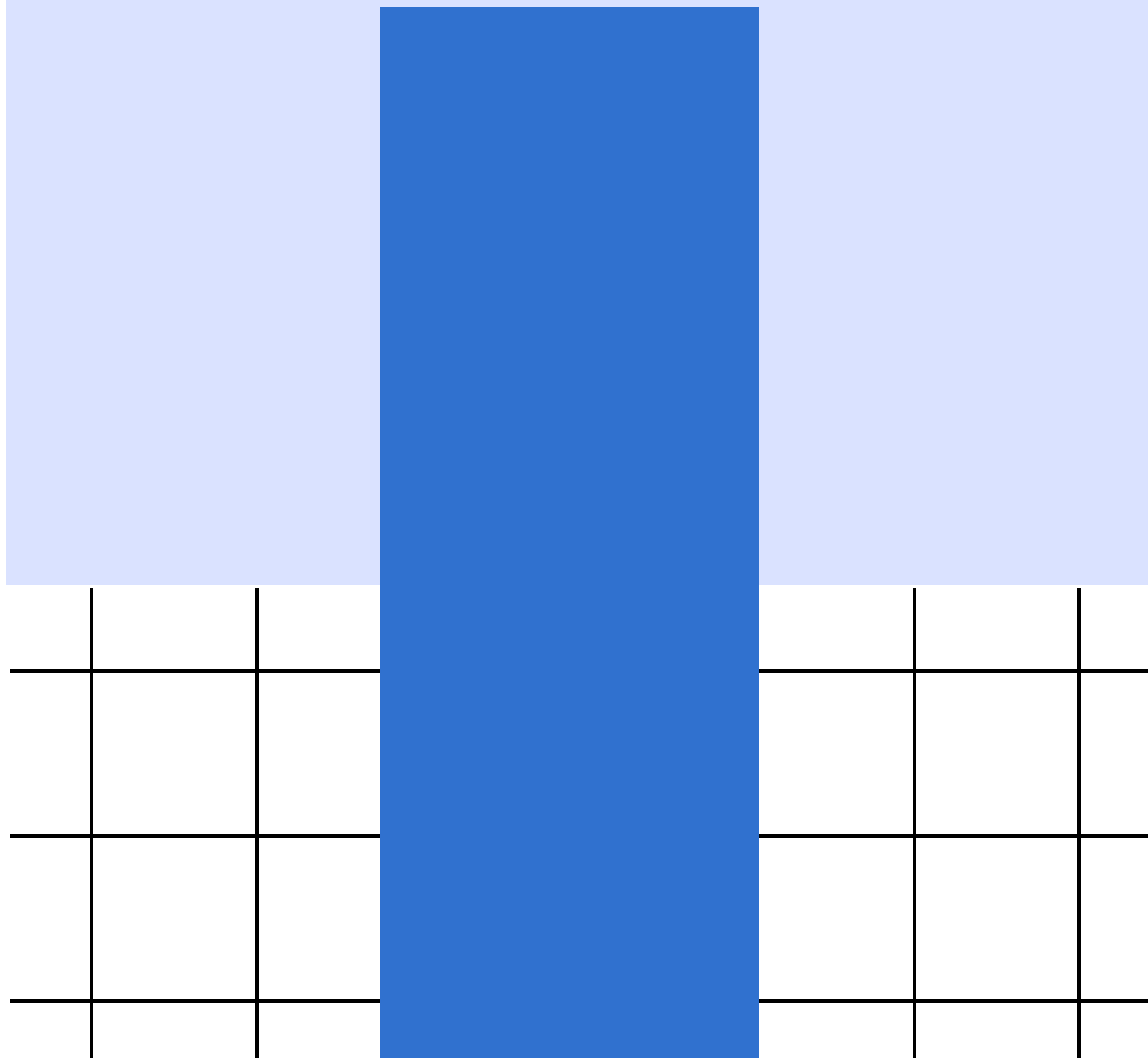


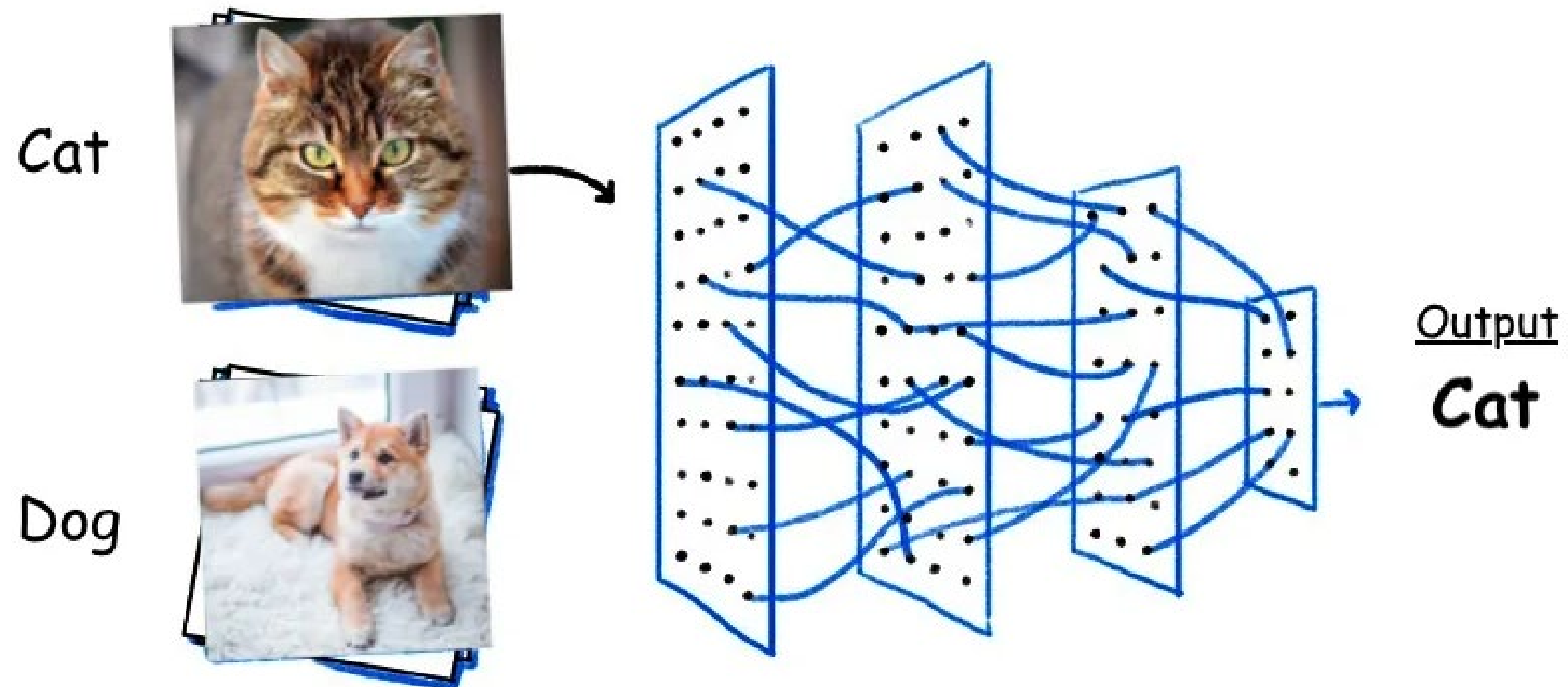
DATASET AND PREPARATION

– Matee Vadrukchid –



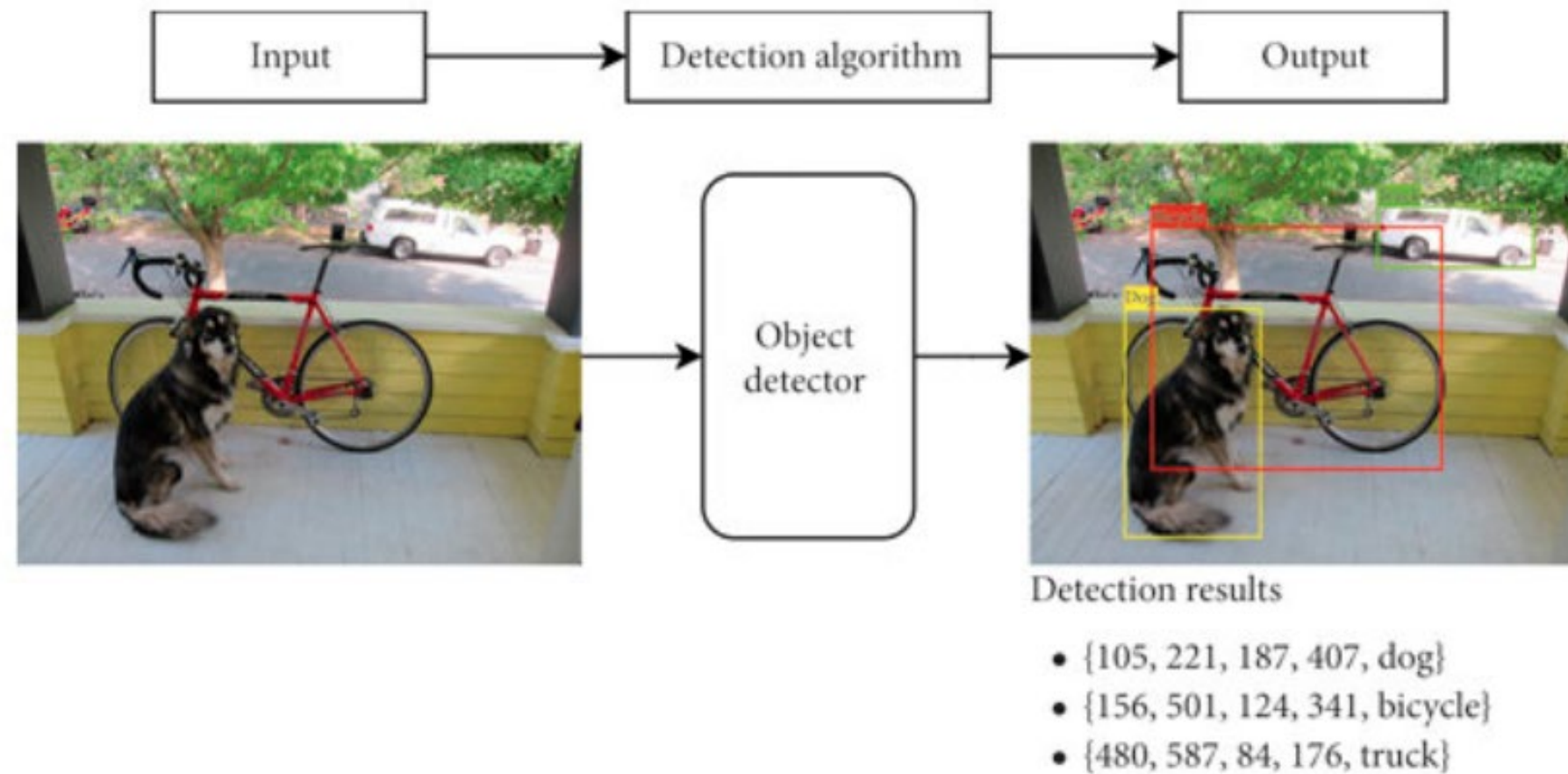
INTRODUCTION

Image Classification Model



INTRODUCTION

Object detection Model



INTRODUCTION

Semantic Segmentation Model



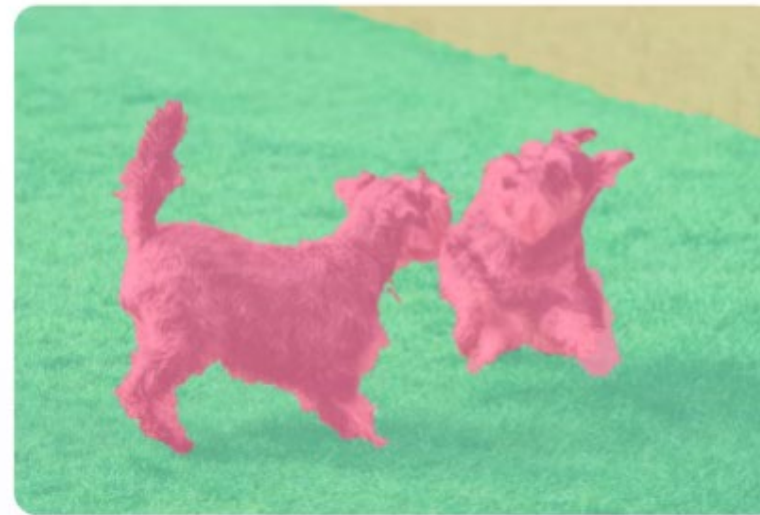
[Link](https://towardsai.net/p/l/machine-learning-7): <https://towardsai.net/p/l/machine-learning-7>

INTRODUCTION

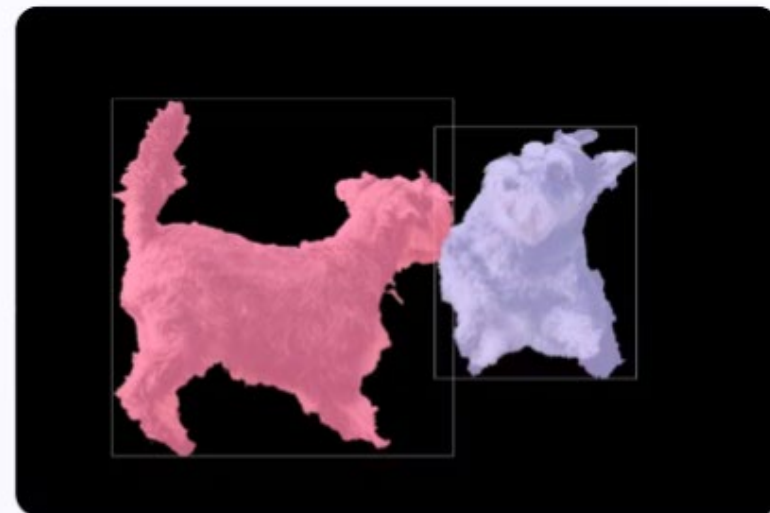
Semantic Segmentation Model



(a) Image



(b) Semantic Segmentation



(c) Instance Segmentation



(d) Panoptic Segmentation

[Link](https://encord.com/blog/instance-segmentation-guide-computer-vision/): <https://encord.com/blog/instance-segmentation-guide-computer-vision/>

INTRODUCTION

Convolutional

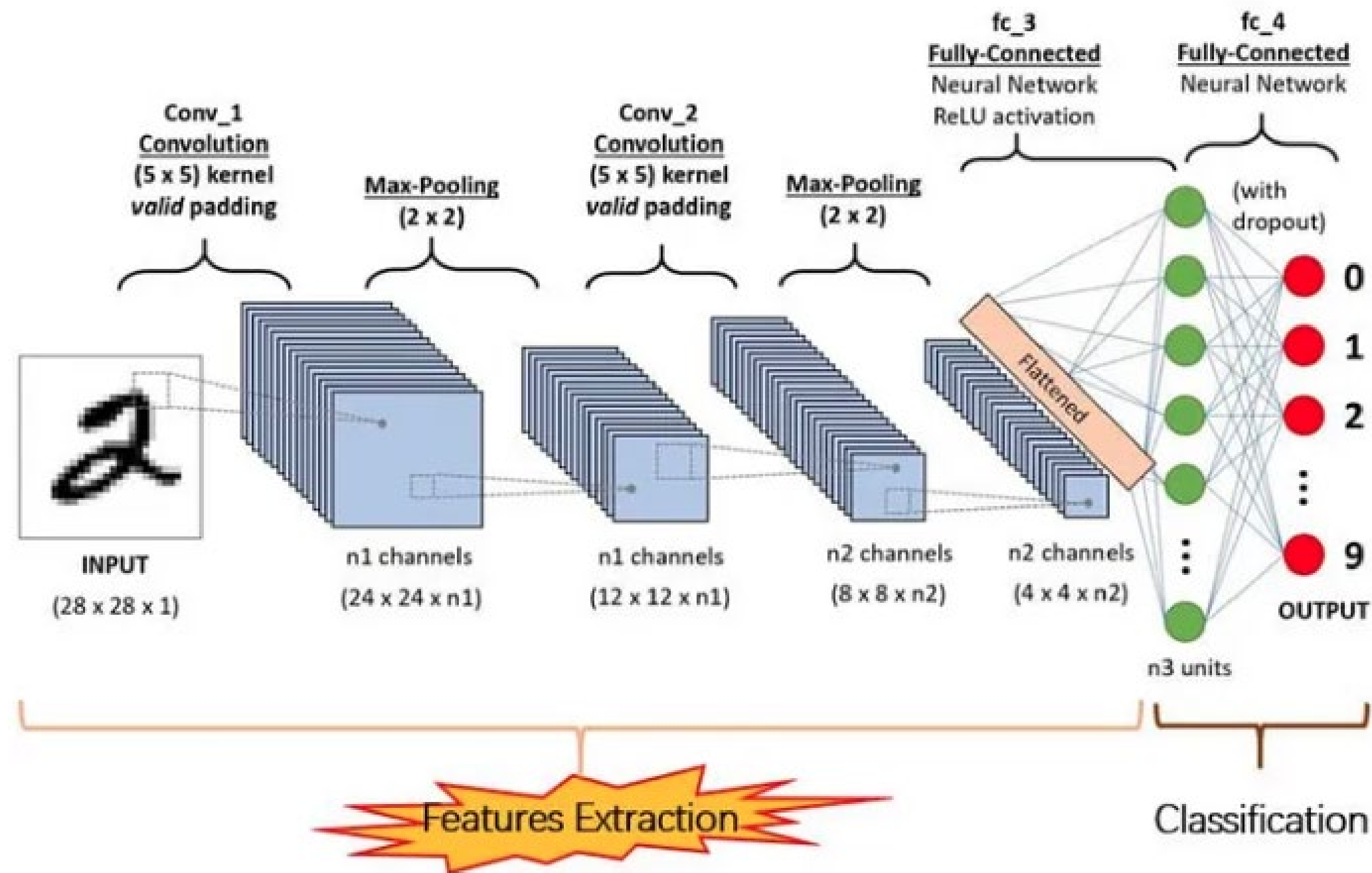


Image source: <https://paperswithcode.com/methods/category/convolutional-neural-networks>

INTRODUCTION

1	2	4	2	2	3	1
6	3	4	1	6	7	2
5	2	3	3	4	6	3
4	1	3	2	5	1	5
2	4	5	3	3	6	7
3	4	2	4	2	5	4
2	5	1	6	1	2	3

input

*

1	2	1
1	2	1
1	2	1

filter

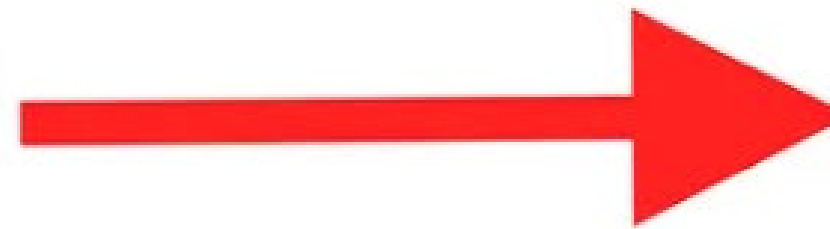
	37					

output

INTRODUCTION

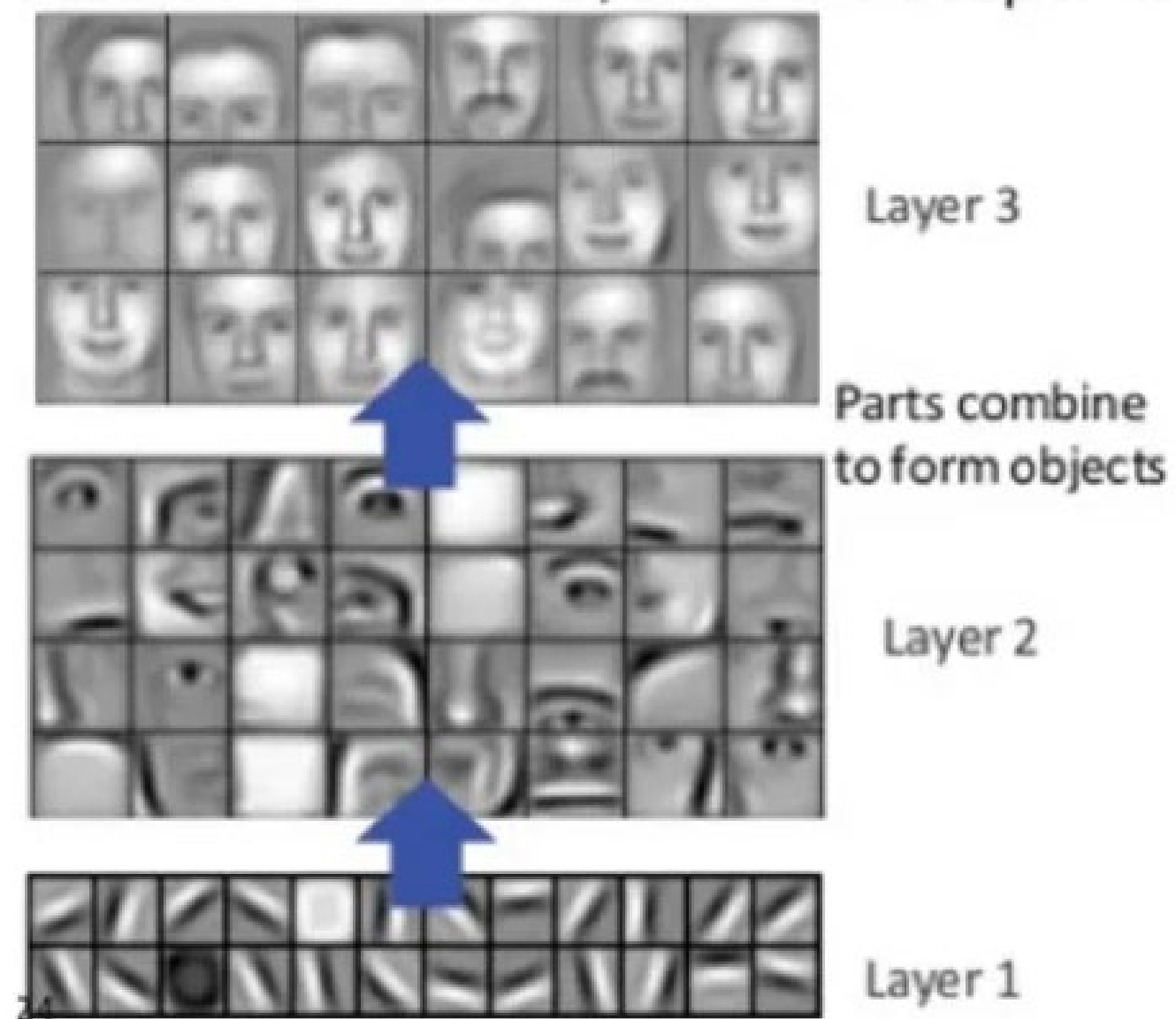


-1	-1	-1
-1	8	-1
-1	-1	-1



<https://www.cs.columbia.edu/education/courses/course/COMSW4995-7/26050/>

INTRODUCTION



Hierarchical feature extraction

INTRODUCTION

Convolutional

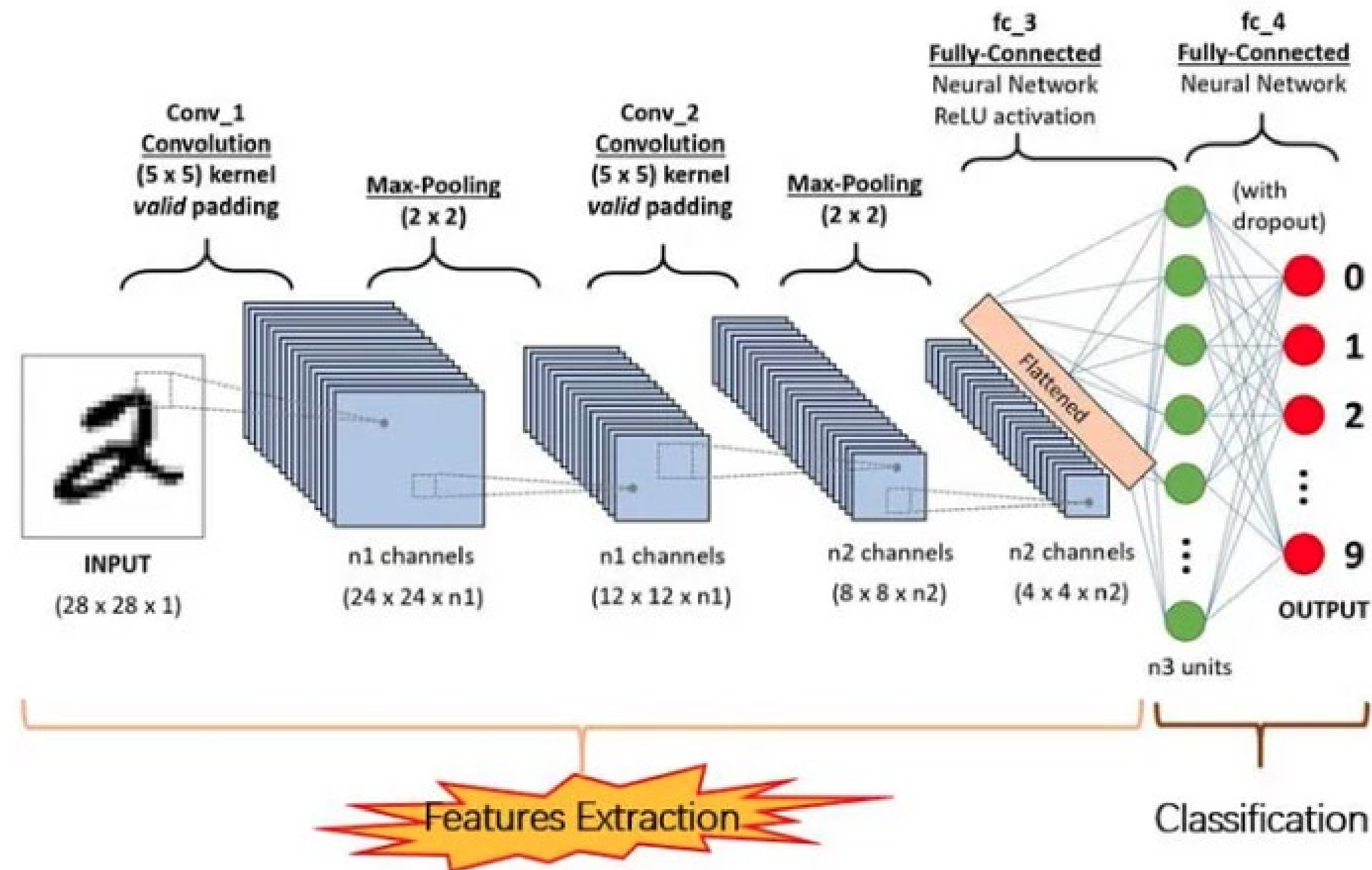
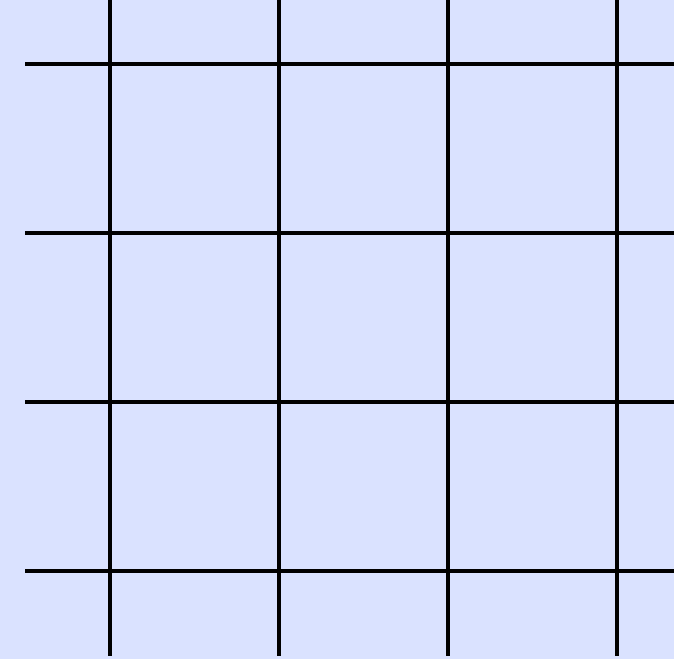
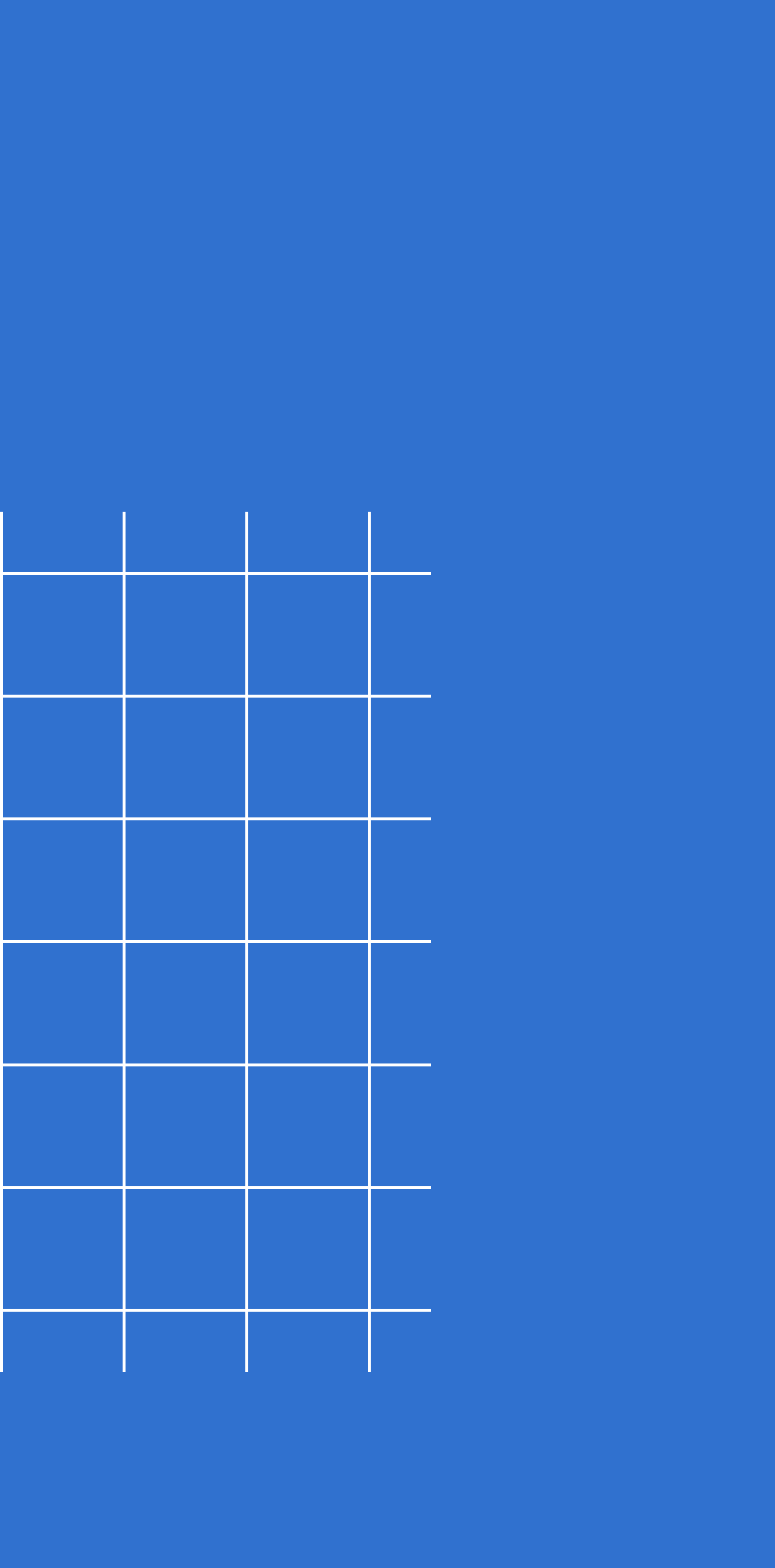


Image source: <https://paperswithcode.com/methods/category/convolutional-neural-networks>



Part 1: Classification

Part 1: Classification

```
dataset/  
├─ train/  
│   ├─ cat/  
│   │   ├─ cat1.jpg  
│   │   ├─ cat2.jpg  
│   │   └─ ...  
│   └─ dog/  
│       ├─ dog1.jpg  
│       ├─ dog2.jpg  
│       └─ ...  
└─ val/  
    ├─ cat/  
    └─ dog/
```

Part 1: Classification

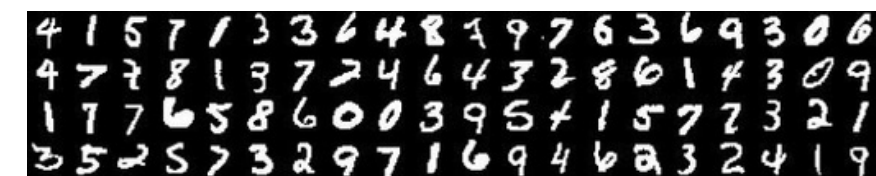
Datasets

- MNIST
- CIFAR-10
- SMILES
- Kaggle:Dogs vs. Cats

Part 1: Classification

MNIST

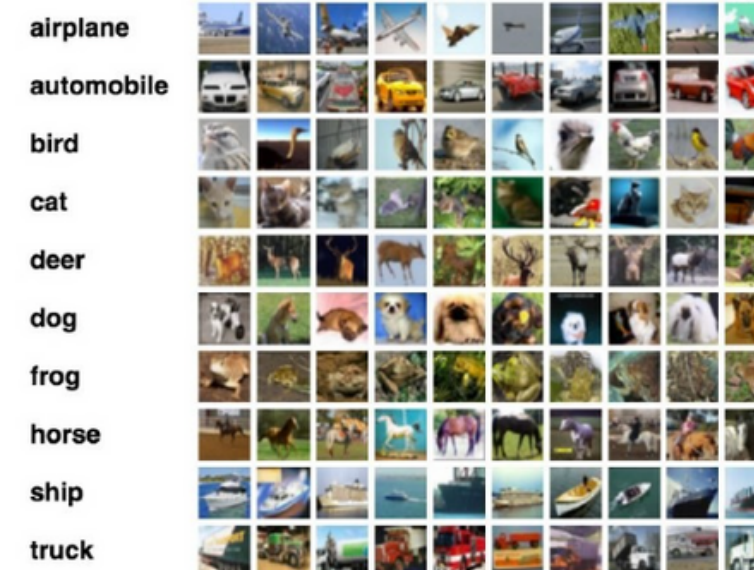
- Stands for modified National Institute of Standards and Technology released in 2004 The goal of this
- dataset is to correctly classify the handwritten digits 0-9 (28x28 pixels)
- It is like “Hello, World” in machine learning
- It consists of 60,000 training images and 10,000 testing images. Pixel intensities are in the range [0,255]



Part 1: Classification

CIFAR-10

- It is considered another standard benchmark data for image classification (released in 2009)
- CIFAR-10 consists of 60,000 of 32x32x3 (RGB) (= 3072 features) images
- CIFAR-10 consists of 10 classes including airplanes, automobiles, birds, cats, deer, dogs, frogs, horses, ships, and trucks



Part 1: Classification

SMILES

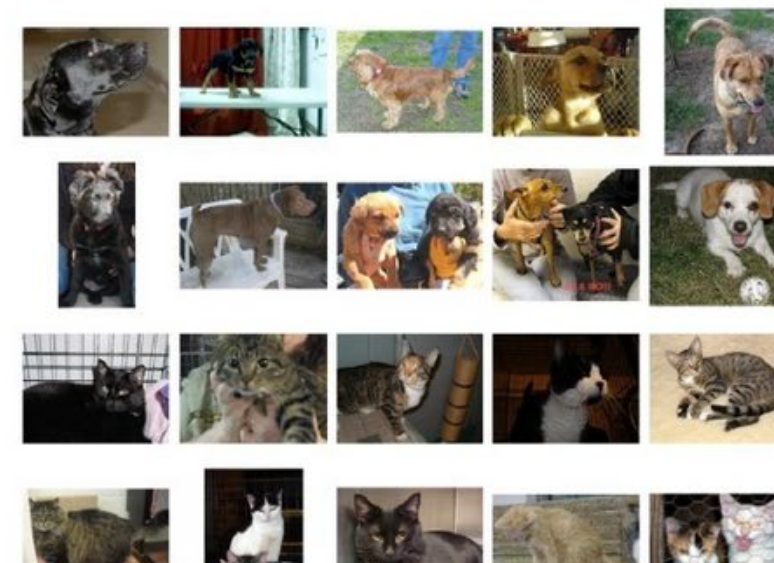
- The SMILES dataset (smiling or not smiling) consists of 13,165 grayscale images with the size of 64x64.
- The early days of machine learning is using only cropped data with minimum background



Part 1: Classification

Kaggle: Dogs vs. cats

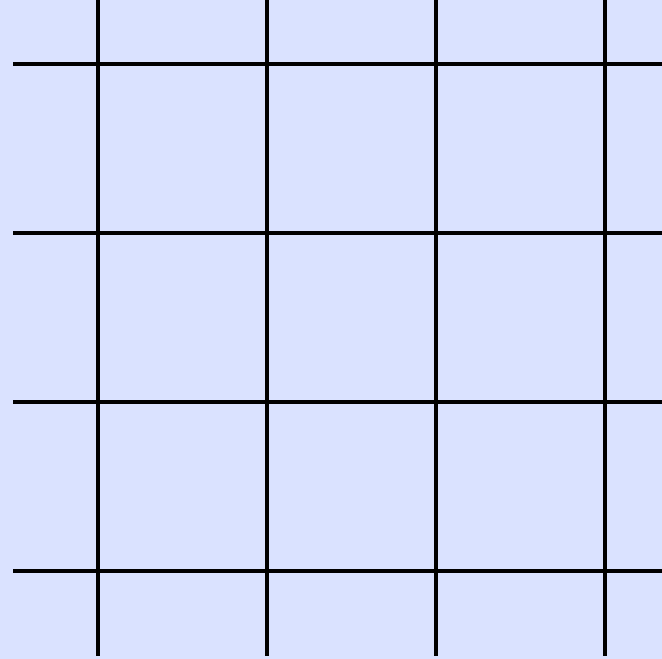
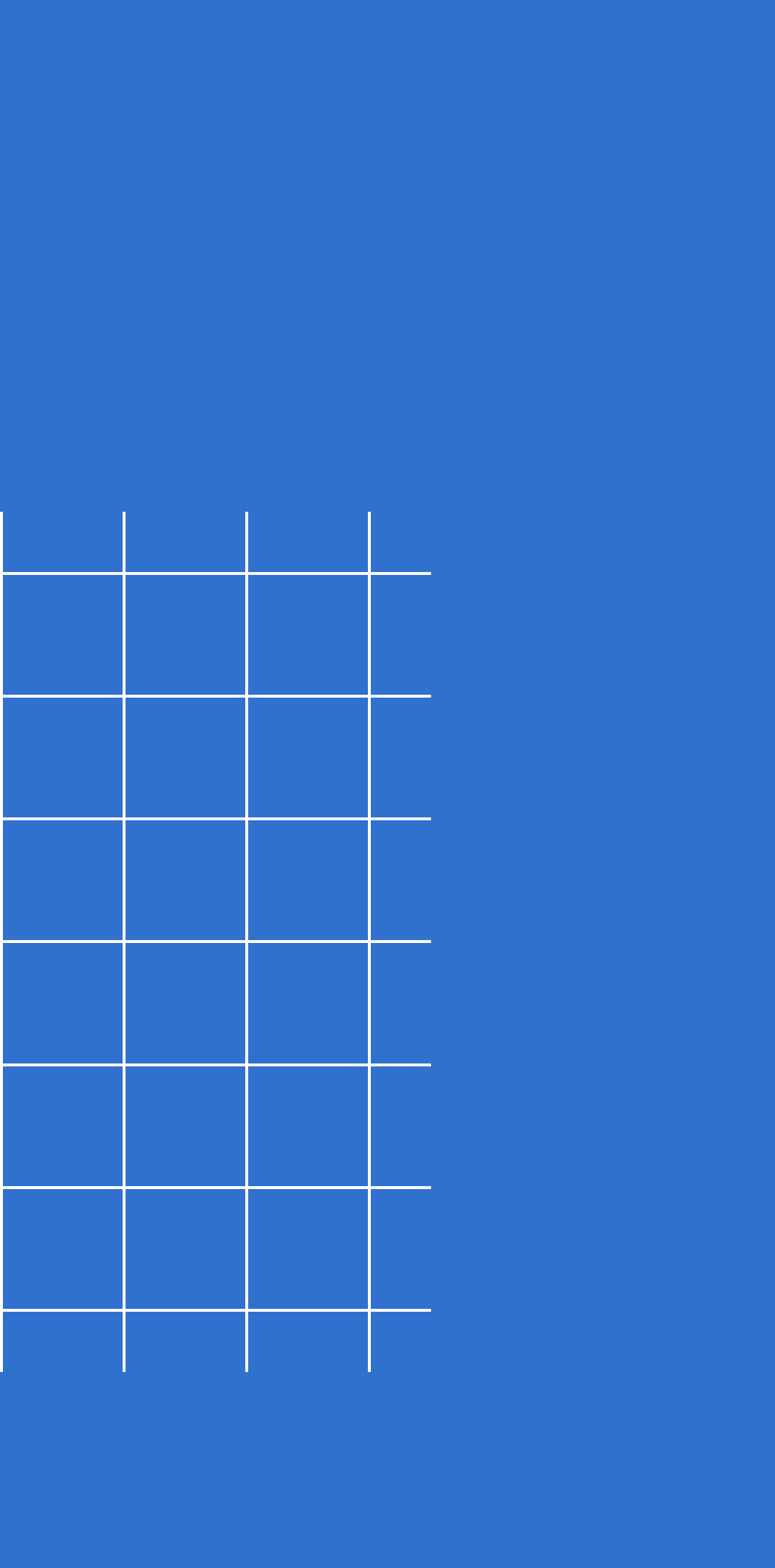
- Dogs vs. Cats challenge is part of a Kaggle competition for machine learning algorithms
- The dataset is provided in 2013 from Kaggle company
- A total of 25,000 RGB images are provided



Part 1: Classification

Datasets

- Flowers-17
- CALTECH-101
- Adience
- ImageNet
- Kaggle: Facial Expression Recognition Challenge

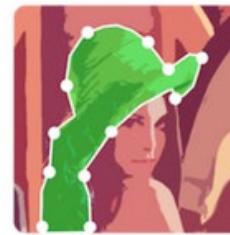


Part 2: Object Detection

Part 2: Object detection

Labelme

Link: <https://github.com/wkentaro/labelme>

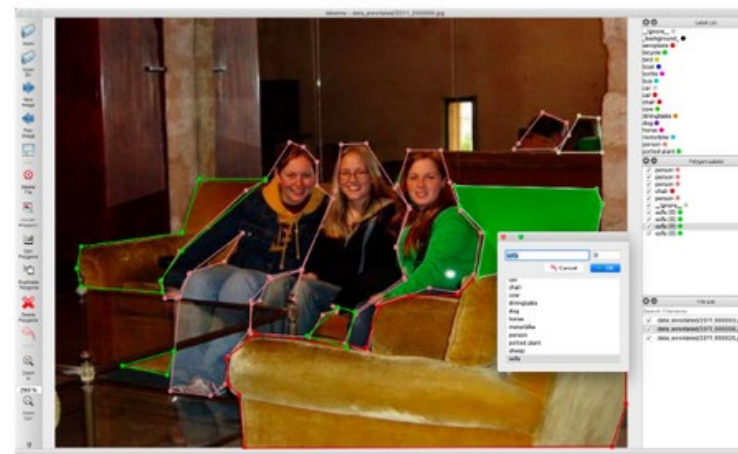


labelme

Image Polygonal Annotation with Python

pypi v5.6.0 python 3.5 | 3.6 | 3.7 | 3.8 | 3.9 ci passing

[Installation](#) | [Usage](#) | [Examples](#)



Part 2: Object detection

Labelme2YOLO

Link: <https://github.com/GreatV/labelme2yolo>

Labelme2YOLO

pypi v0.2.5 downloads 4.4k/month downloads 94k

Labelme2YOLO efficiently converts LabelMe's JSON format to the YOLOv5 dataset format. It also supports YOLOv5/YOLOv8 segmentation datasets, making it simple to convert existing LabelMe segmentation datasets to YOLO format.

New Features

- export data as yolo polygon annotation (for YOLOv5 & YOLOv8 segmentation)
- Now you can choose the output format of the label text. The two available alternatives are `polygon` and bounding box(`bbbox`).

Performance

Labelme2YOLO is implemented in Rust, which makes it significantly faster than equivalent Python implementations. In fact, it can be up to 100 times faster, allowing you to process large datasets more efficiently.

Installation

```
pip install labelme2yolo
```

