The practice of AI

C2: Deep learning & computer vision

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2020/7/6

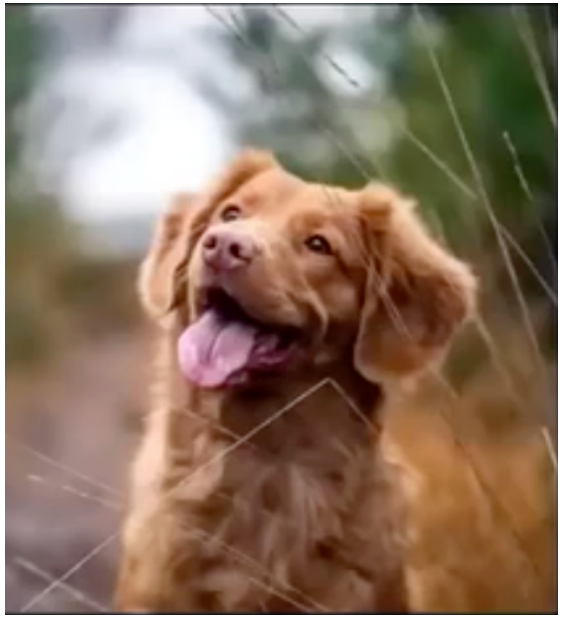
Outline

1. Goal
2. Deep learning overview
3. Demo for CNN model train
4. Demo from model Inference
5. Brief summary

Goal

Learn how to train and use a DL model

What is deep learning



- Recognize patterns VS Learning features
- More deep neural networks
- More unexplainable

Why now

- Prevalent data
- High hardware performance
- More software framework

DL workflow

- Build neural networks
- Initialize parameters
- Feed data to neural networks
- Caculate error by predicted values and real values
- Adjust parameters base on error
- Iterate previous steps until error is accepted

DL models

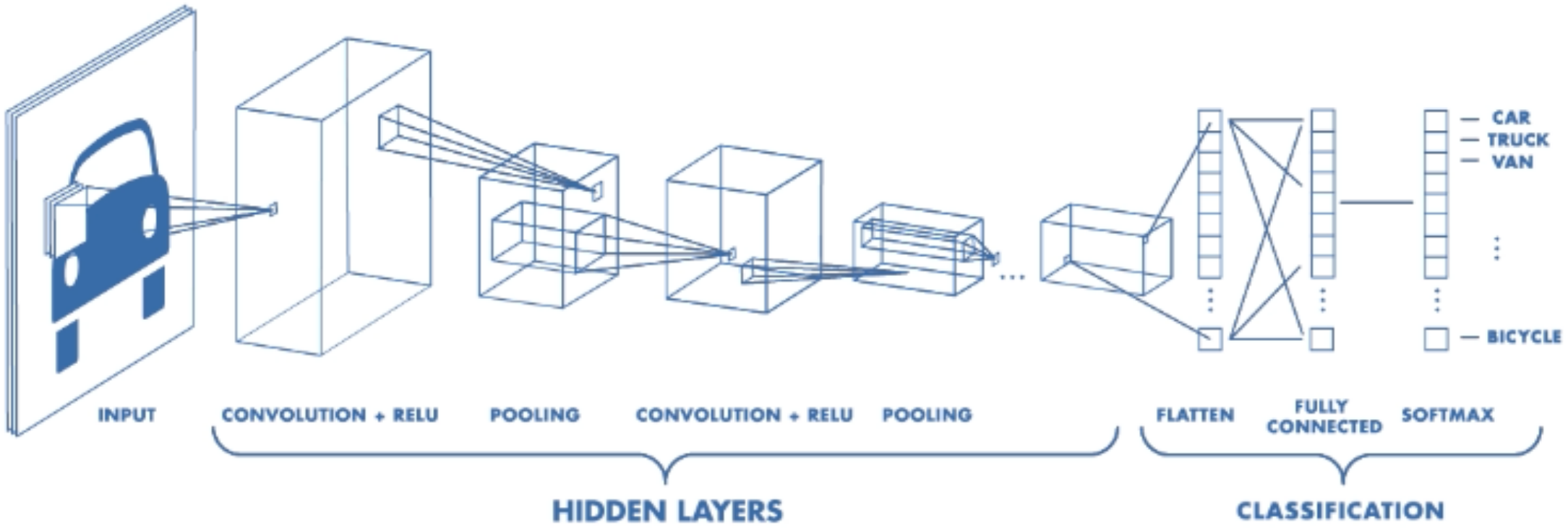
Neural networks

- LeNet
- AlexNet
- VGG/GoogleLeNet
- ResNet
- InceptionNet
- DenseNet

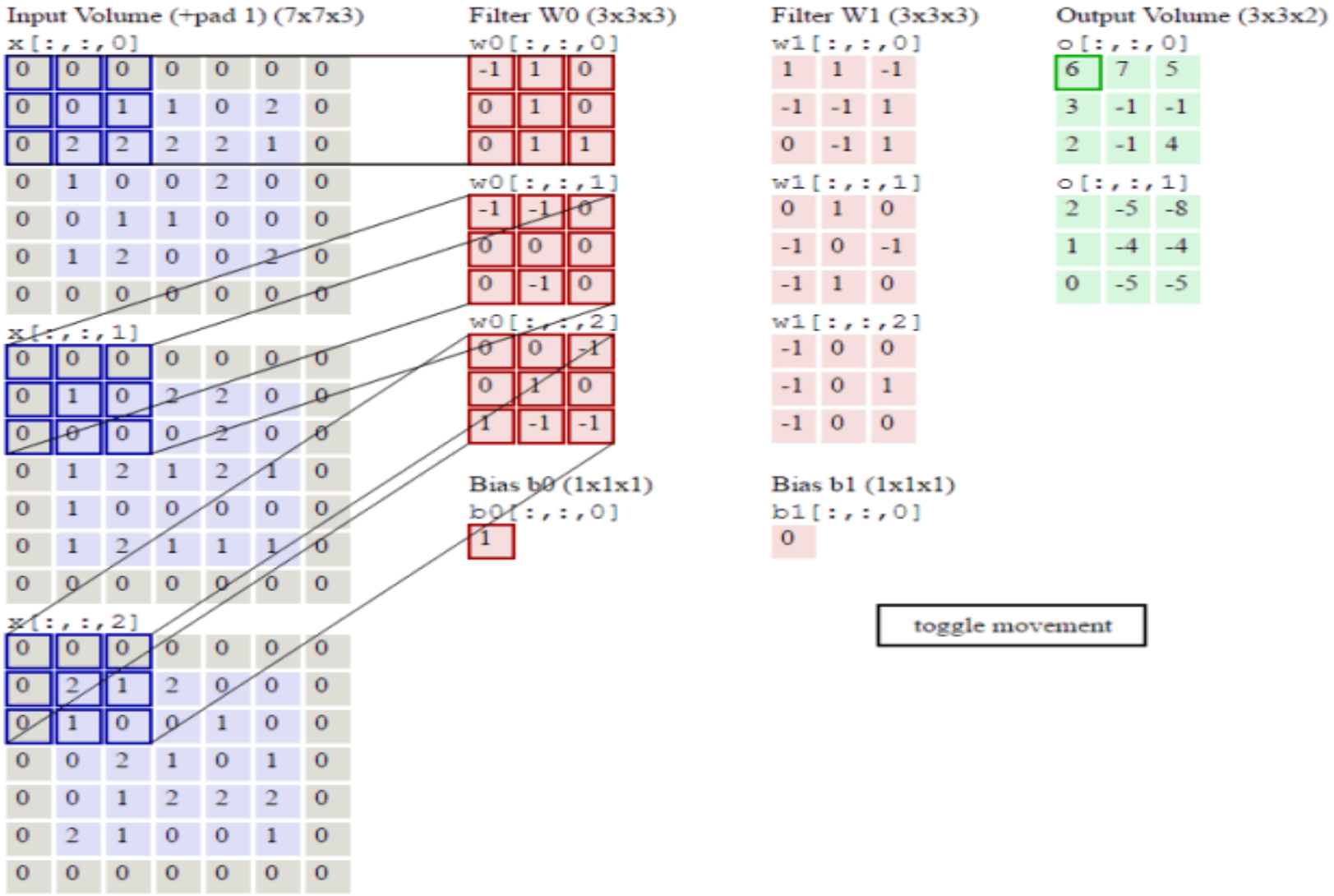
DL models and applications

- Computer vision
  - CNN
  - R-CNN/Fast R-CNN
  - Mask R-CNN
- NLP/Speech
  - RNN
  - LSTM
  - GRU
- Methodologies
  - Transfer Learning
  - Reinforcement Learning

Aarchitecture or CNN



Feature extraction of CNN

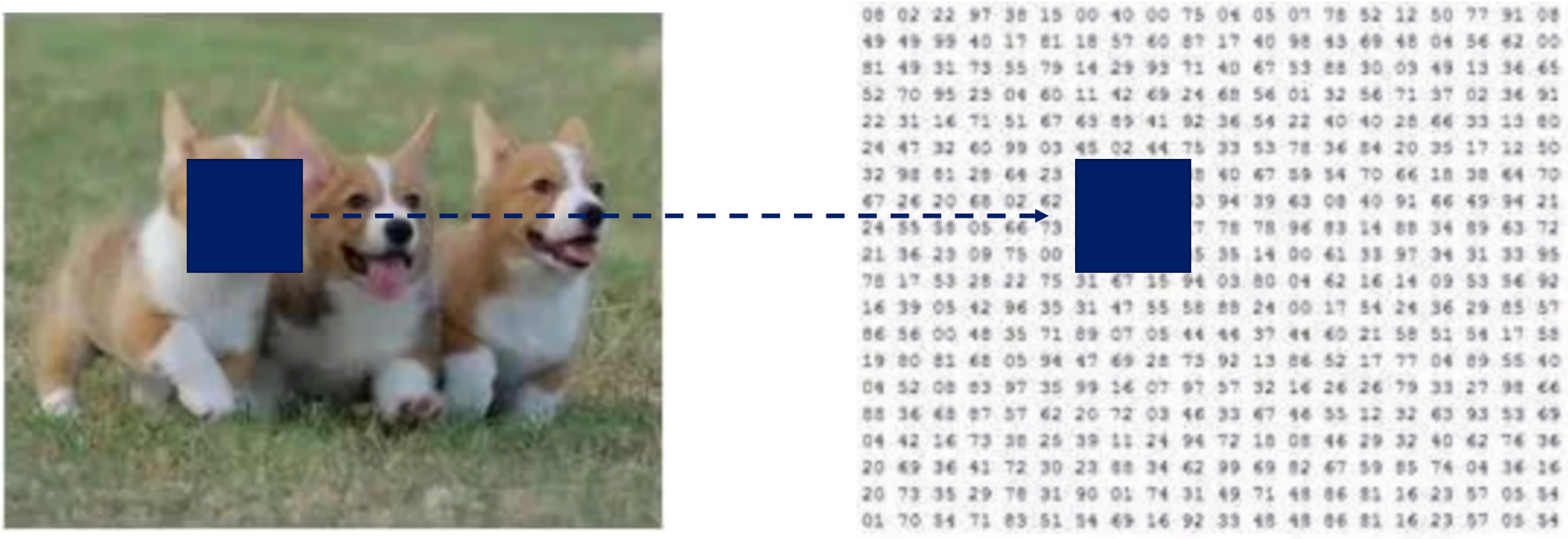


Demo #1

Train a model

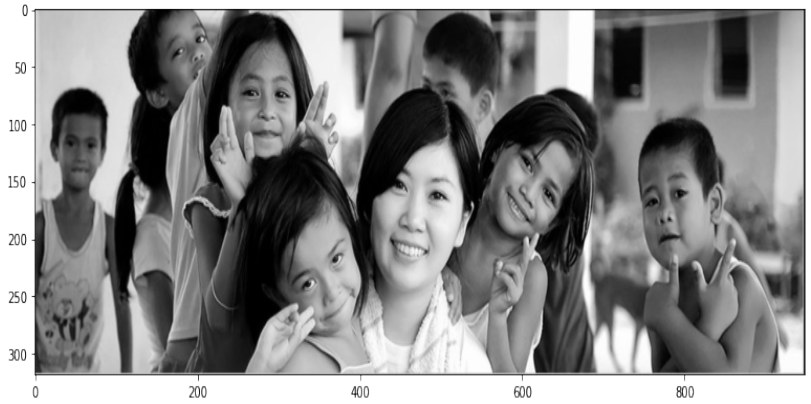
CV: Image format

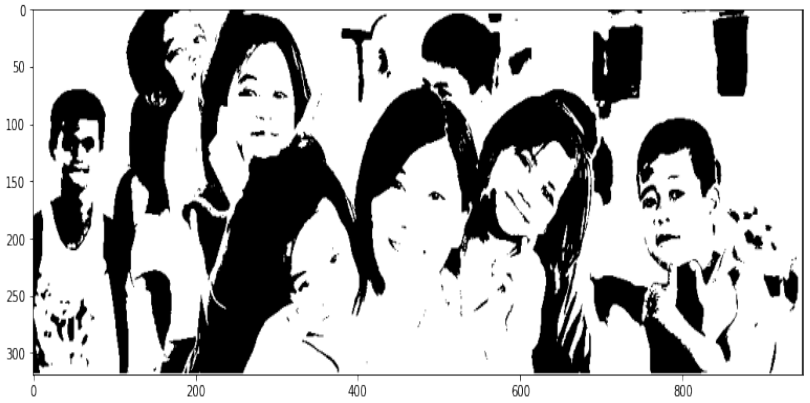
Shape：[height,weight,channel]

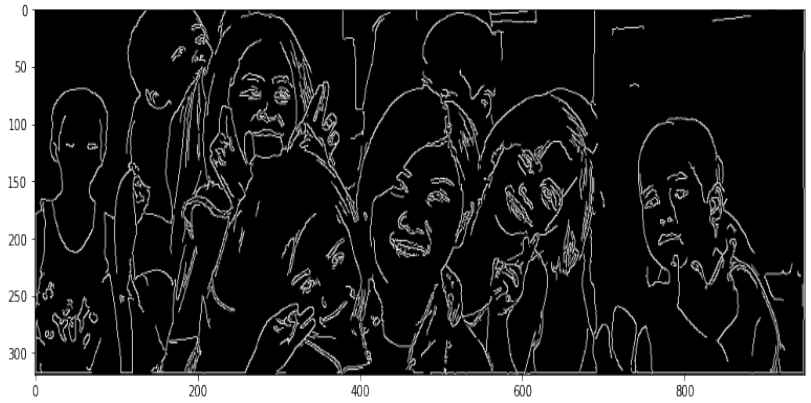


CV: Common translation

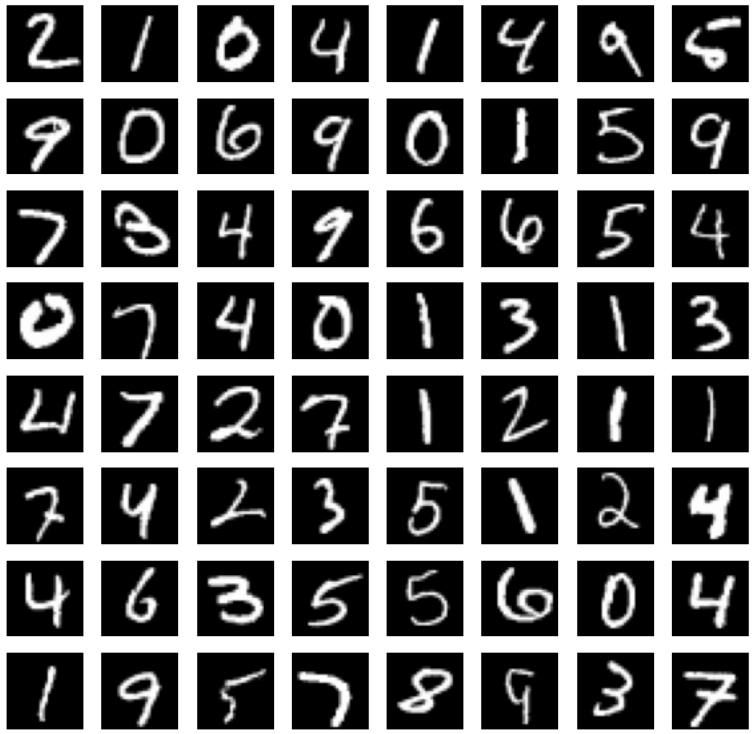
- Grayscale
- Blur
- Binarization
- Edge detection







Demo: mnist recognition



- Create train/test dataset
- Build a CNN model
- Train model
- Performance evaluate
- Visual analysis
- Inference and deployment

Learn from Demo #1

- Train (Hyper parameters selection)
  - CNN layers
  - Learning rate
  - Iteration round
  - Loss/activation functions

- Inference/evaluate
  - Sample unbalance
  - Unexplainable
  - NOT 100% accurate

Demo #2

Use a model