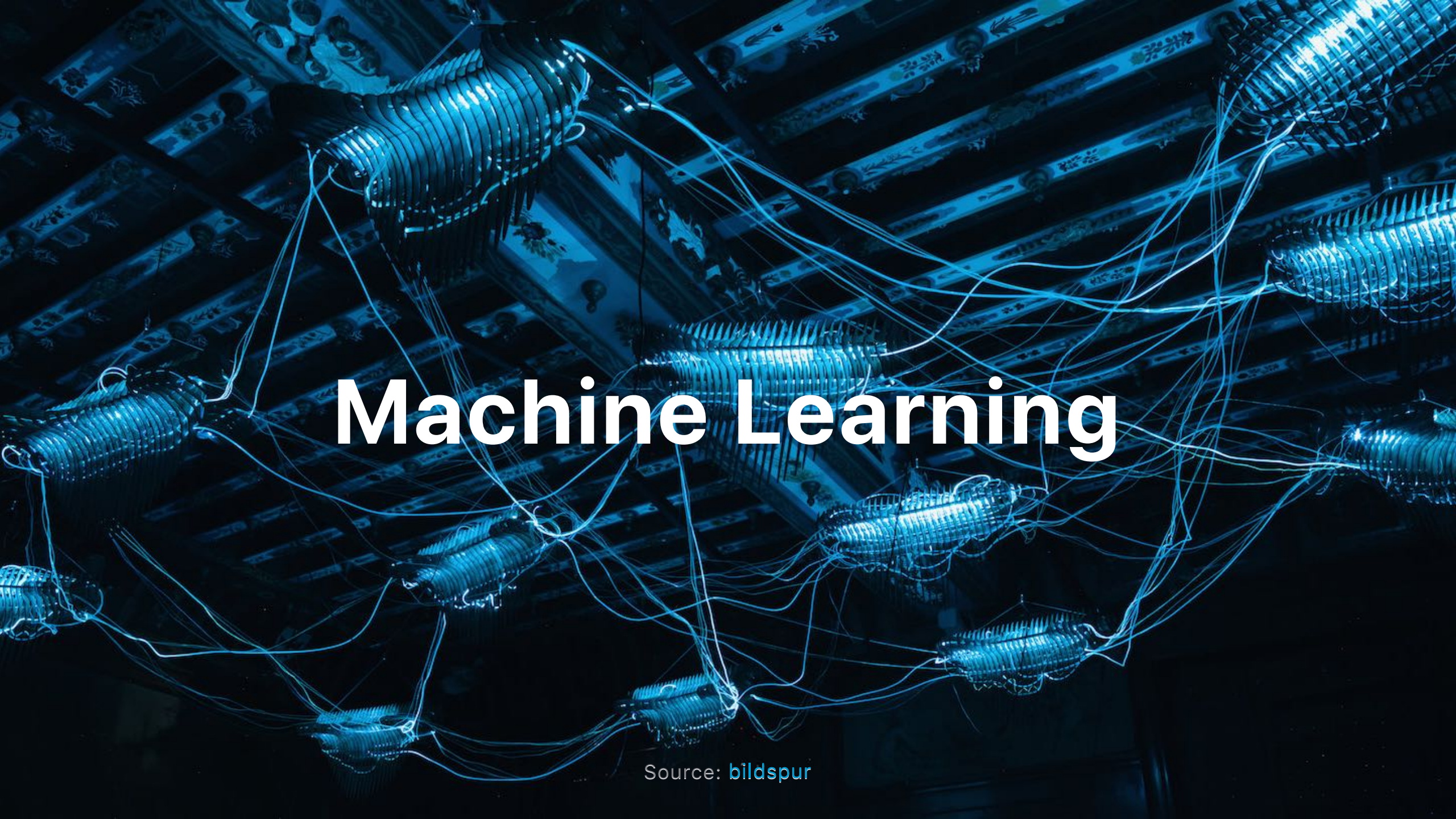
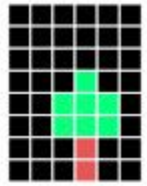



Source: bildspur

# Traditional

Problem

# Machine Learning



find tree

prepare
a dataset

train

write
algorithm

threshold()
blur()
brightness()

ml
algorithm

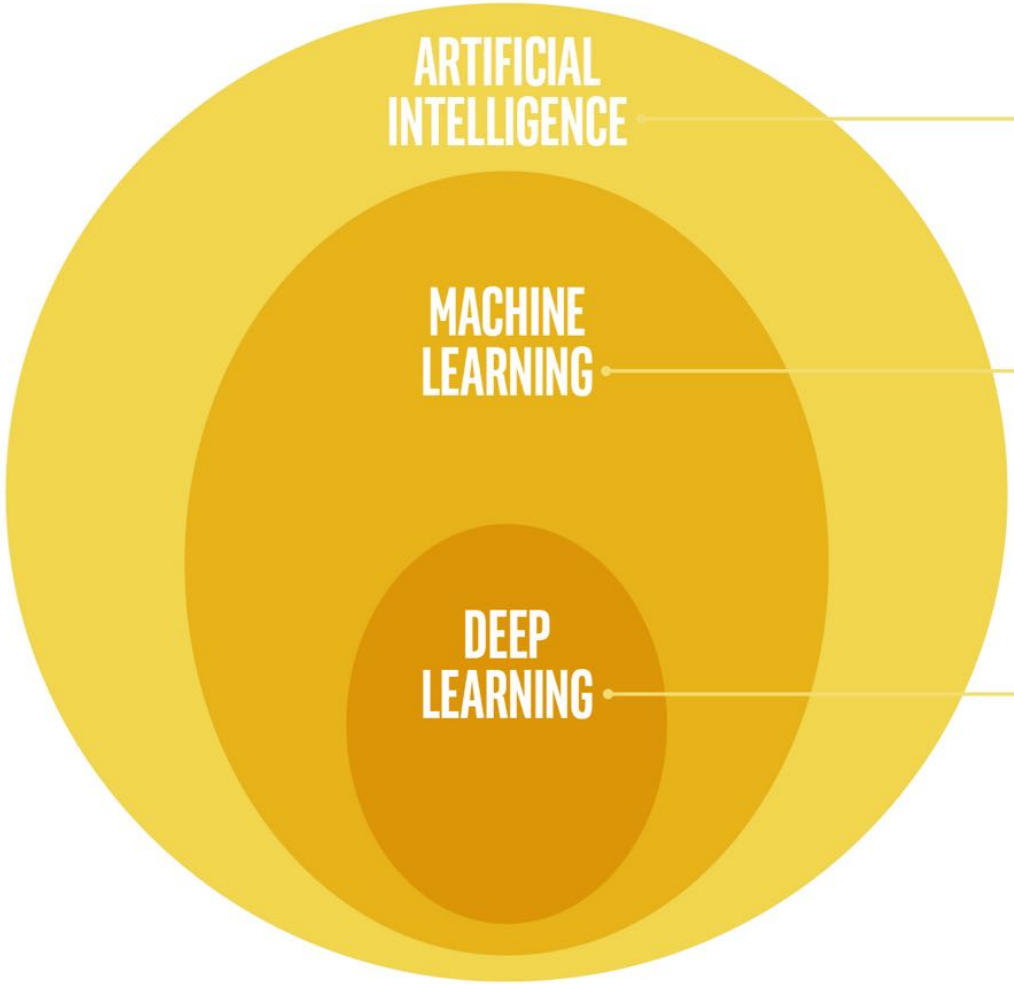
location: (x,y)

# Machine Learning

- Get & prepare data
- Select ML-algo ■
- Train / Test / Validate

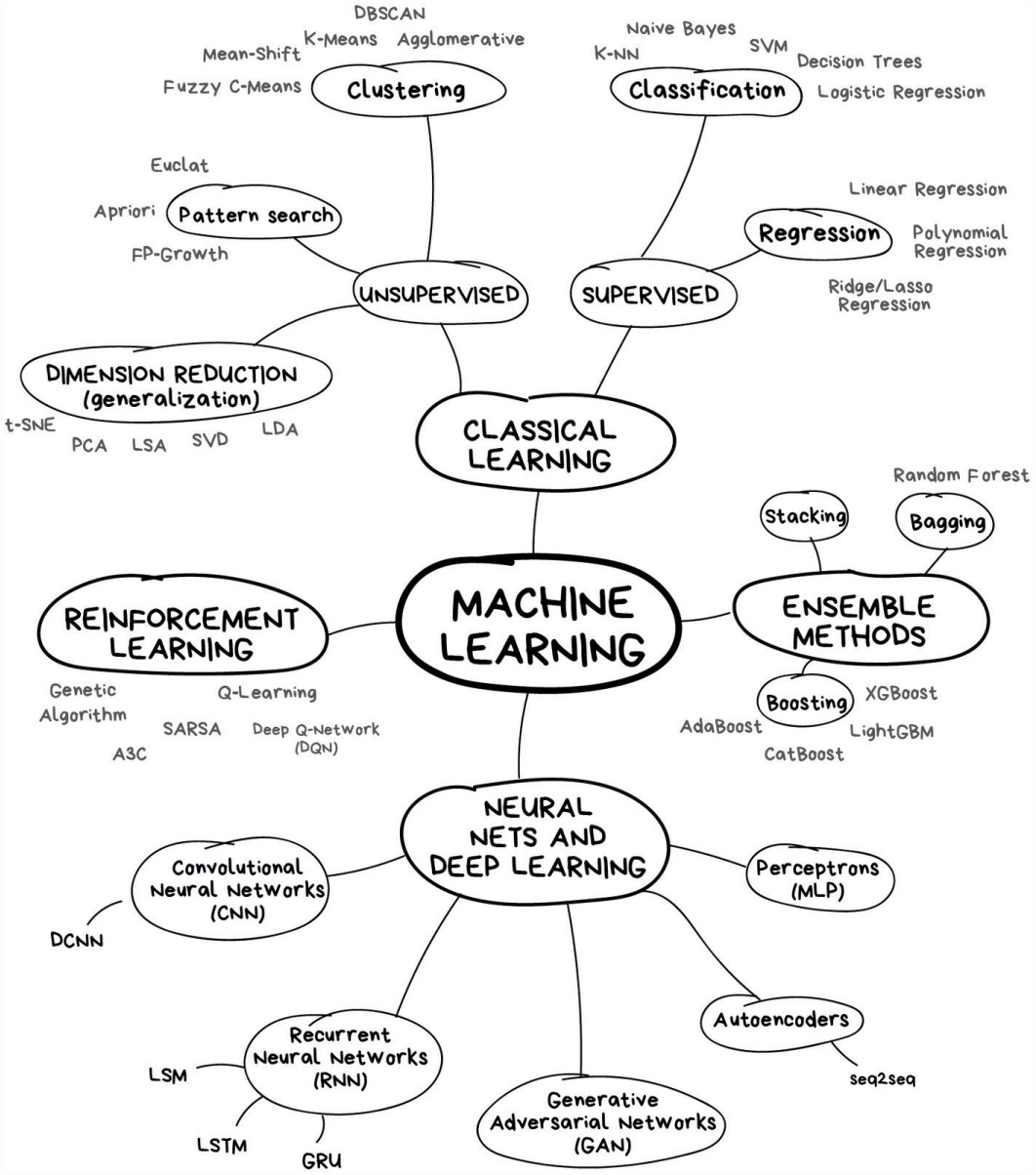
# Machine Learning Frameworks

# ARTIFICIAL INTELLIGENCE TERMS




- **AI** is an umbrella term for machines capable of perception, logic, and learning.
- **Machine learning** employs algorithms that learn from data to make predictions or decisions, and whose performance improves when exposed to more data over time.
- **Deep learning** uses many-layered neural networks to build algorithms that find the best way to perform tasks on their own, based on vast sets of data.

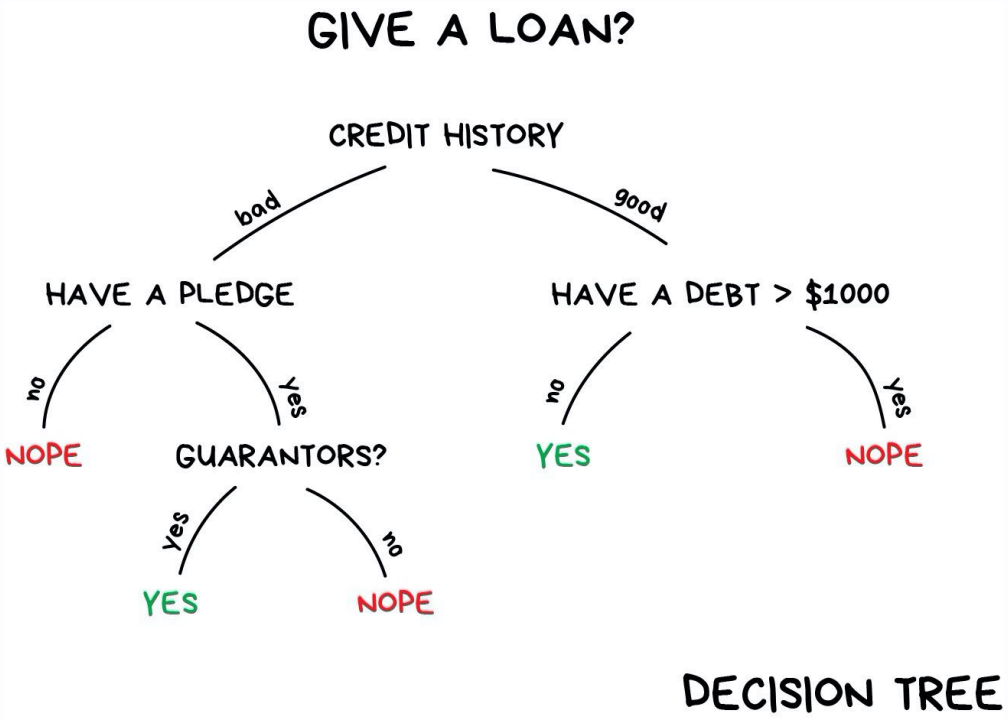
Source: Intel




Source: @noeliagorod

# Classic ML

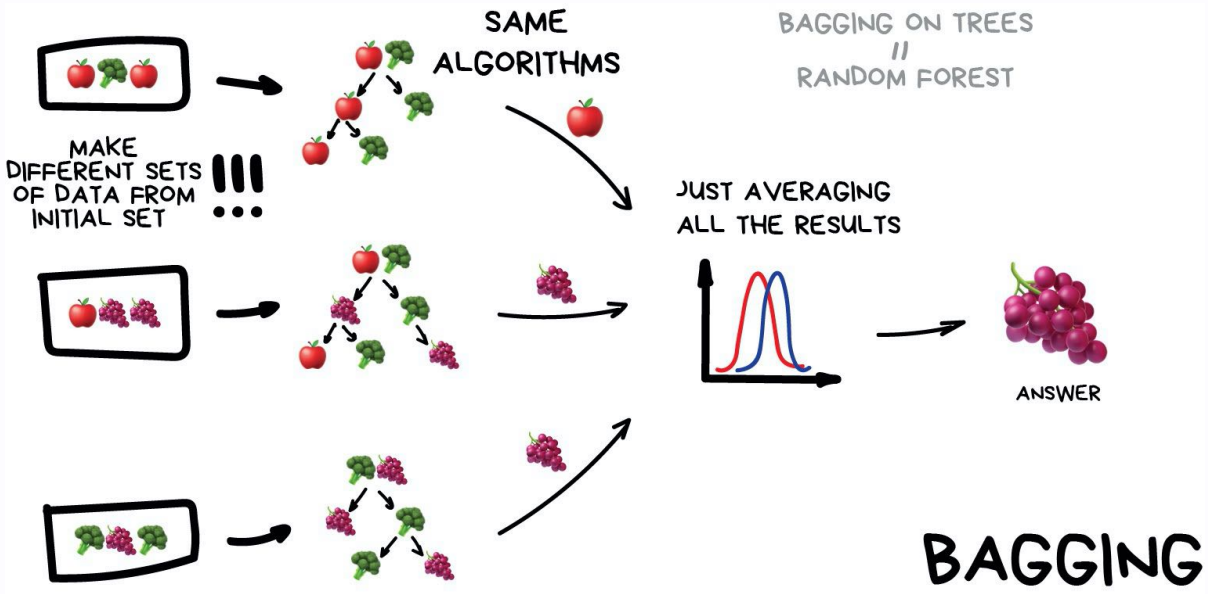
- Statistics 📈
  - Logistic Regression
  - Naive Bayes
  - Decision Trees
  - ...




Source: @noeliagorod

# Ensemble Methods

- multiple not-so-good methods
- = good method
- bagging / boosting

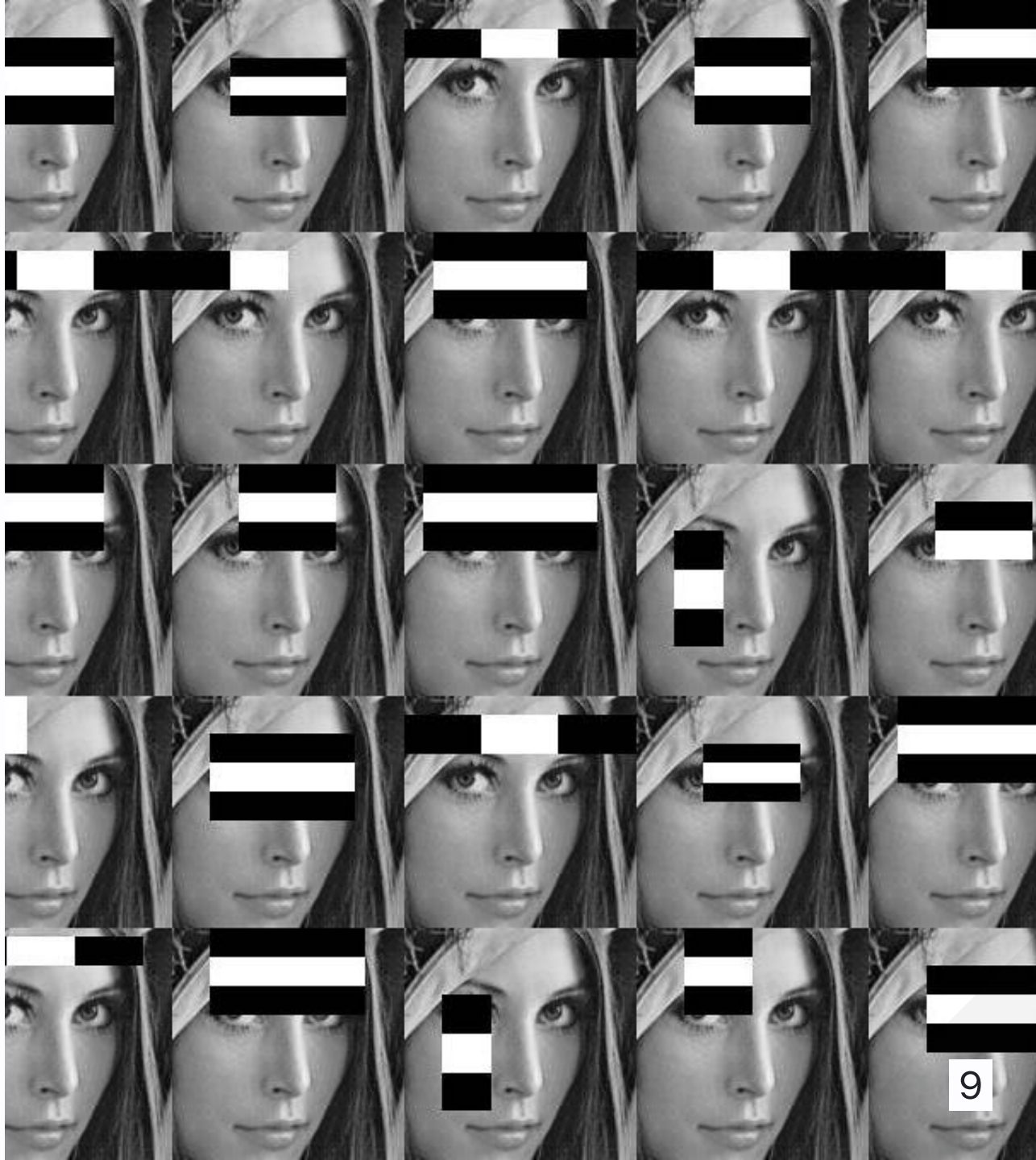



Source: Noelia González

# Ensamble Methods & CV

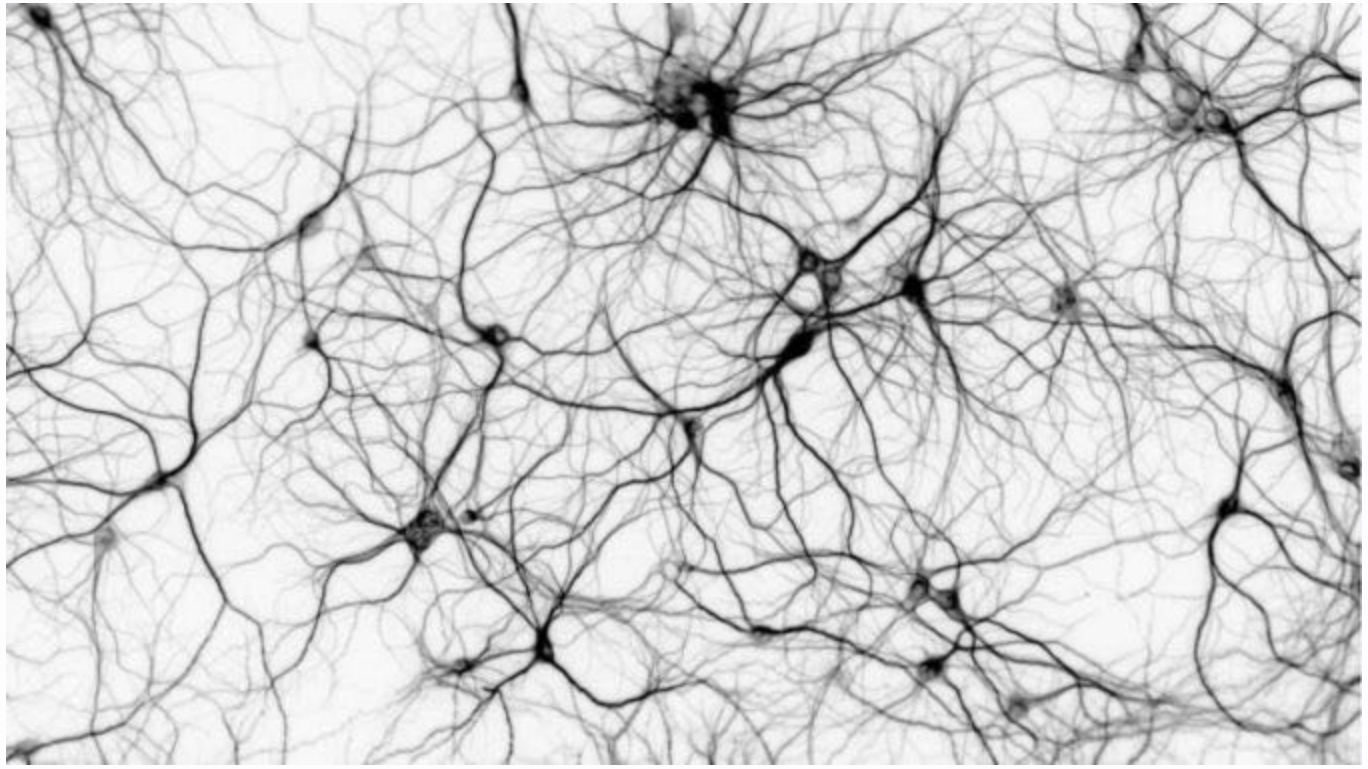
- facial detection
- fast and simple
- classify each part of an image

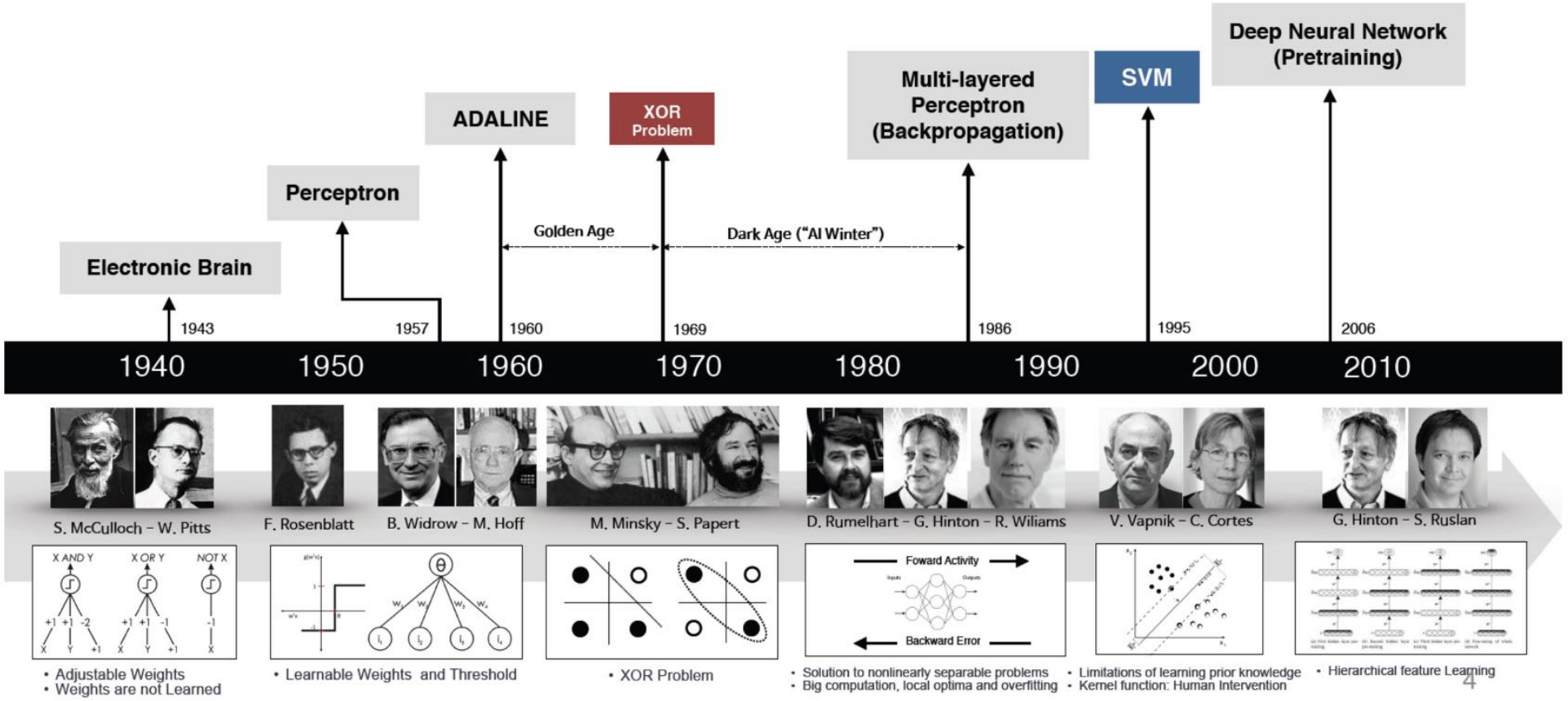
Source: Greg Borenstein



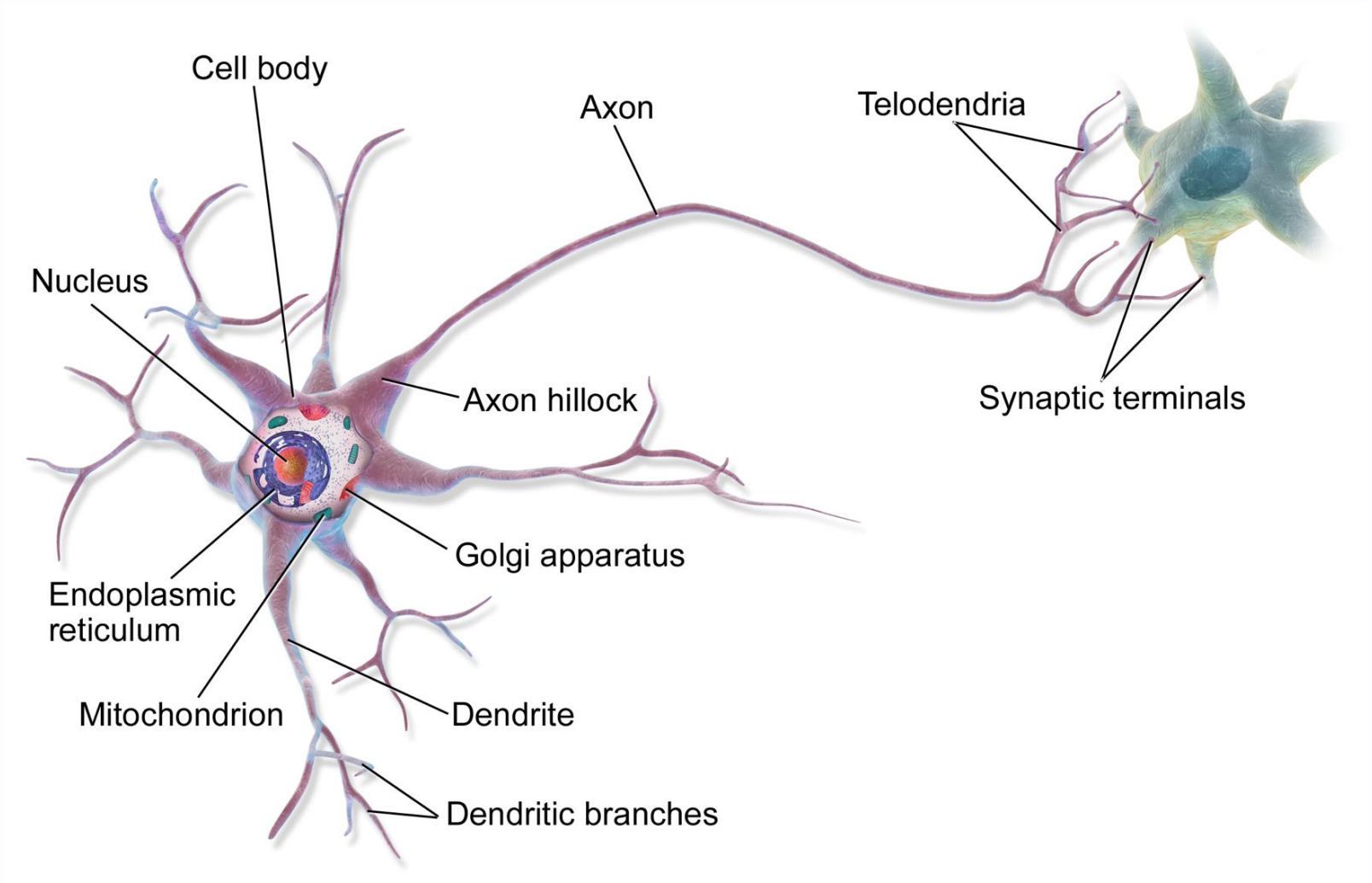
Source: Ankur Divekar

# Artificial Neural Networks

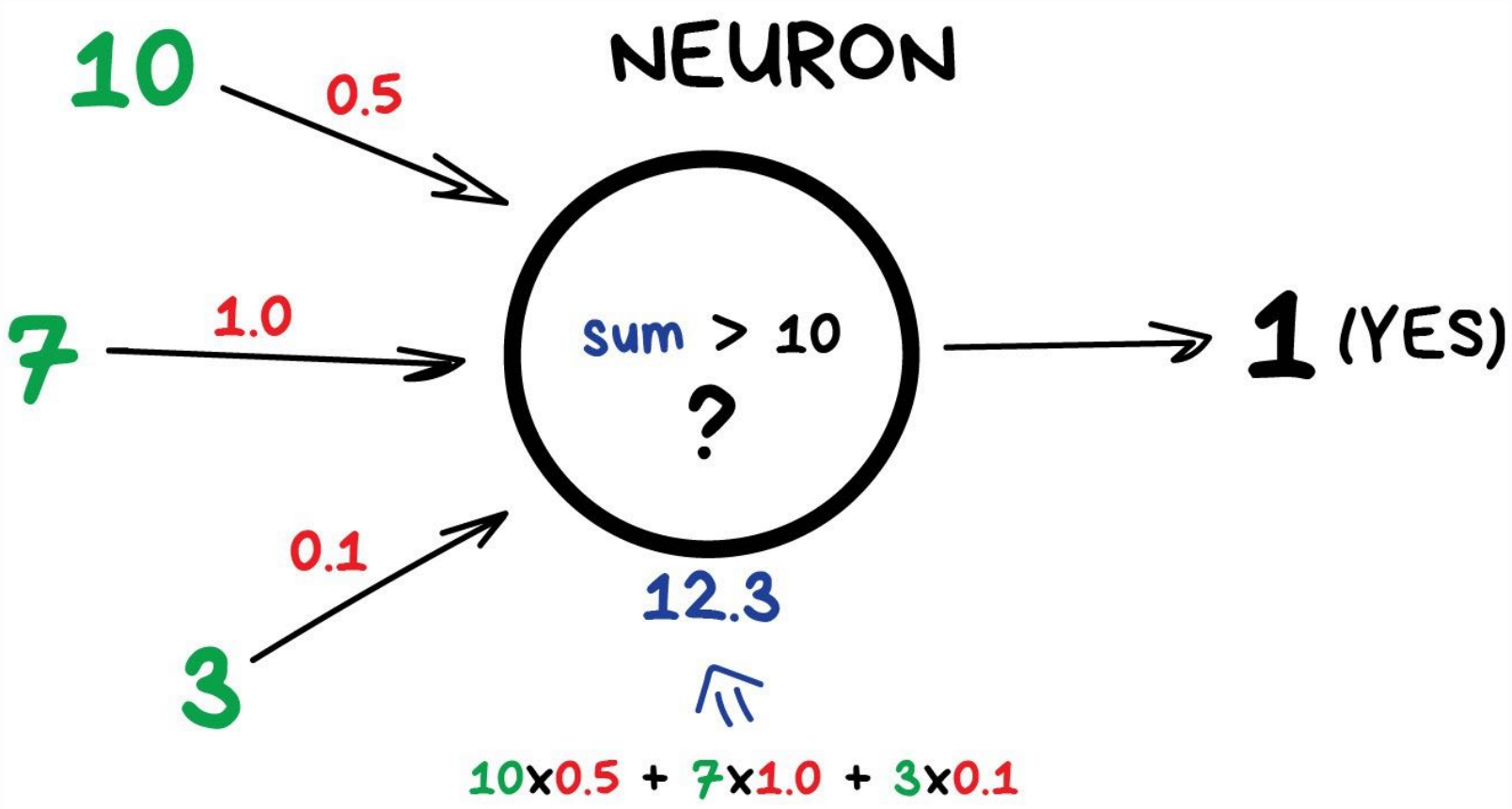





Source: @geovedi

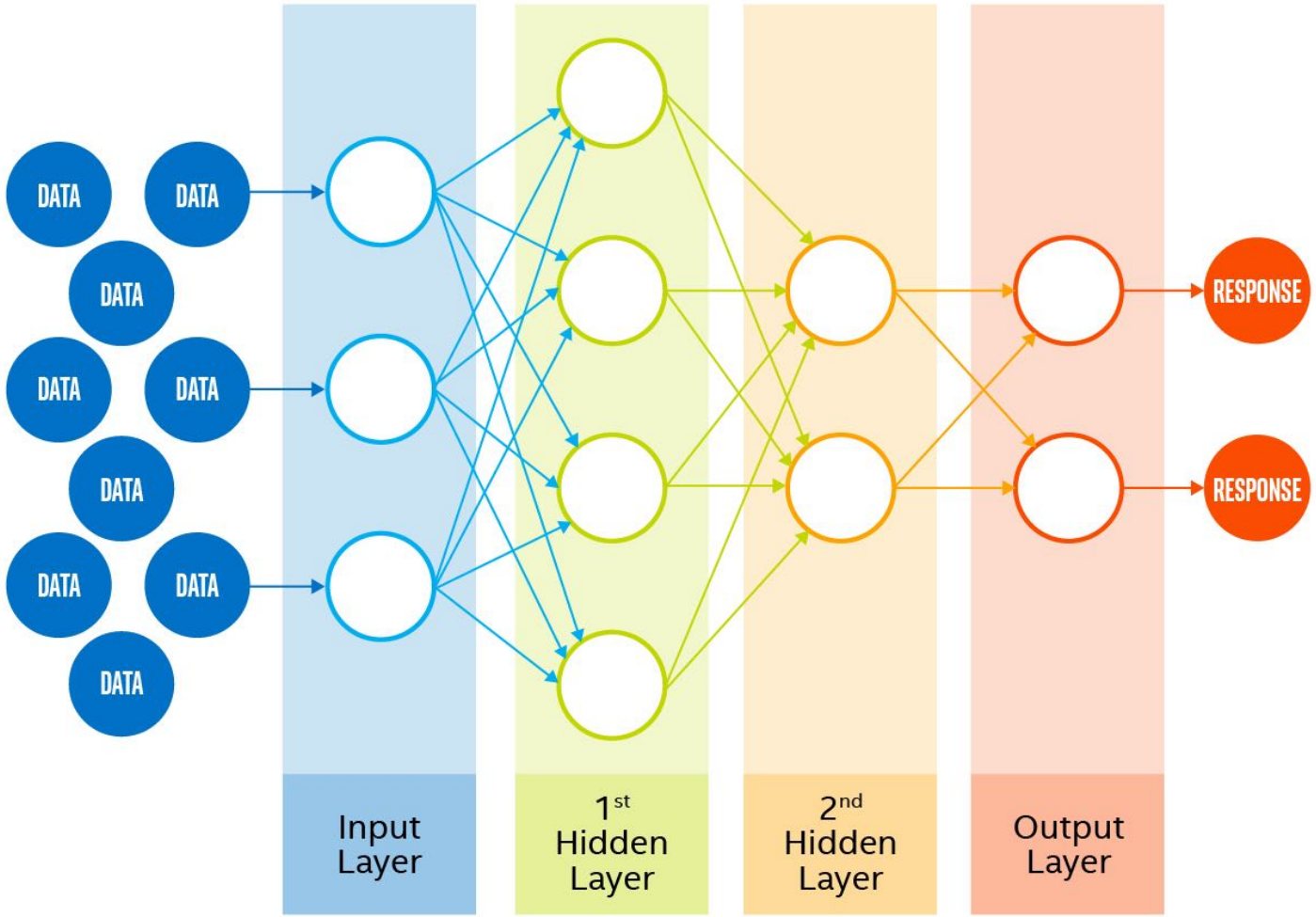



Source: BruceBlaus

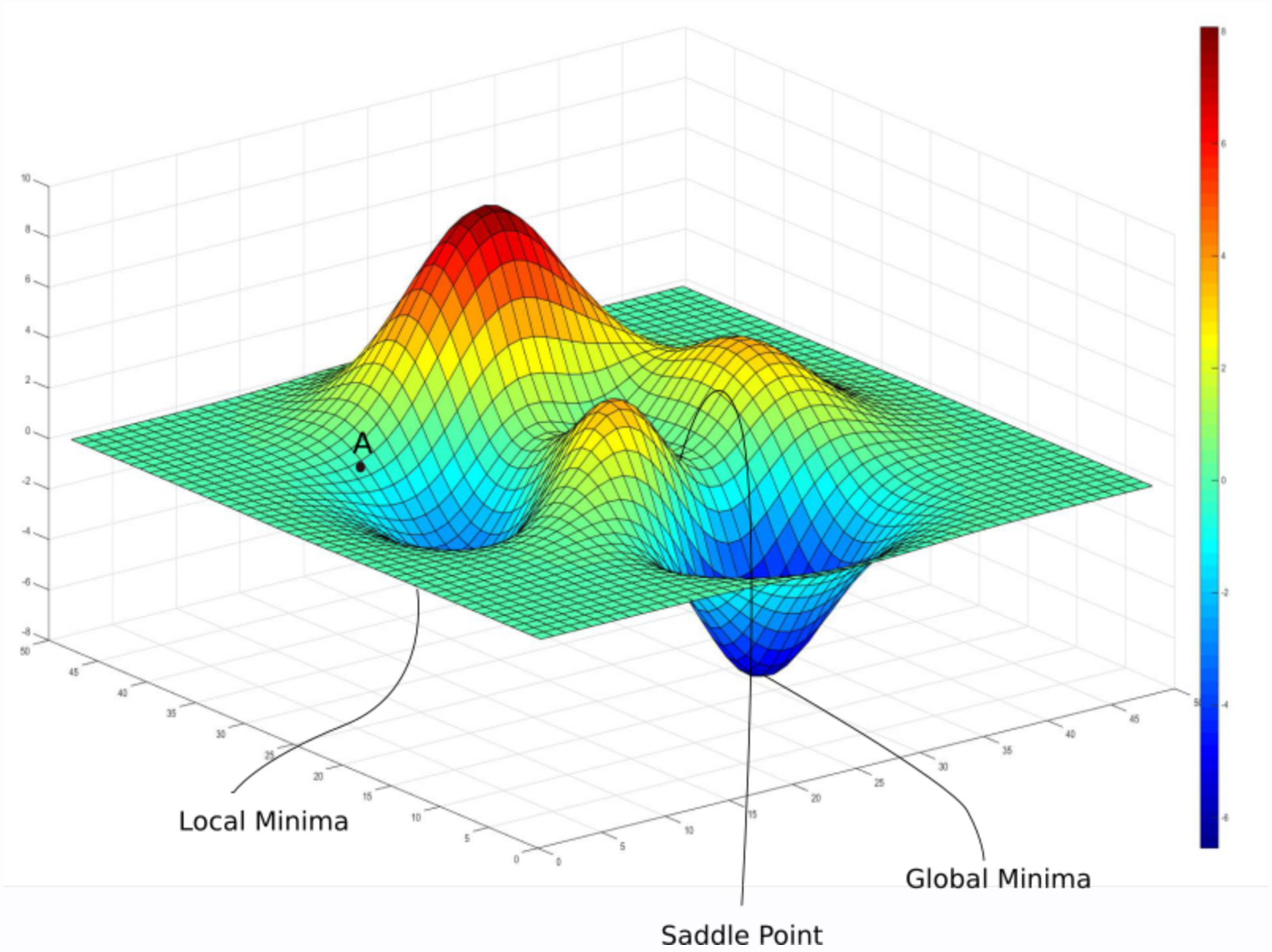



Source: Noelia González

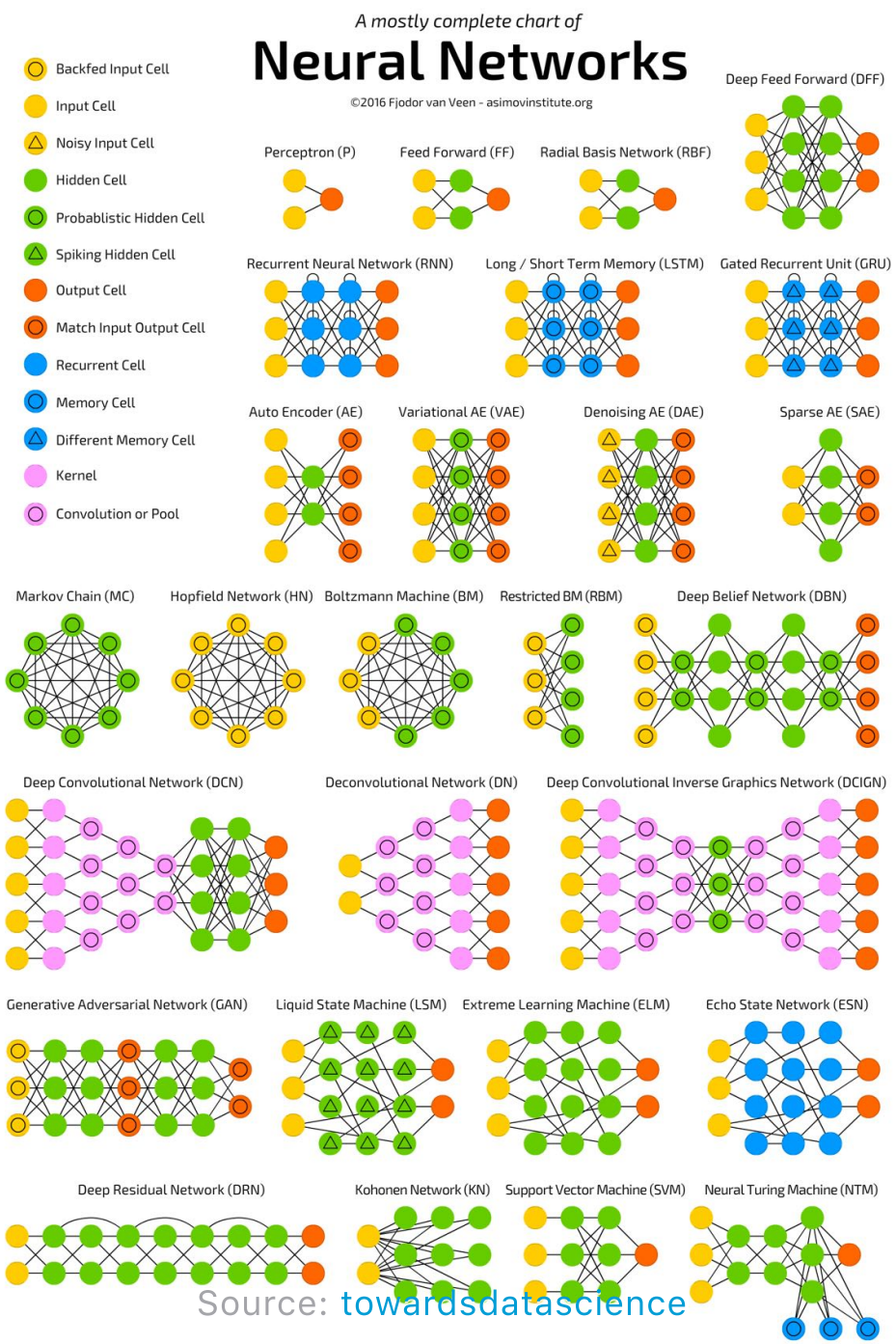
# A SIMPLE NEURAL NETWORK




Source: Intel

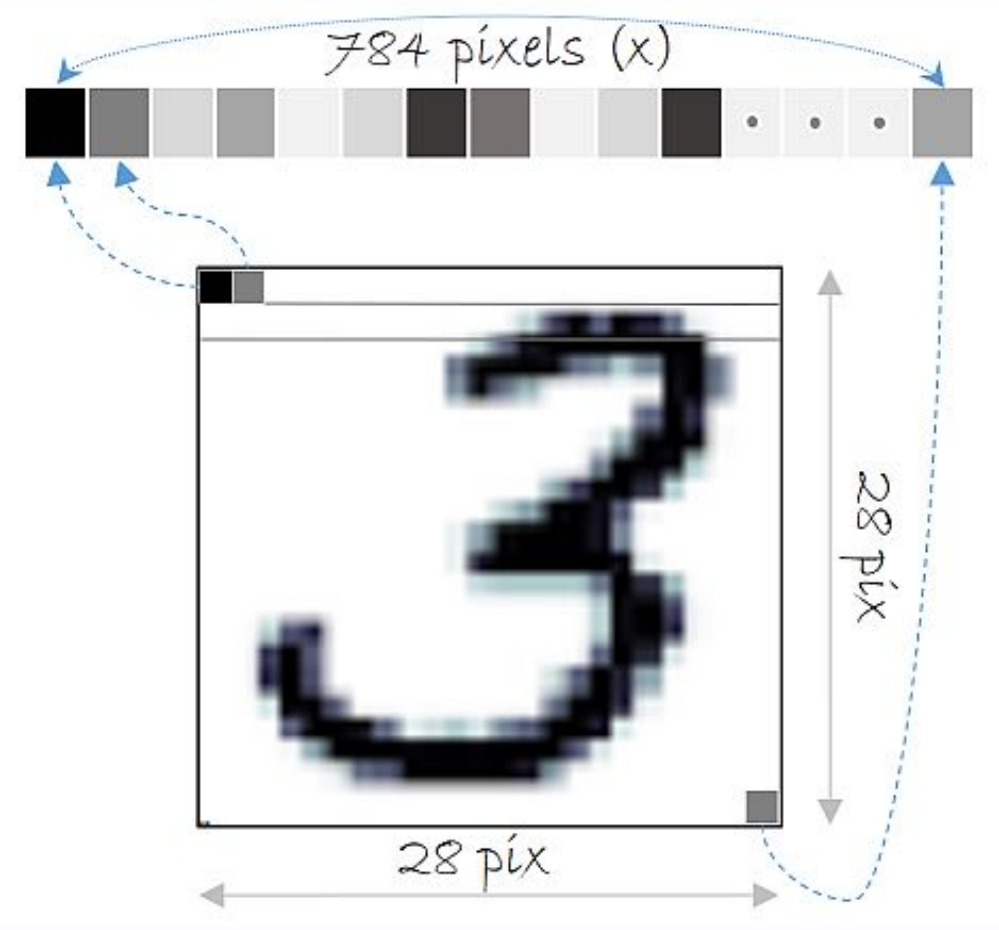



Source: venkatavinay222

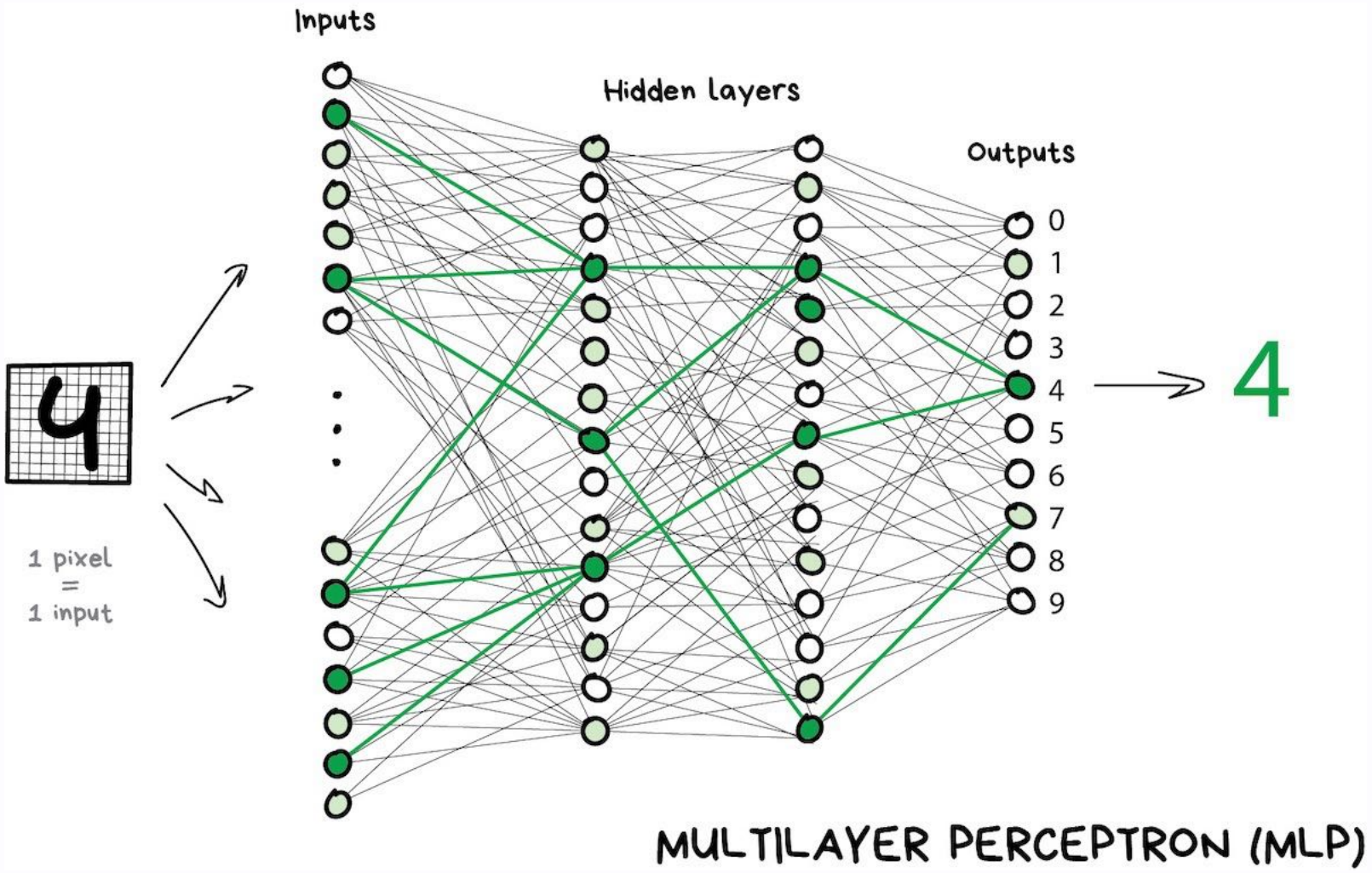



Source: towardsdatascience

# MNIST




Source: Wikipedia

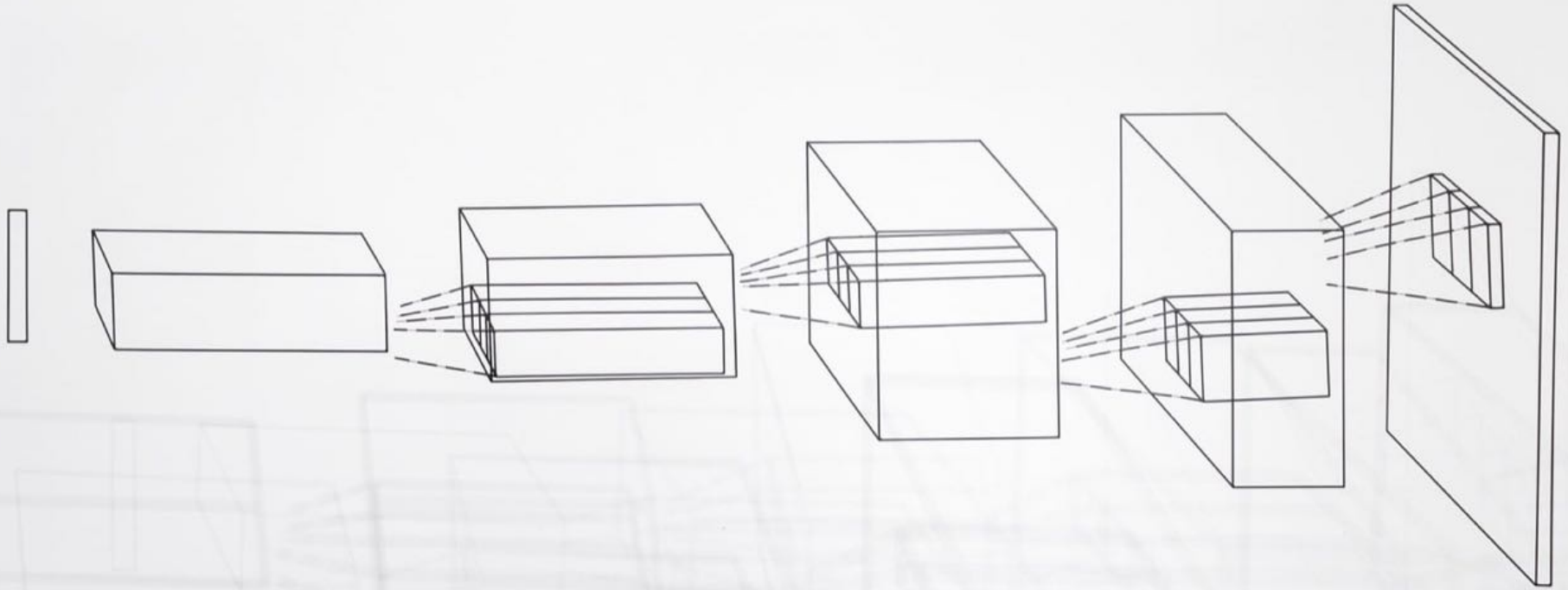



Source: Noelia González

# MLP & Image 🙈

- Performance
  - `640 * 480 = 307'200 inputs`
  - select features -> more work
- Spatial Dimension
  - MLP does not care about order

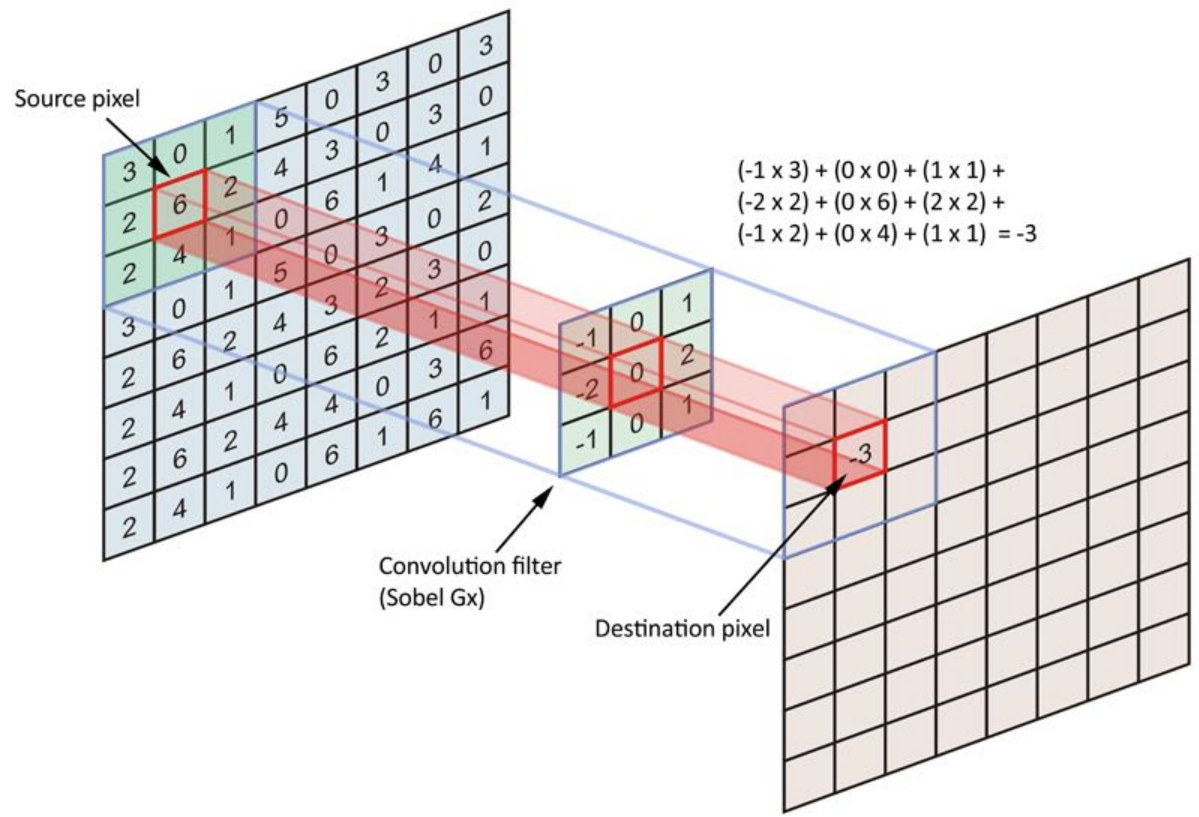
# Convolutional Neural Network

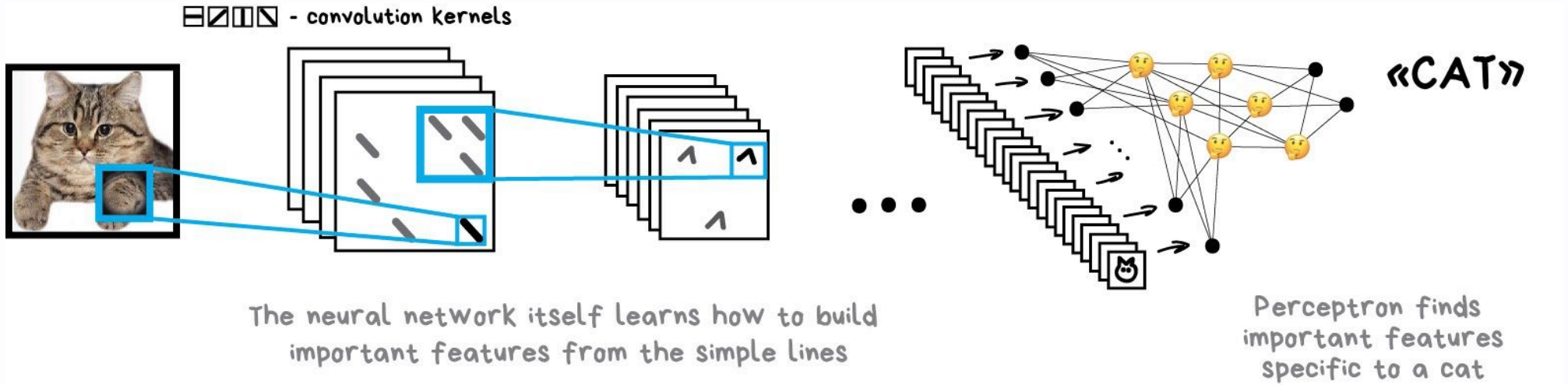


Source: Philipp Schmitt

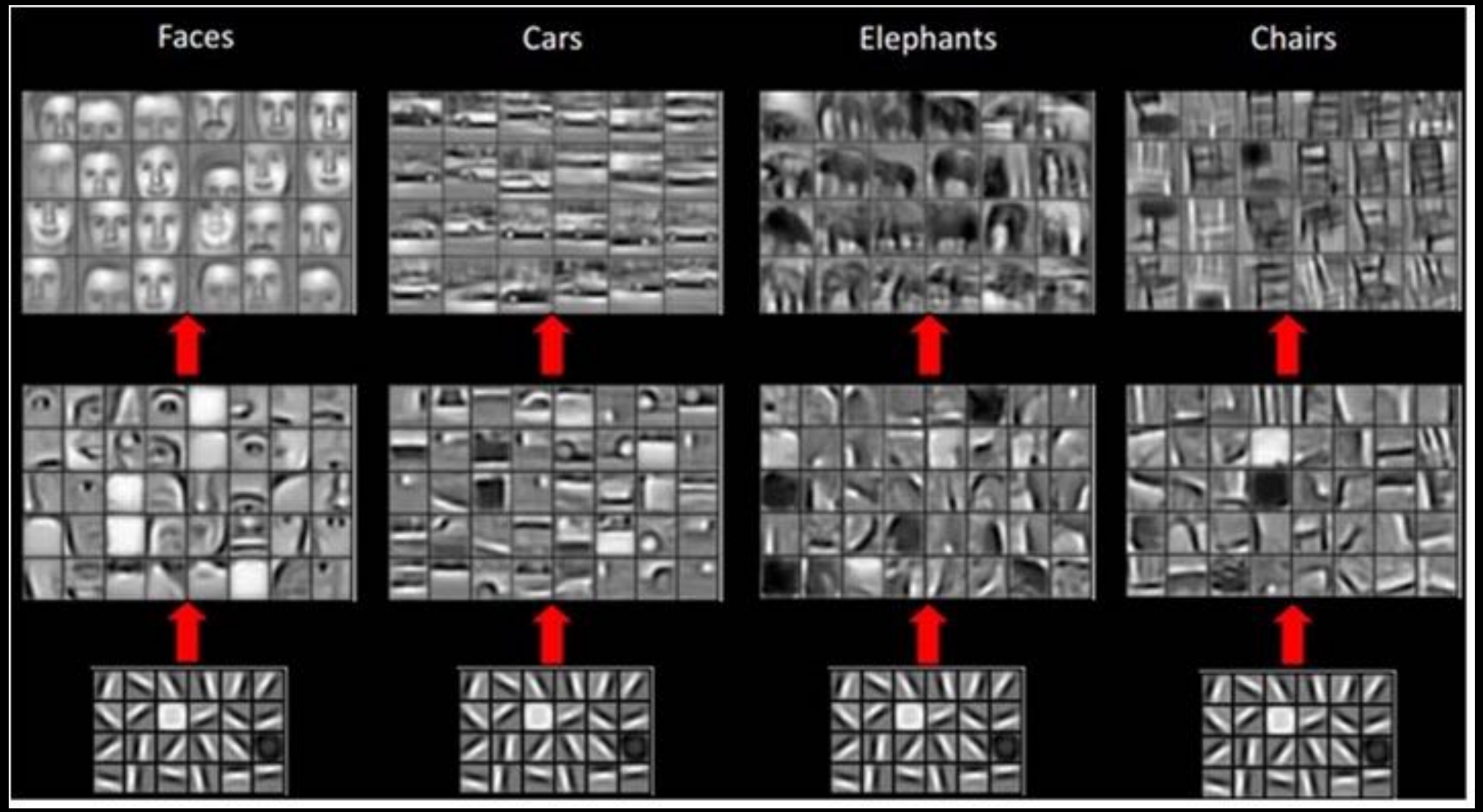
# Convolution

- Filter (Instagram)
- Transforms the image
- Blur / Sobel / ...
- 



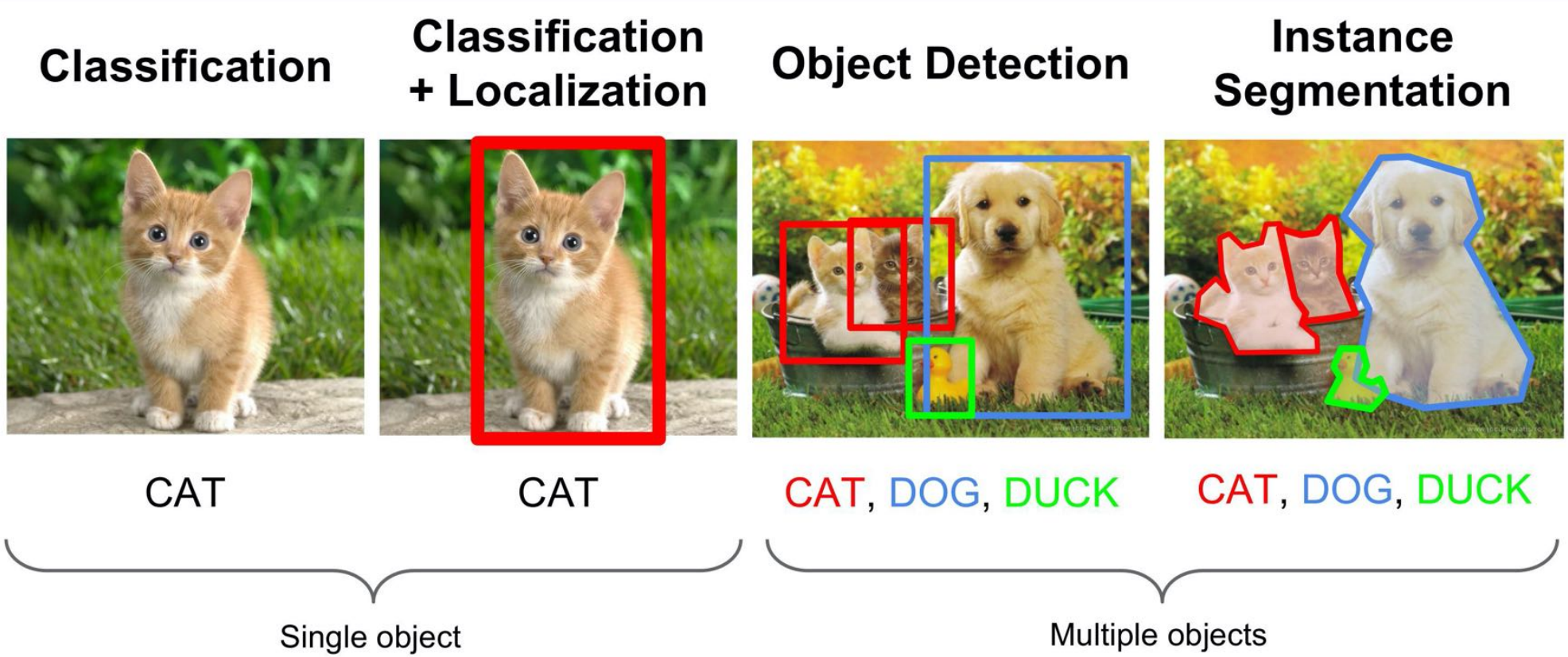



Source: Noelia González



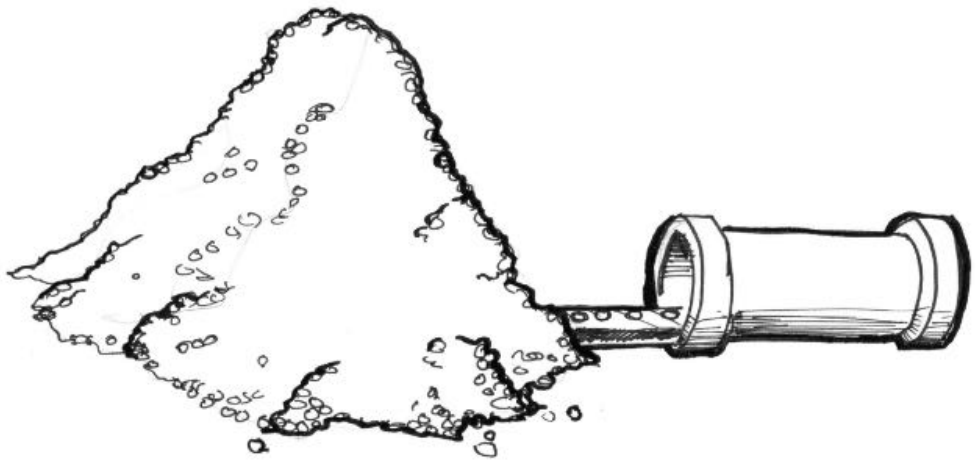

Source: Noelia González

# Applications of CNN

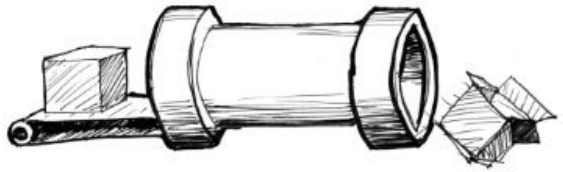



Source: zylapp

# Performance



Train



Predict

# Using a Neural Network

- model
  - describes the neural network
- weights
  - pre-trained weights

# Deep Vision

- CNN inferencing for Processing
- Uses OpenCV as engine
- Model repository (Pretrained)

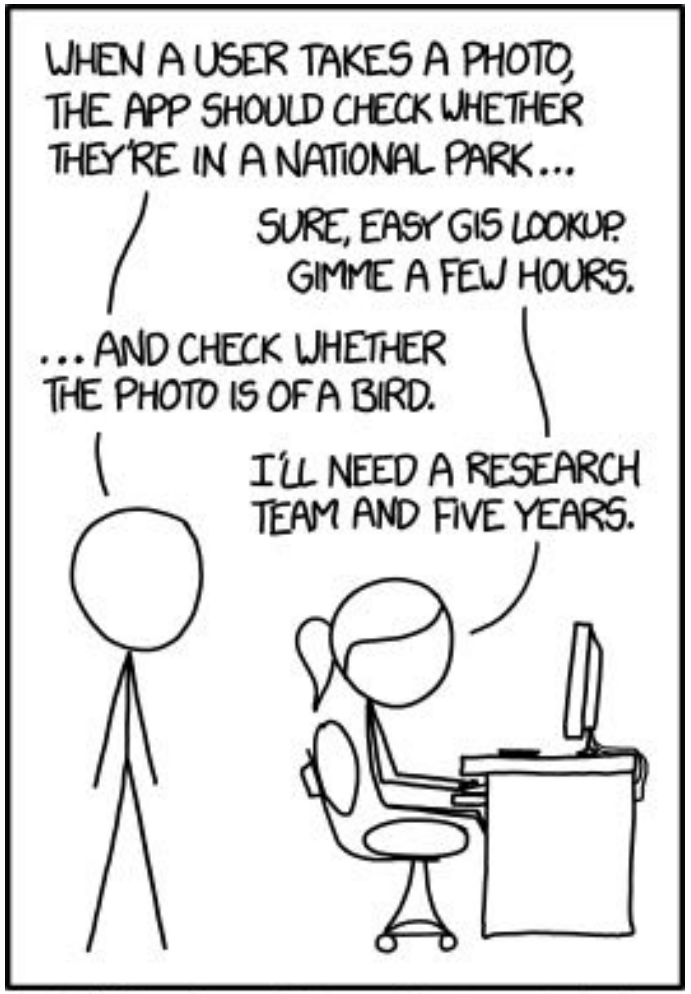
# Task 7

Download and install the Deep Vision library. Try out the examples and get an overview how the framework works by reading the readme.

# Task 8 - Project

Think about a simple project you could implement with the tools you already know (and Deep Vision).

- Smartphone Watchdog
- Document in a few words / sketches!
- Upload till the end of today to the filer.


WHEN A USER TAKES A PHOTO, THE APP SHOULD CHECK WHETHER THEY'RE IN A NATIONAL PARK...
SURE, EASY GIS LOOKUP. GIMME A FEW HOURS.
...AND CHECK WHETHER THE PHOTO IS OF A BIRD.
I'LL NEED A RESEARCH TEAM AND FIVE YEARS.
IN CS, IT CAN BE HARD TO EXPLAIN THE DIFFERENCE BETWEEN THE EASY AND THE VIRTUALLY IMPOSSIBLE.

Source: xkcd