DATA SCIENCE INTERNSHIP

MONTH 2

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REAL WORLD PRODUCTION PROCESS

- The process of manufacturing semiconductors consists of more than a hundred steps
- Each step require few measurements
- Preventive action
- Nuclear Power Plant anomaly detection system

ANOMALY DETECTION SYSTEM

- Poor performance of previous system
- One-class SVM algorithm

	Precision	Recall	F1-score	Support
Outlier	0.07	0.51	0.13	104
Not outlier	0.94	0.54	0.69	1463
Avg/total	0.88	0.54	0.65	1567

DBSCAN

ANOMALY DETECTION SYSTEM

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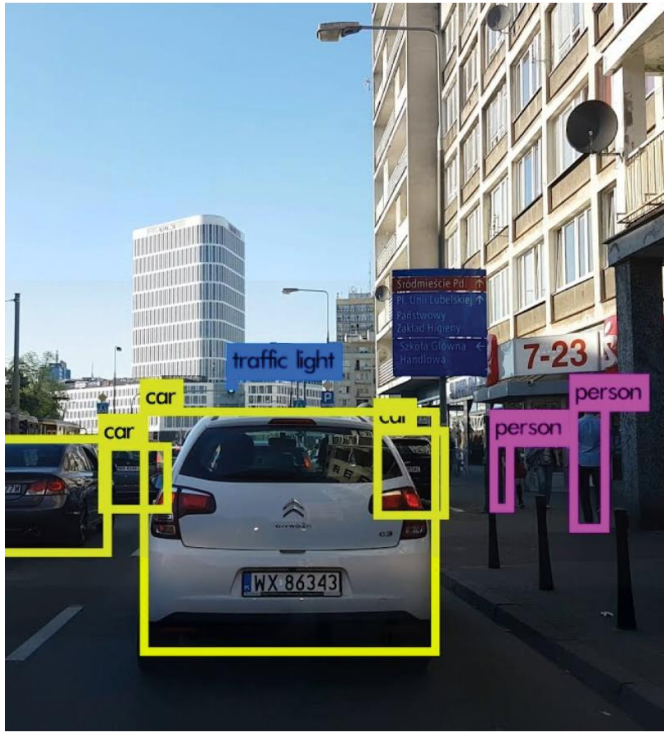
DBSCAN

	Precision	Recall	F1-score	Support
Outlier	0.58	1.00	0.74	104
Not outlier	1.00	0.95	0.97	1463
Avg/total	1.00	0.95	0.96	1567

OneClassSVM

OBJECT DETECTION FOR SELF-DRIVING CAR

- YOLO object detection for self-driving car using Tensorflow
- Objects are: car, truck, pedestrian and street lights
- YOLO – deep learning state of the art approach
- Projects consists two major tasks:
  - Research
  - Develop POC

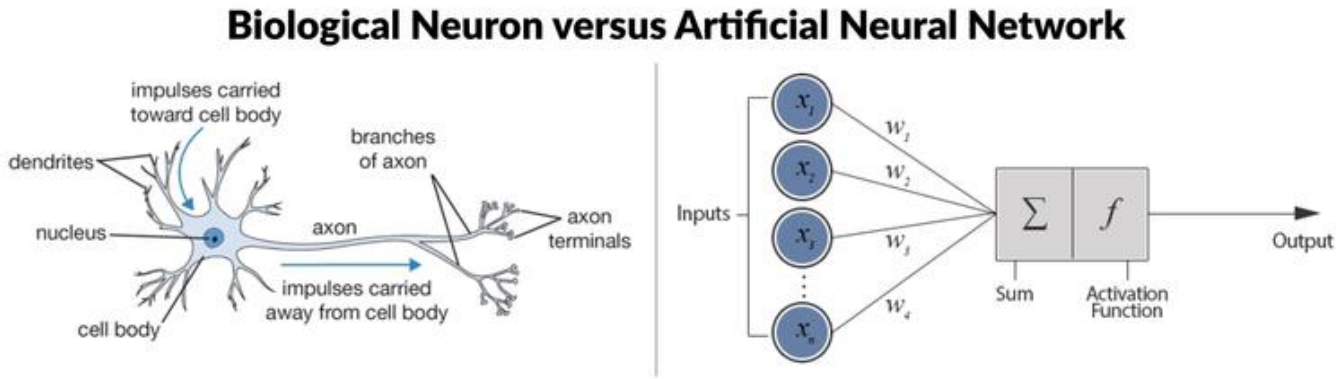


COMPUTER VISION AND DEEP LEARNING

- We try to teach computers how to see
- DL added a huge boost to the already rapidly developing field of CV
- Artificial Neural Networks
- Convolutional Neural Networks

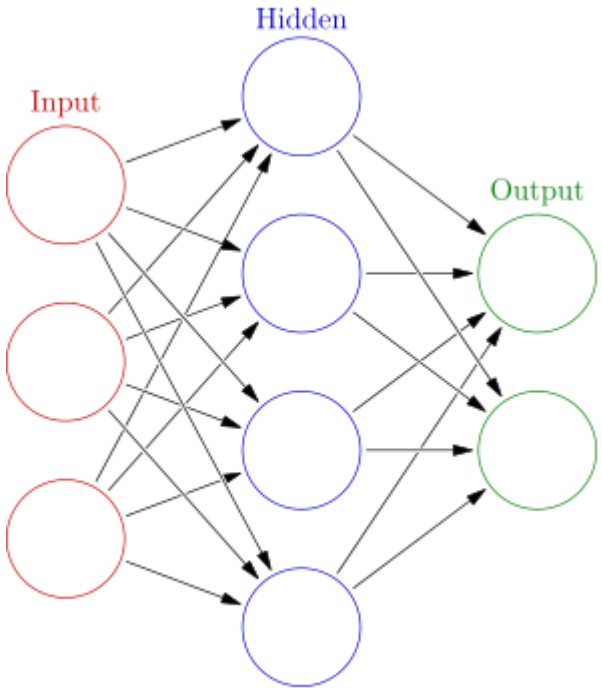
ARTIFICIAL NEURAL NETWORKS

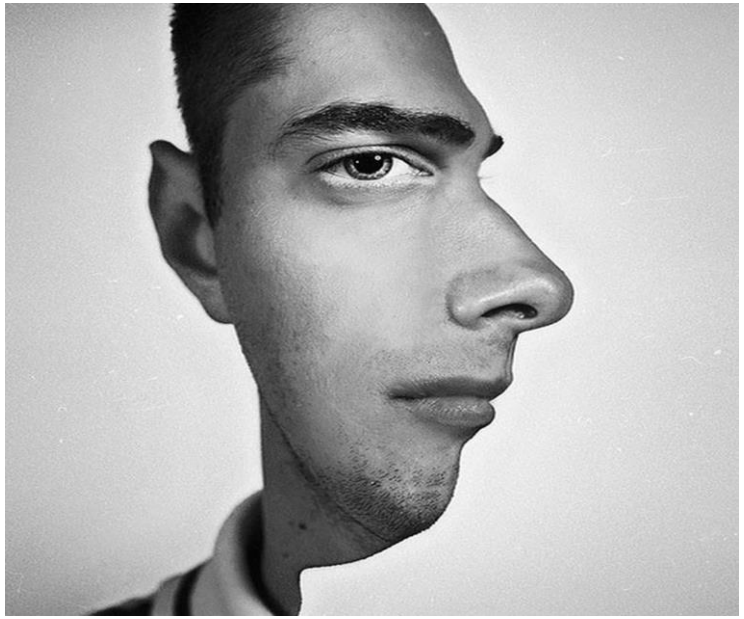
- Inputs, weights, activation function, output
- Backpropagation



ARTIFICIAL NEURAL NETWORKS - TRAINING

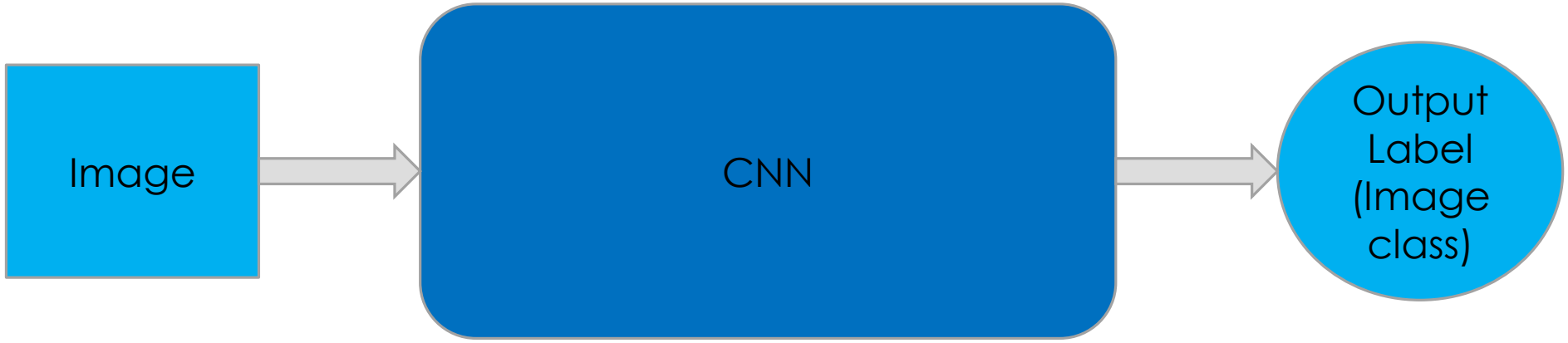
Step 1: Randomly initialise the wights to small numbers
Step 2: Input the first obesrvation of your dataset
Step 3: Forward-Propagation
Step 4: Measure generated error
Step 5: Back-Propagation
Step 6: Repeat Steps 1 to 5 and update weights
Step 7: Epochs





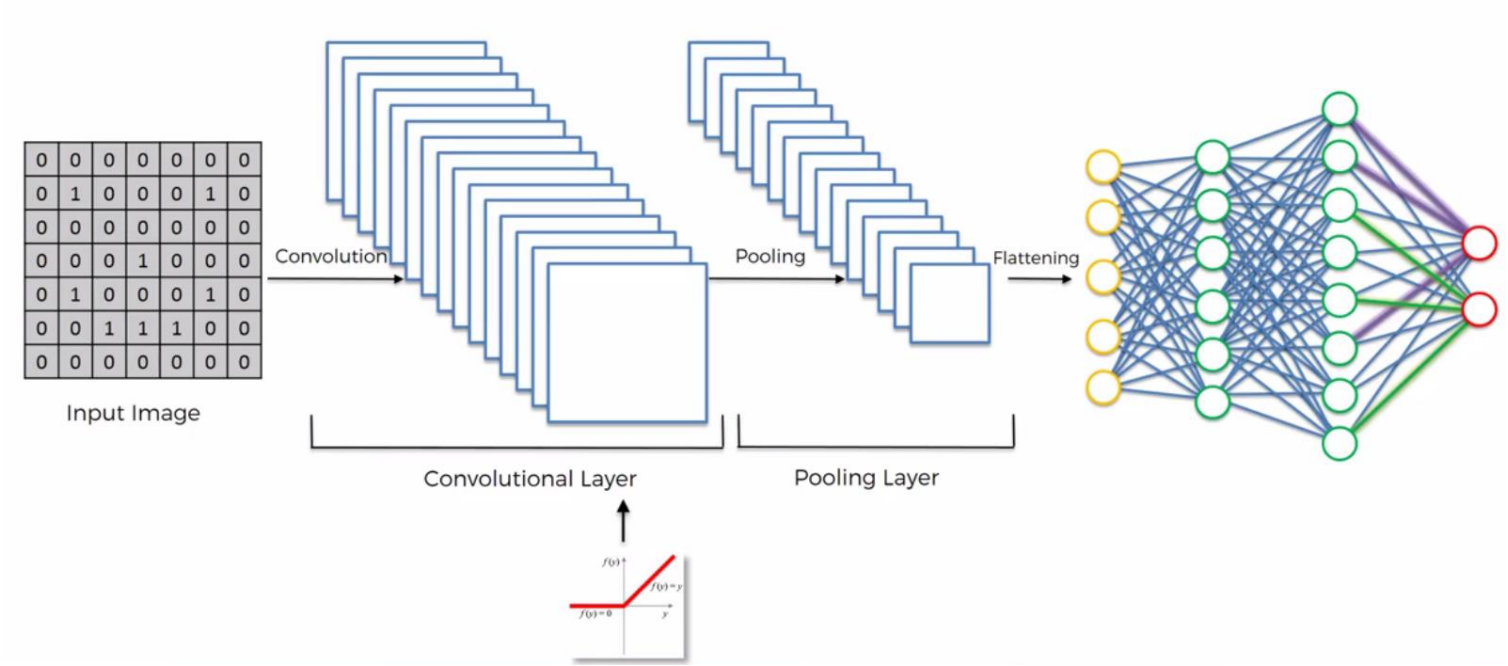
CONVOLUTIONAL NEURAL NETWORK

- Depending on the features that you process you categorize things in certain ways
- CNN automatically extracts features



ARCHITECTURE OF CNN

- Input image
- Convolution
- Convolutional layer
- Pooling Layer
- Flattening
- Fully connection



Example – Car recognition with CNN

- Probably the most well-known problem in computer vision
- Convolutional NN for car recognition
- Small dataset

What next?

- More research on YOLO approach
- Build an AI system for object detection

THANK YOU!