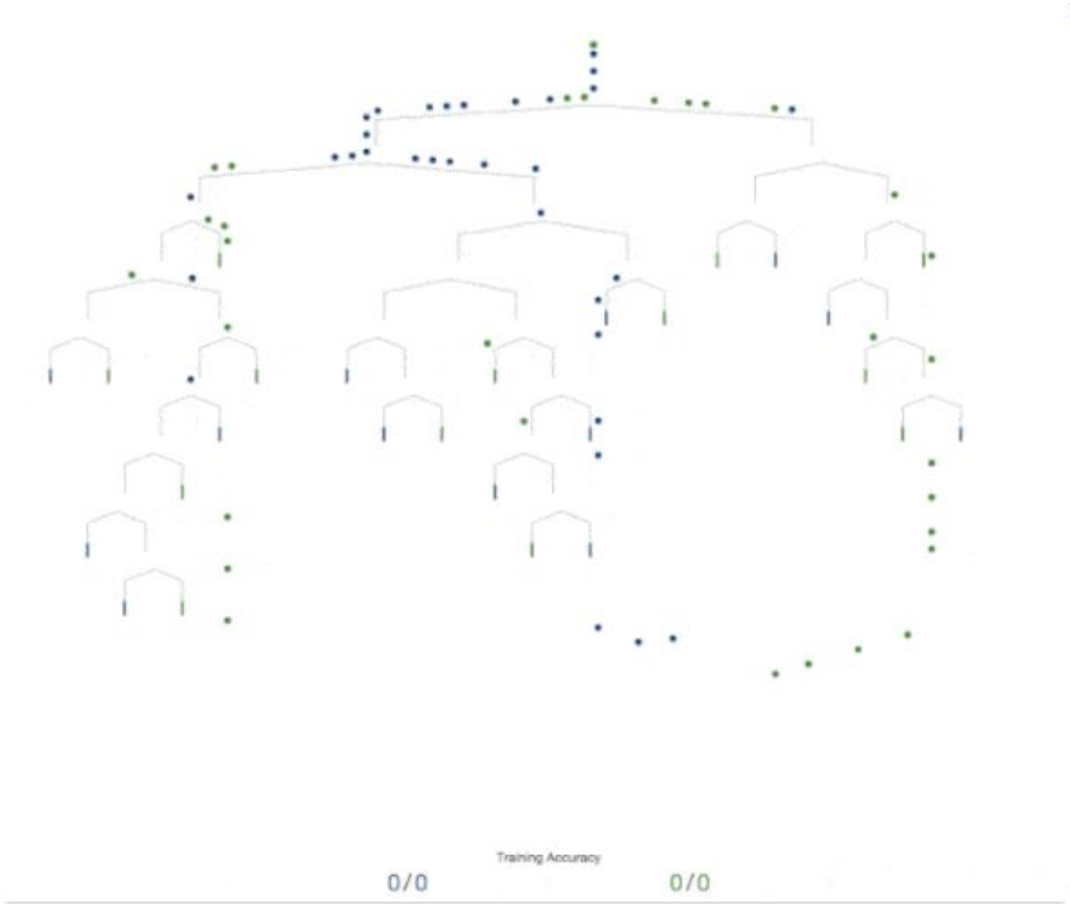
Supervised learning

- Is a subset of machine learning algorithms that learn and makes inferences from data that has been labelled.
- Two main sub categories are classification and regression

Classification	Regression
Naive bayes	Linear Regression
K Nearest Neighbours	Logistic Regression
ANN	Decision trees
	Ensemble methods
	ANN



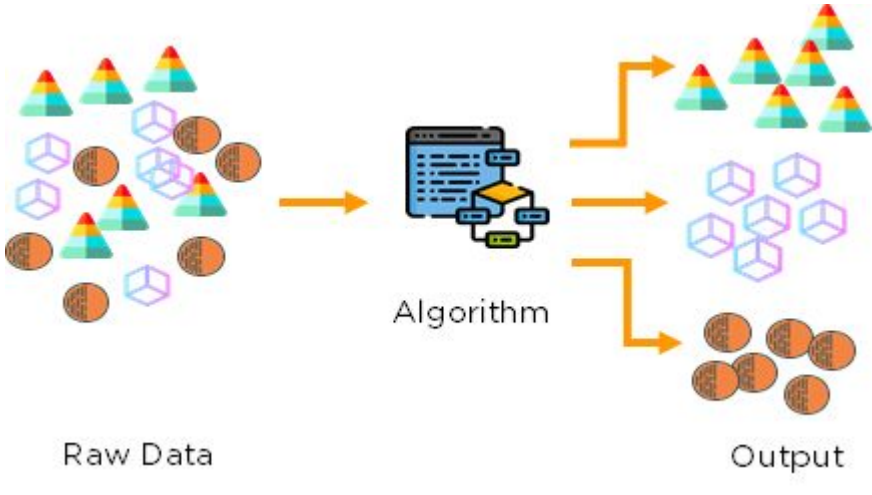
Decision Tree



Unsupervised learning

- Unsupervised learning is a machine learning technique that finds and analyzes hidden patterns in unlabeled data.
- Three main sub categories are clustering, Dimensionality reduction and Association rule learning.

Clustering	Dimensionality Reduction	Association rule learning.
K-means	PCA	Apriori
Mean shift	LDA	Fp growth
ANN	Auto encoders	ANN
	ANN	



Reinforcement learning

Reinforcement learning is learning that involves the interaction between an agent and its environment to meet some goal. This interaction results in the agent changing its state and recieving a reward or penalty based on its state.

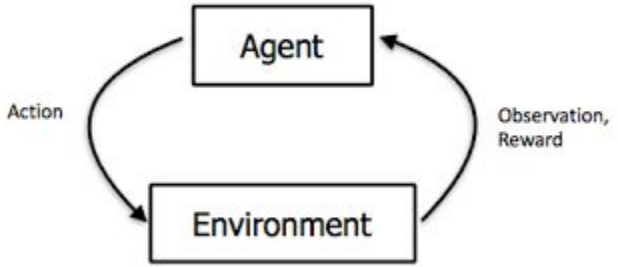
- Learns through trial and error
- Environment has rules

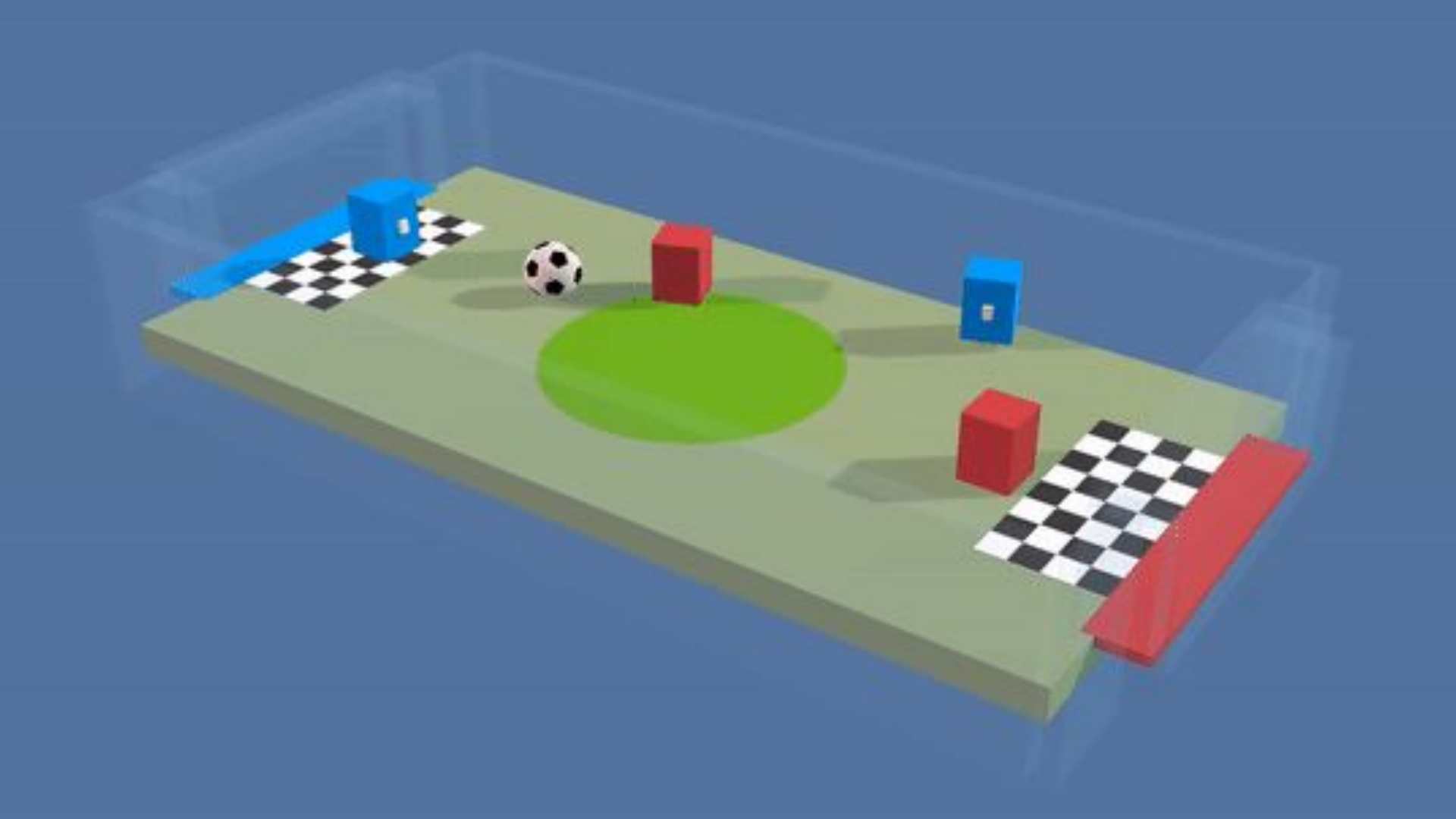
<u>Algorithms</u>

Deep Q network

Q learning

State Action reward state action



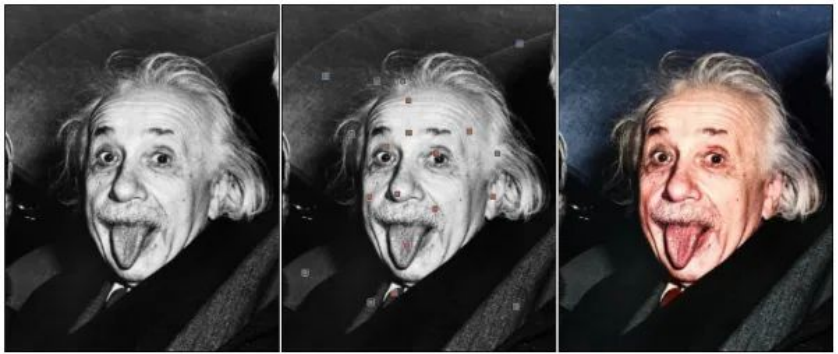


Applications of machine learning

- Image Recognition/Classification
- Sentiment Analysis
- Email Classification and spam filtering
- Speech recognition
- Recommendation Systems
- Medical Diagnosis

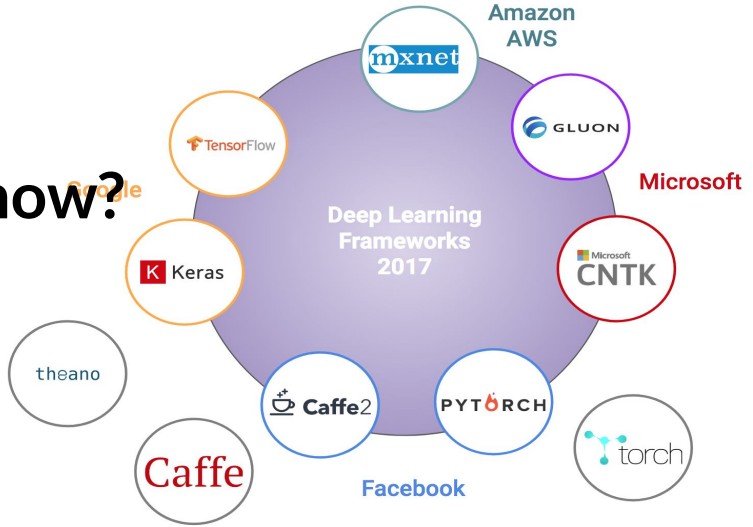
Cool Applications of machine learning

- Self driving cars
- Deep fakes
- Art
- Beating humans at games
- Creating music
- Generating sound from videos with no sound
- Black and white images to colored



Why machine learning is popular now?

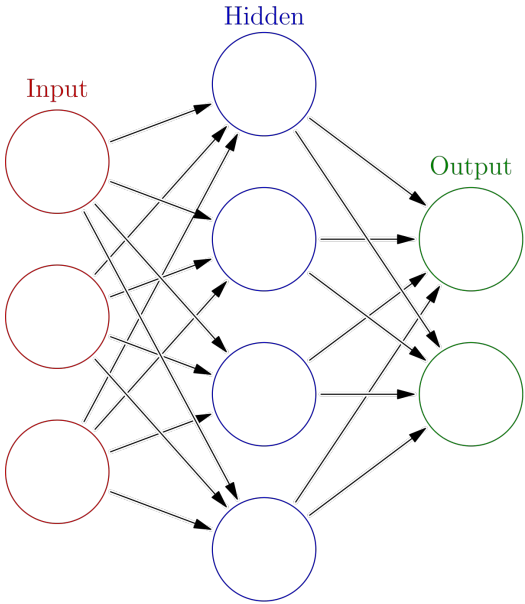
- Better algorithms & understanding
- Computing power (GPUs, TPUs)
- Open source tools and models
- Online communities

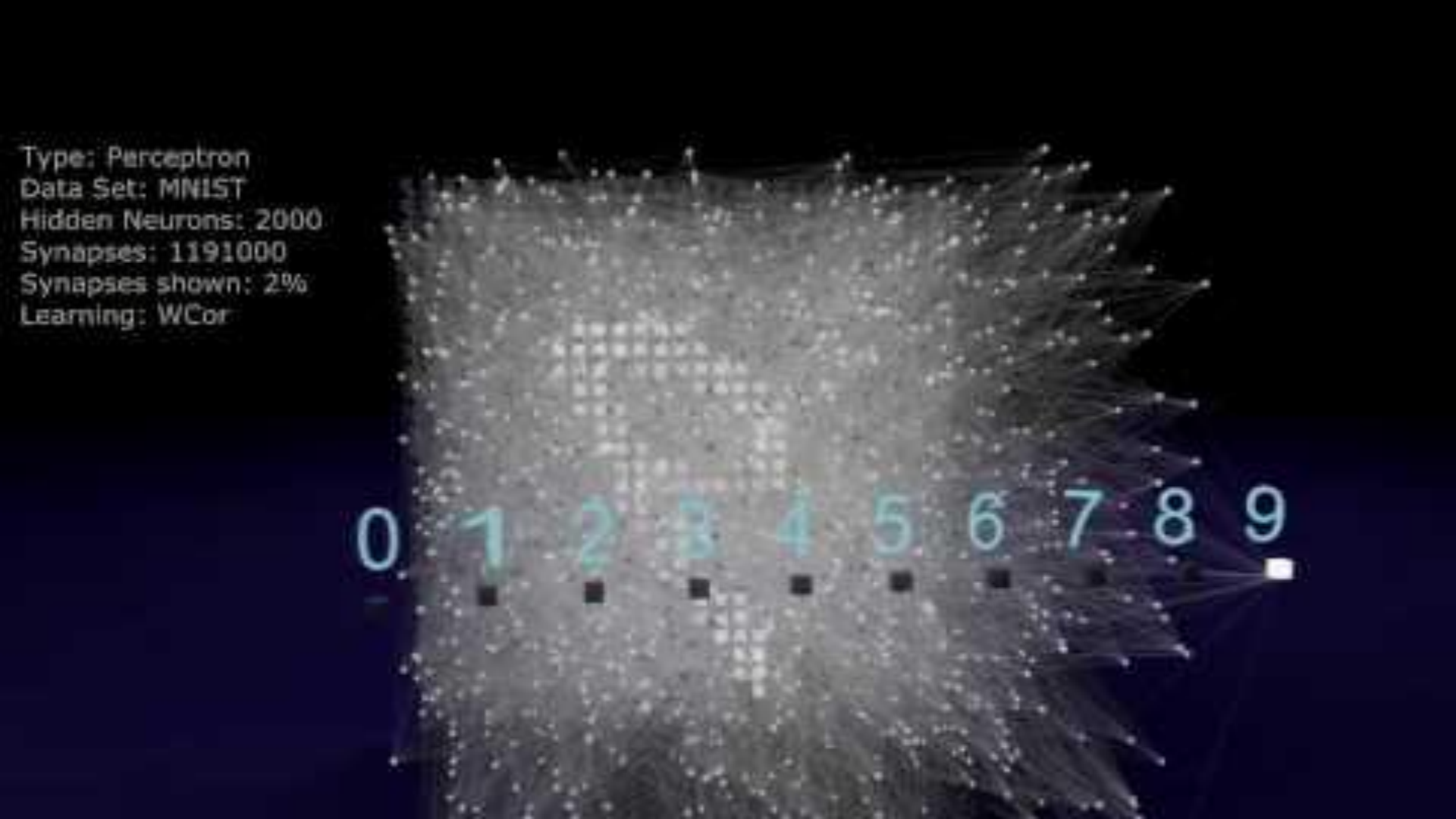


Deep learning

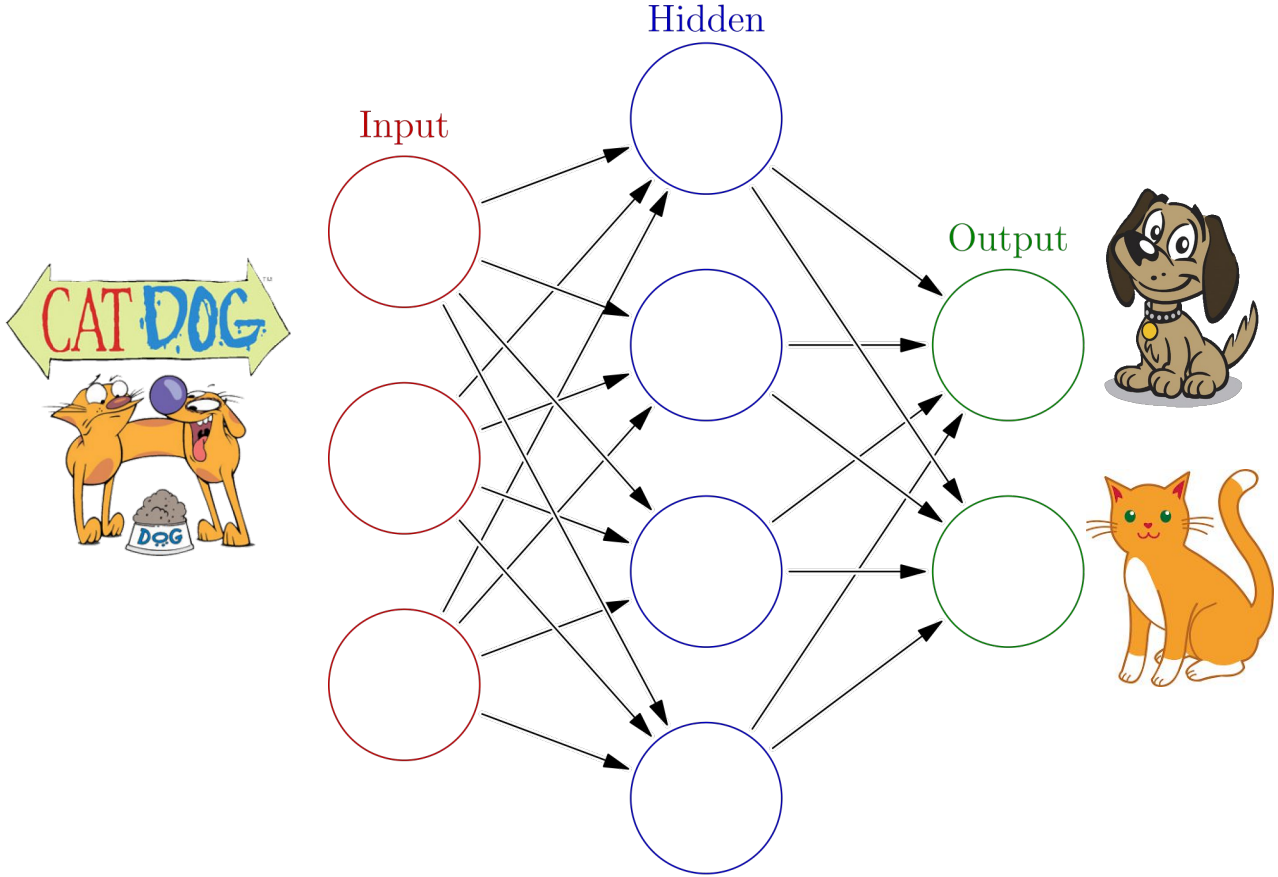
Deep learning is a subfield of machine learning that uses algorithms and networks inspired by the brain to extract patterns in data

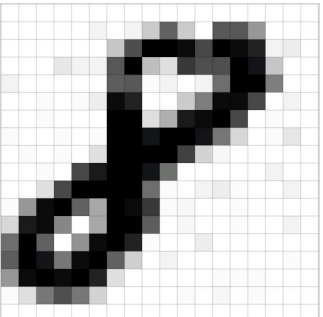
- Many layers of artificial neurons
- Structured and unstructured data
- Learning can be supervised or unsupervised




Type: Perceptron
Data Set: MNIST
Hidden Neurons: 2000
Synapses: 1191000
Synapses shown: 2%
Learning: WCor
0 1 2 3 4 5 6 7 8 9

How do machines learn?





Beginner Learning resources

Fast ai

machine learning mastery

Introduction to machine learning

3Blue1Brown

Data Science Central

Medium Machine Learning

Siraj Raval

Python for Data Analysis

Towards data science

Deeplearning.ai


That's all Folks!