

01

TECART | SMART TECHNOLOGY

CNN

The team



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Recap Workshop week 1

- 1 Pengertian Deep Learning
- 2 Bagaimana Neural Network Bekerja (forwardpropagation , Loss , Backpropagation)
- 3 Permasalahan permasalahan pada deep learning
- 4 Mengklasifikasi Digit pada Mnist dataset

MATERI HARI INI

1

KONVOLUSI

2

APA ITU CNN

3

OPERASI CNN

4

DATA
AUGMENTASI

5

PRETRAINED

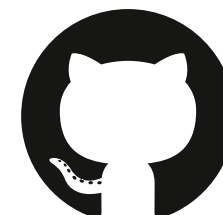
6

DEMO

Available:

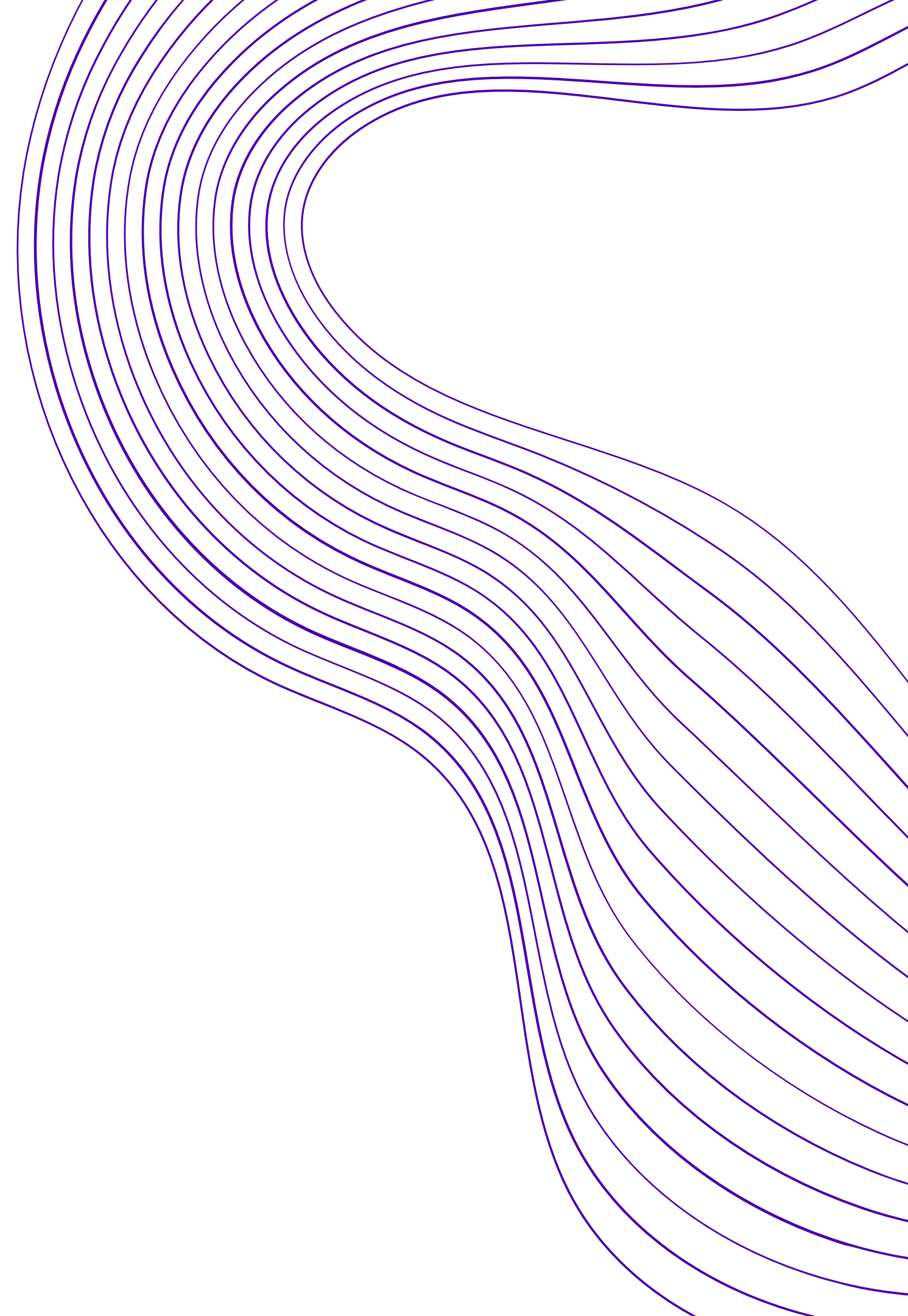


On Recording

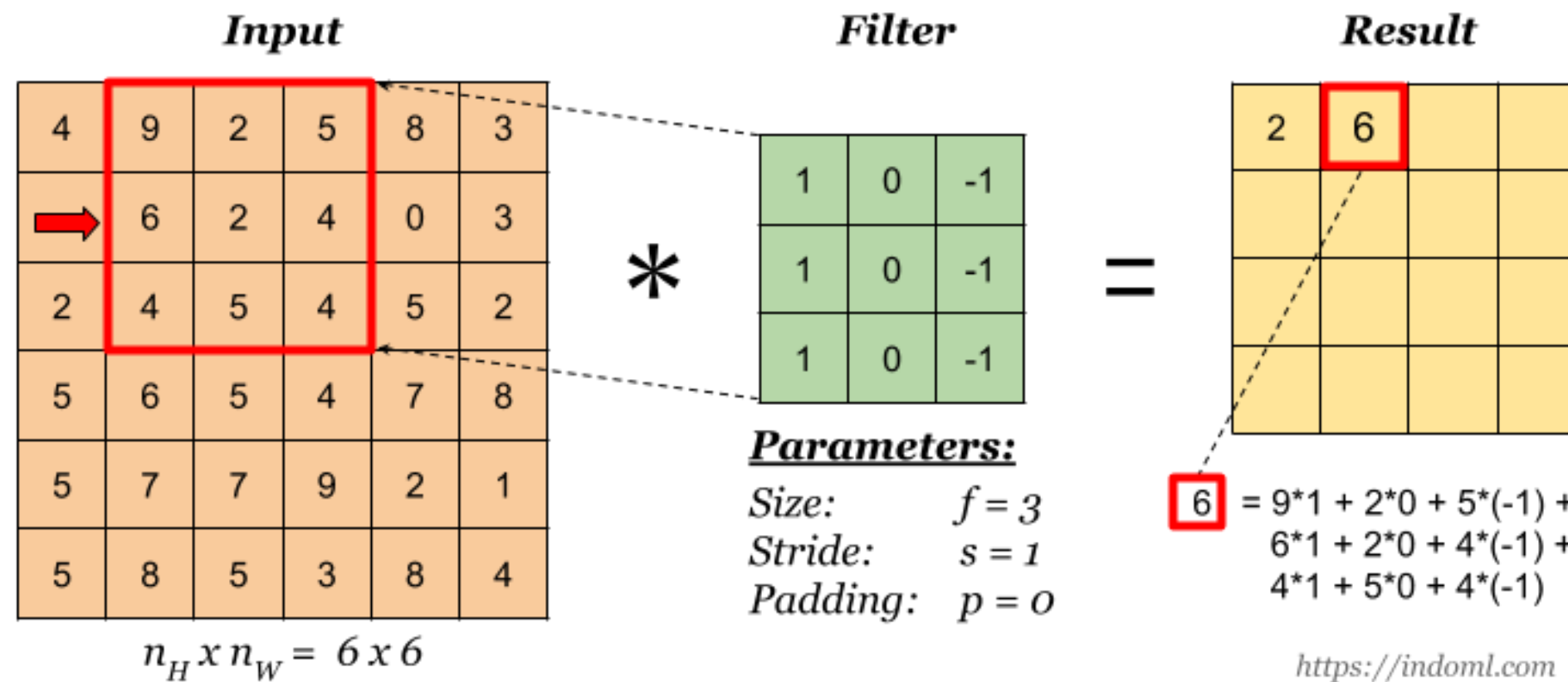
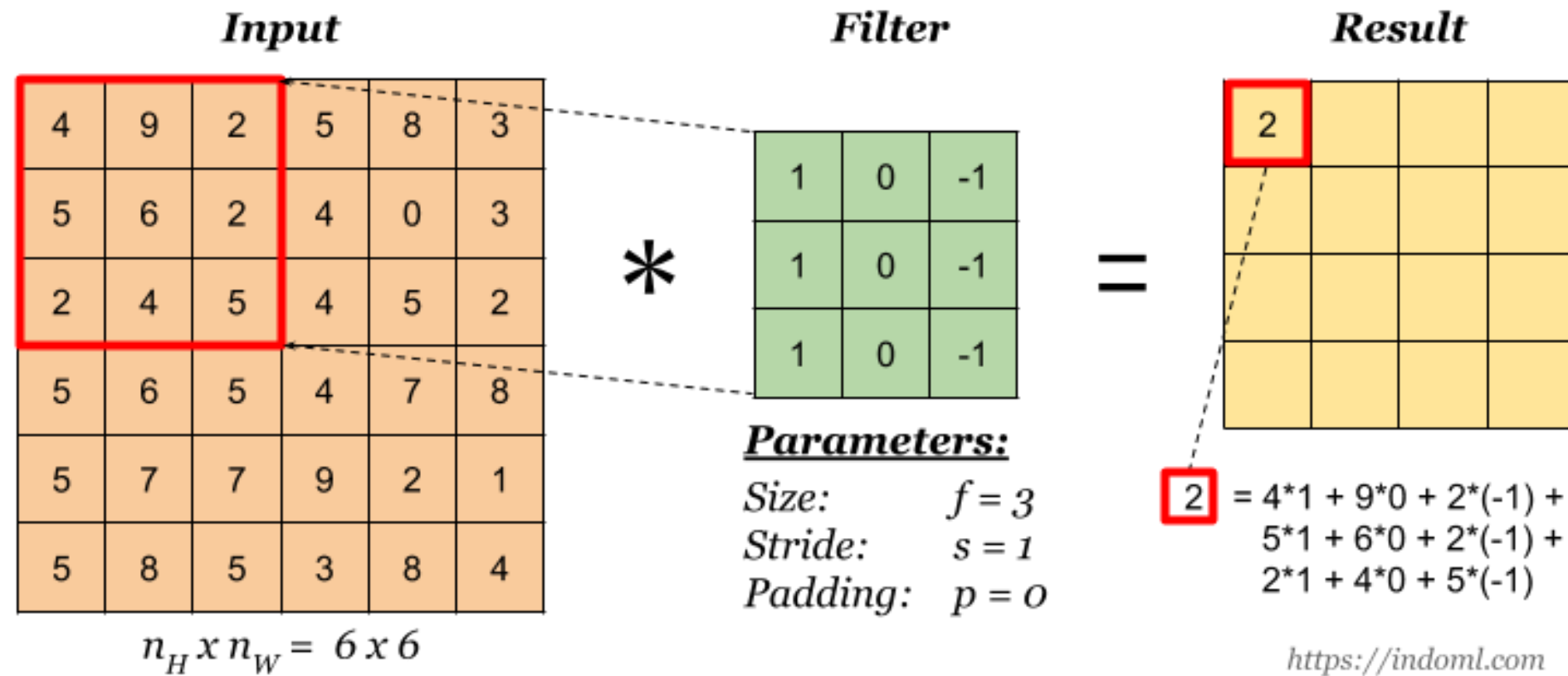


<https://github.com/NaraSurya/Deep-Learning-Workshop-Tecart-2020>

Konvolusi



Konvolusi



Konvolusi

7	2	3	3	8
4	5	3	8	4
3	3	2	8	4
2	8	7	2	7
5	4	4	5	4

*

1	0	-1
1	0	-1
1	0	-1

=

6		

$$\begin{aligned} &7 \times 1 + 4 \times 1 + 3 \times 1 + \\ &2 \times 0 + 5 \times 0 + 3 \times 0 + \\ &3 \times -1 + 3 \times -1 + 2 \times -1 \\ &= 6 \end{aligned}$$

Image Created By <https://medium.com/datadriveninvestor/convolutional-neural-networks-3b241a5da51e>

Konvolusi



Convolutions in image processing | Week 1 | MIT 18.S191 Fall 2020 | Grant Sanderson

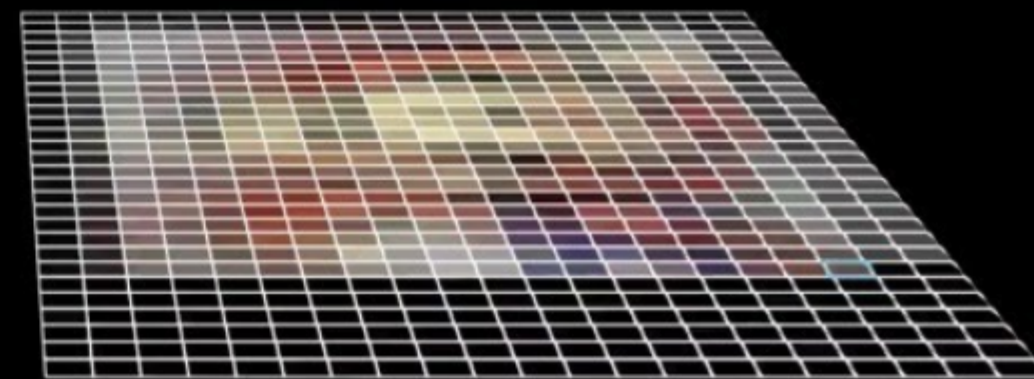
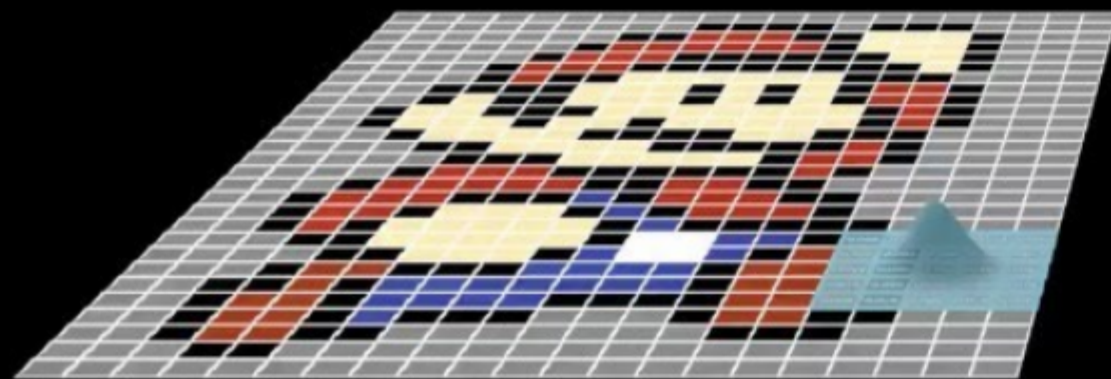


Watch later



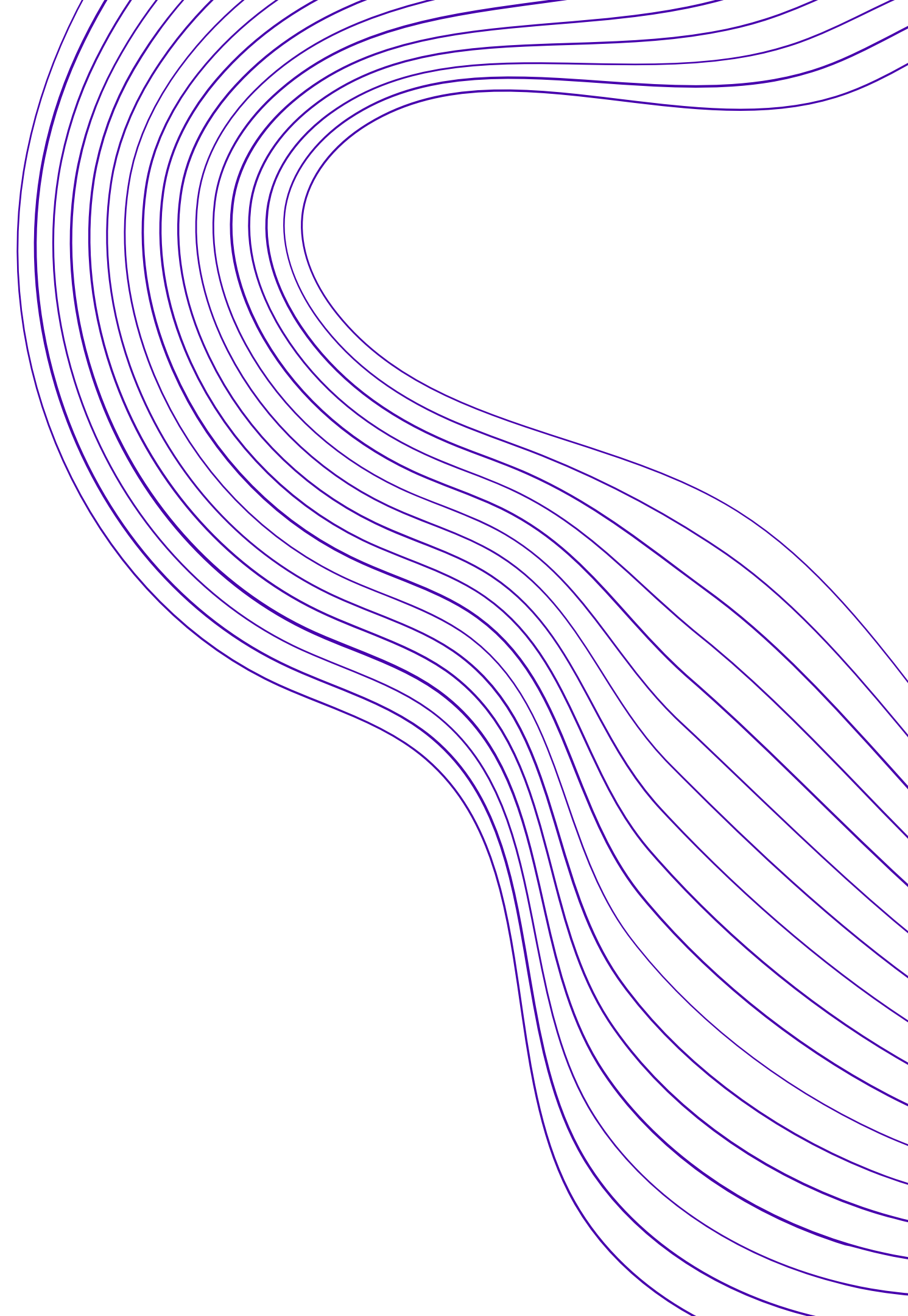
Share

Convolutions



in image processing

**Apa itu
CNN ?**



Kenapa Convolutional Neural Network ?

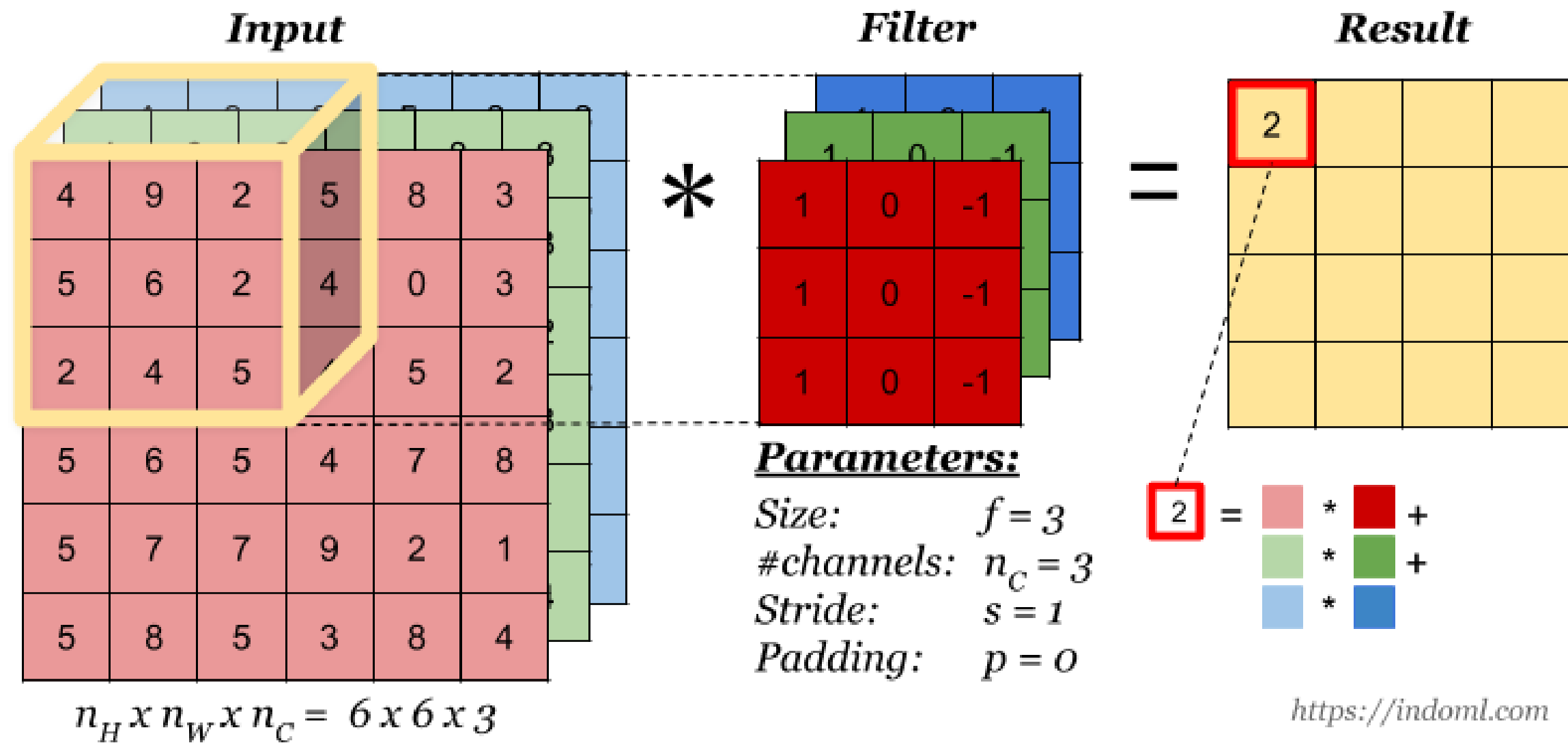
Beberapa data seperti gambar dan text , contohkan saja gambar. piksel piksel pada gambar berelasi dan membentuk sebuah pattern atau feature pada piksel piksel disekelilingnya dan piksel piksel tersebut tidak berdiri individu. Bagaimana cara kita mengcapture feature tersebut ?



Kenapa Convolutional Neural Network ?

Beberapa data seperti gambar dan text , contohkan saja gambar. piksel piksel pada gambar berelasi dan membentuk sebuah pattern atau feature pada piksel piksel disekelilingnya dan piksel piksel tersebut tidak berdiri individu. Bagaimana cara kita mengcapture feature tersebut ?

Convolutional Neural Network



Convolutional Neural Network

1

CNN 1 Dimension

2

CNN 2 Dimension

3

CNN 3 Dimension

Key konsep dari Convolutional Neural Network adalah Neural Network yang dapat mengcapture pattern atau feature berdasarkan local region / windows kernel sehingga bagian data yang berelasi dengan bagian data tetangga informasi tersebut dapat dicapture

Convolutional Neural Network

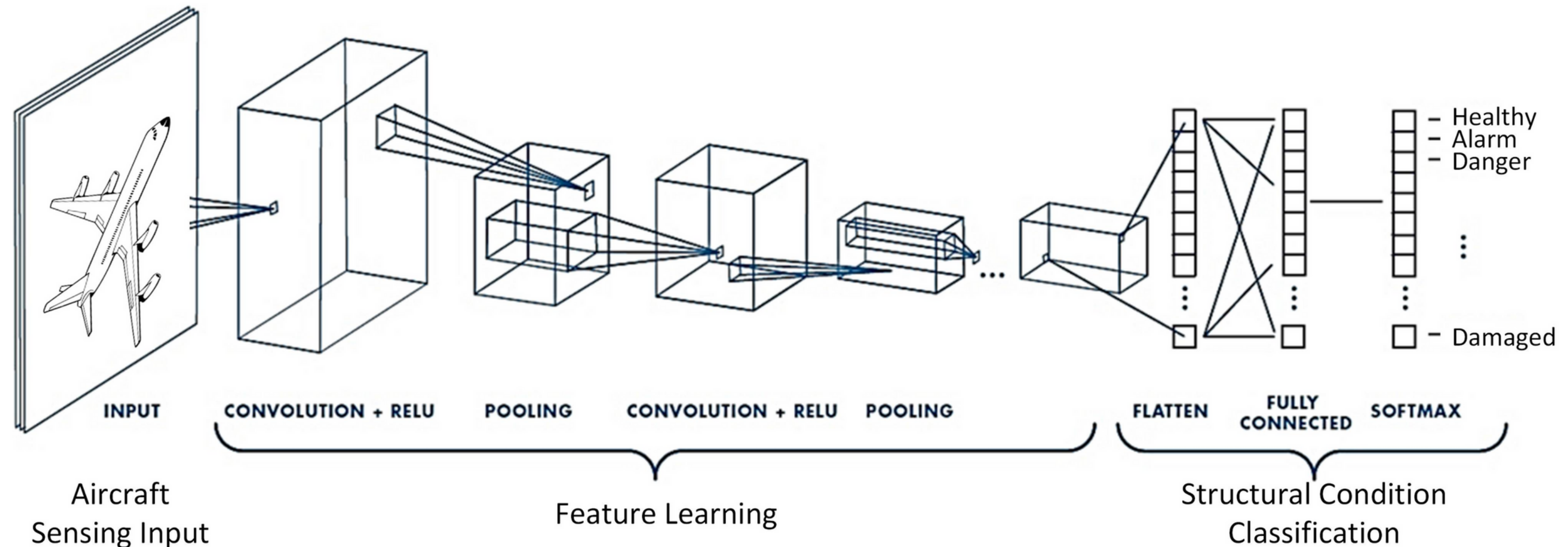
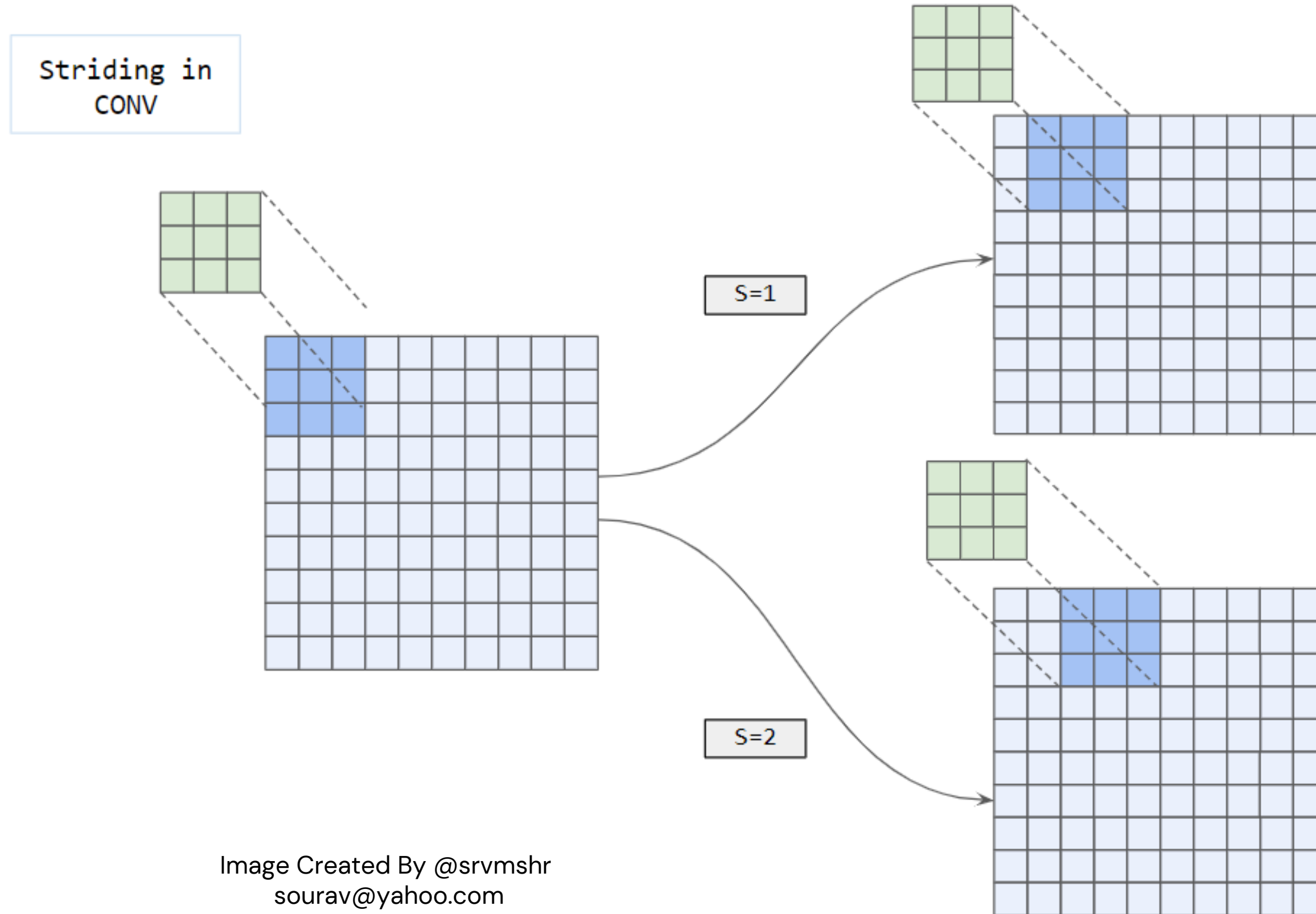


Image Created By Tabian, Iuliana, Hailing Fu, and Zahra Sharif Khodaei. "A convolutional neural network for impact detection and characterization of complex composite structures." *Sensors* 19.22 (2019): 4933.

Operation Convolutional



Stride



padding

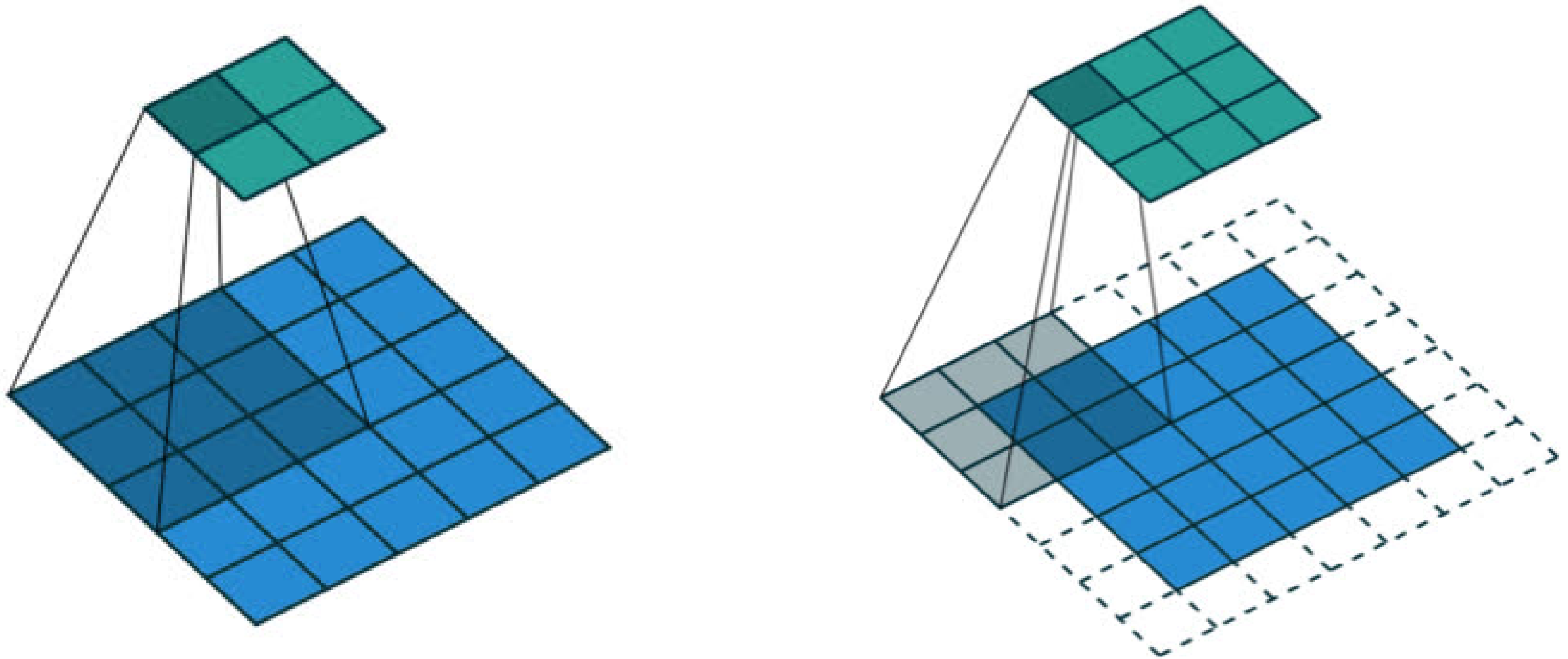
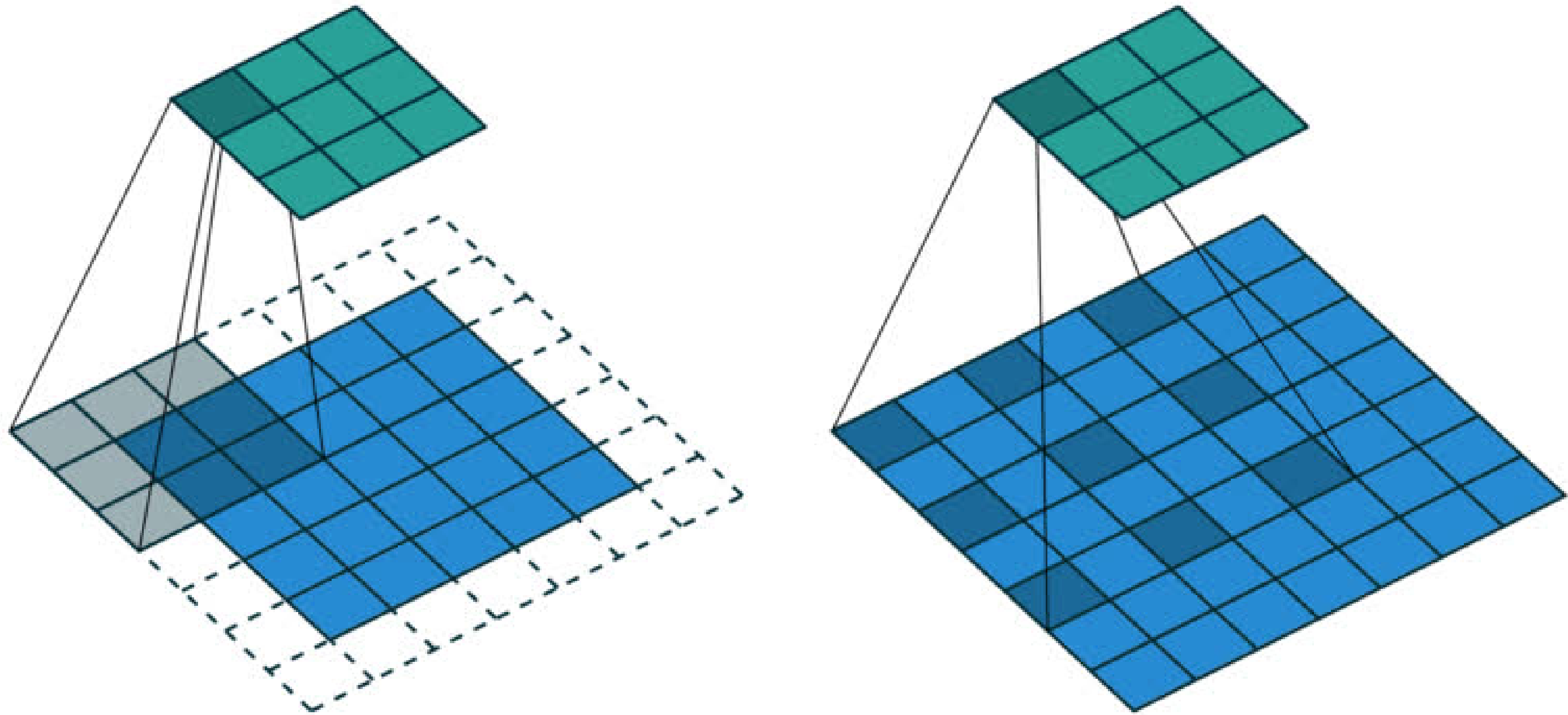


Image Created By Wikipedia

Dilated Convolution



Pooling Layer

Feature Map

1	3	2	5
0	8	7	0
6	3	1	9
2	3	0	7

Max Pooling

Average Pooling

Computer Vision

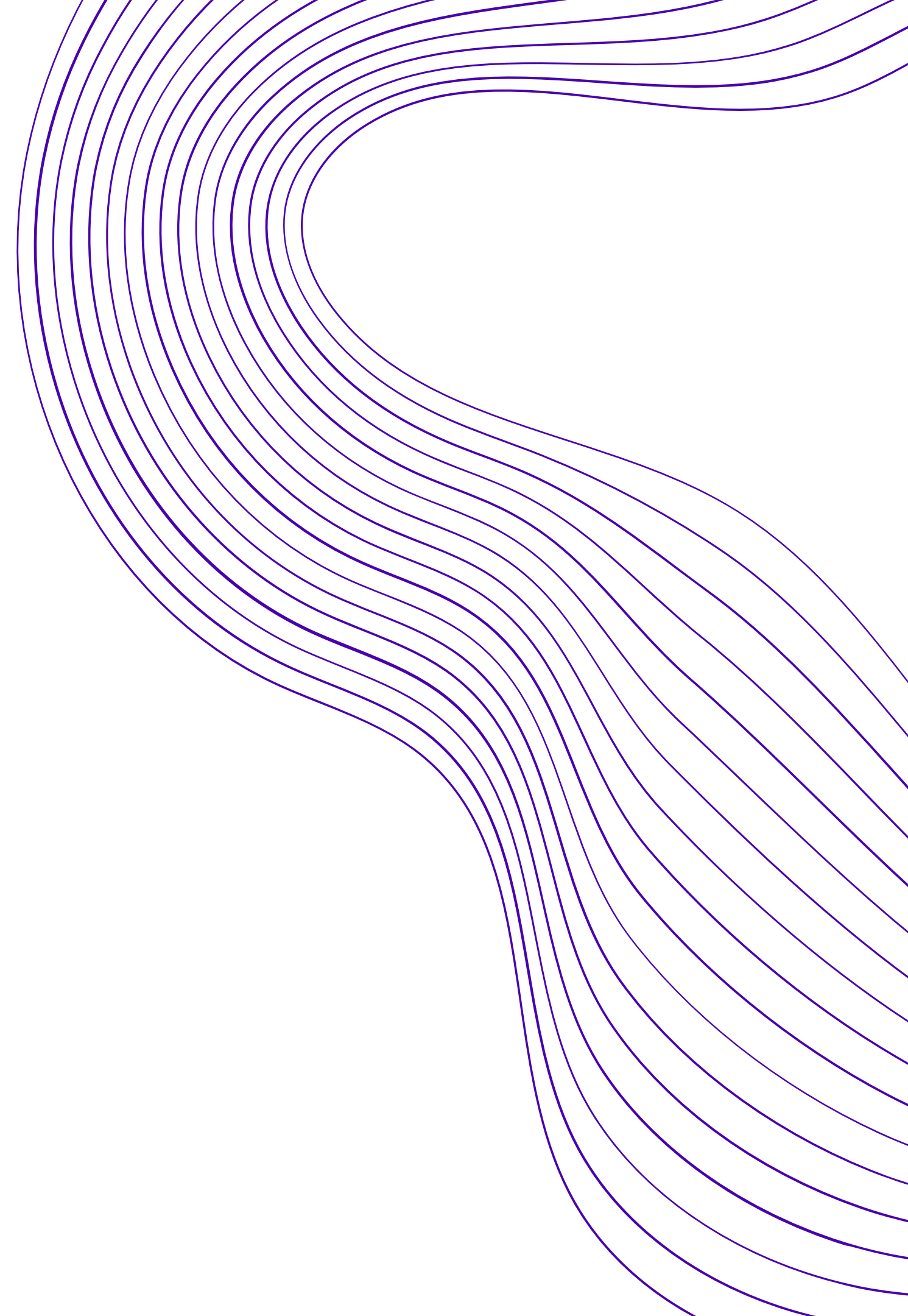


Image Augmentasi

Image Augmentasi merupakan proses penambahan jumlah data training dengan membuat sedikit perubahan pada example namun tetap tidak merubah labelnya.

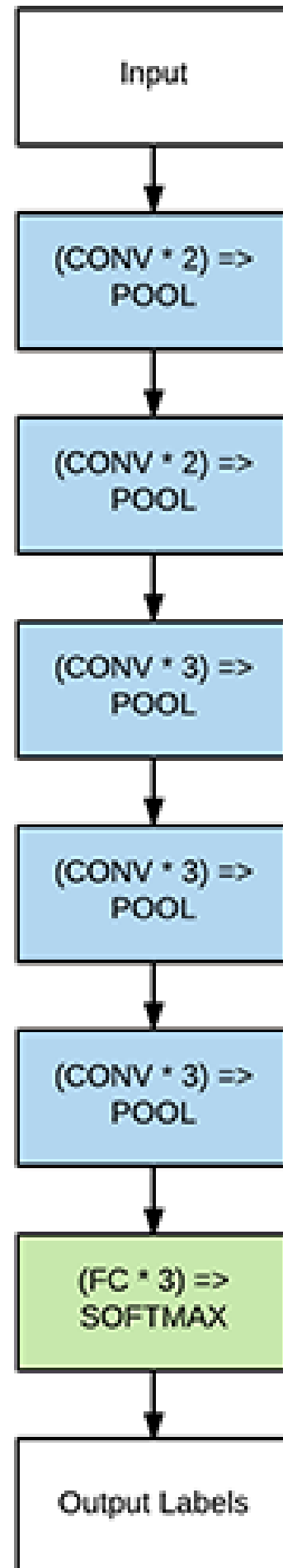
Common Technique Image Augmentasi

1. Flipping and Crop
2. Rotate
3. Randomly Change Brightness
4. dll

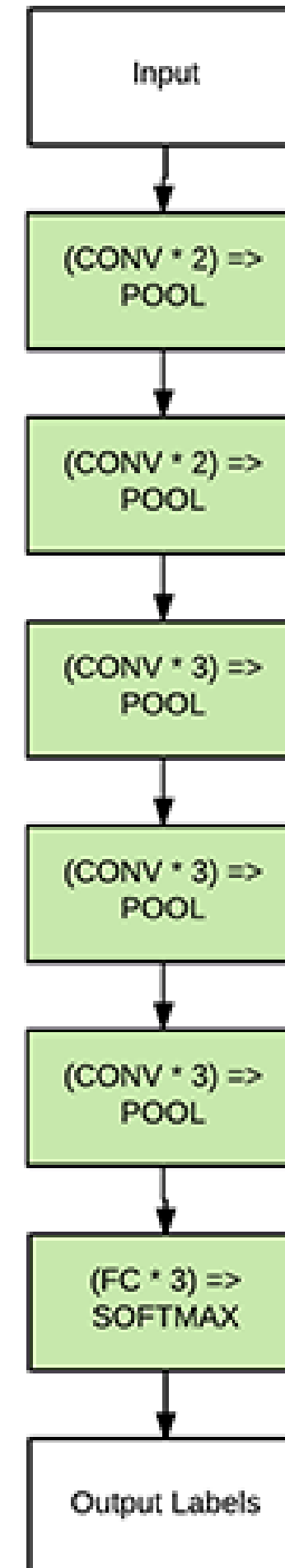
Finetuning Pre-trained

Freeze Early
Layers in
Network

Only Train
FC Layers



Unfreeze Early
Layers & Train
All



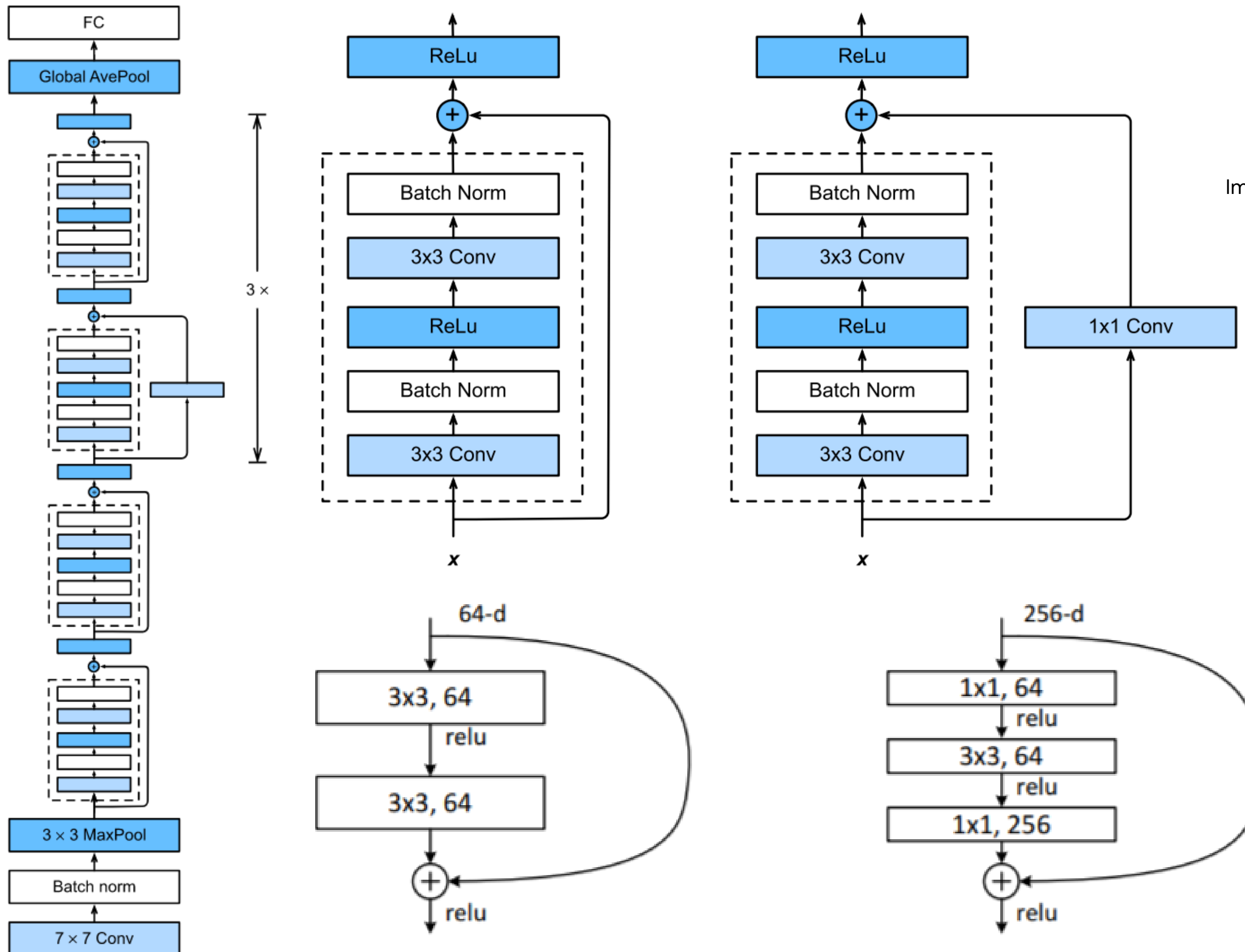
VGG



Learn More : Simonyan, Karen, and Andrew Zisserman. "Very deep convolutional networks for large-scale image recognition." arXiv preprint arXiv:1409.1556 (2014).

Resnet

Image Created By Book Dive into Deep Learning



Learn More : He, Kaiming, et al. "Deep residual learning for image recognition." Proceedings of the IEEE conference on computer vision and pattern recognition. 2016.

Densenet

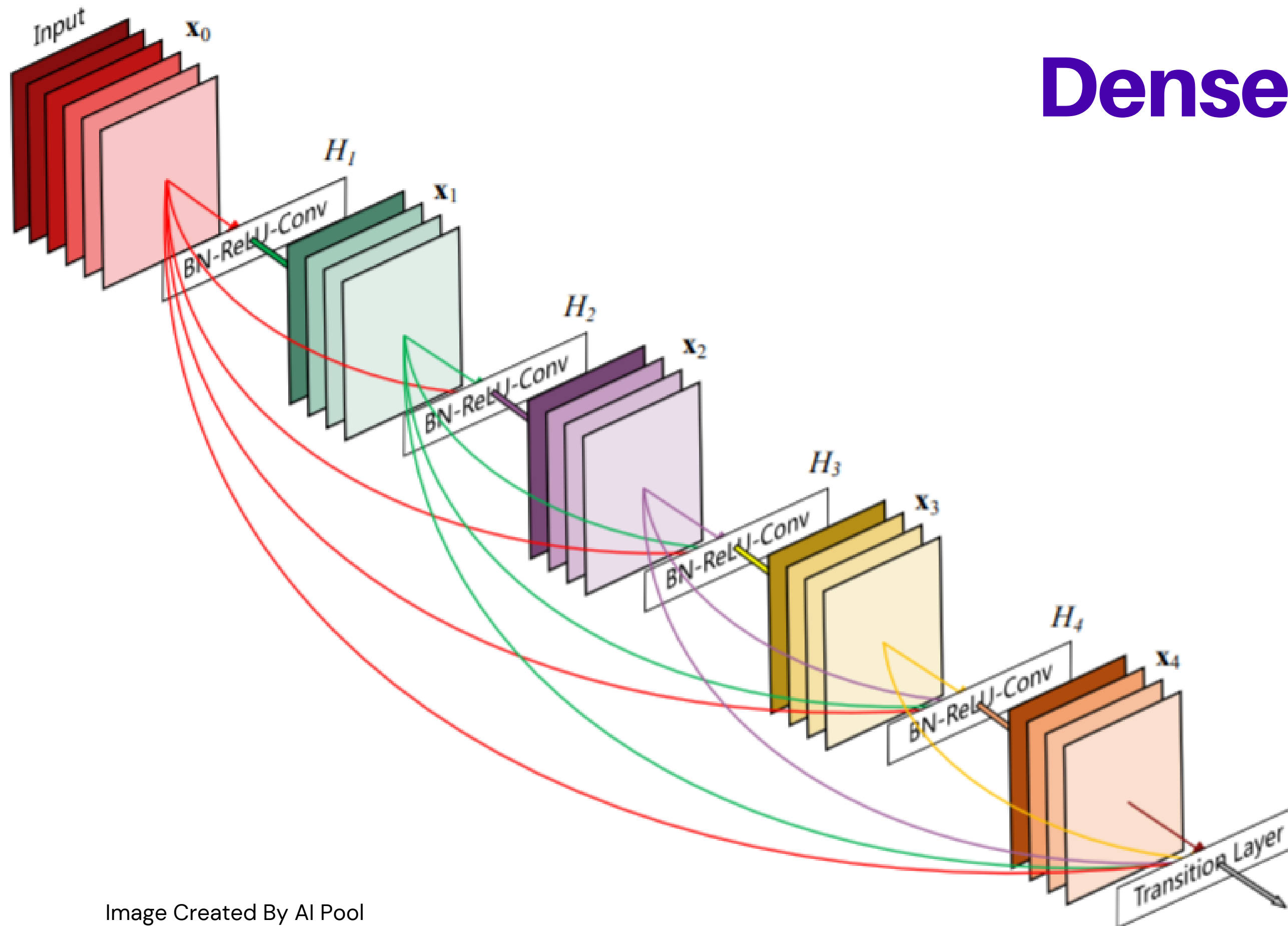


Image Created By AI Pool

Learn More : Huang, Gao, et al.
"Densely connected
convolutional networks."
Proceedings of the IEEE
conference on computer
vision and pattern
recognition. 2017.

Computer Vision Application

1

Image Classification

2

Object Detection

3

Object Tracking

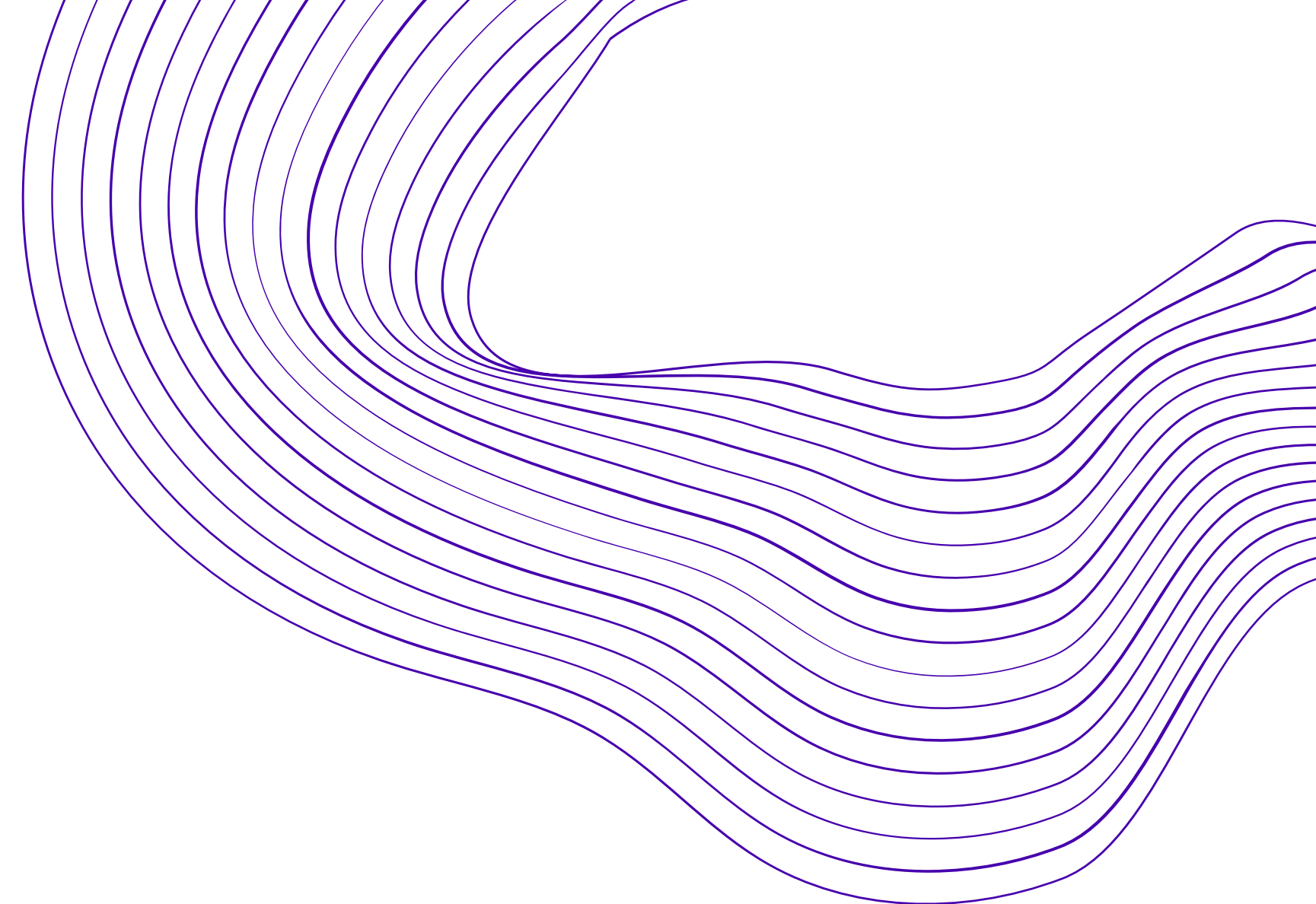
4

Pose Estimation

5

Scene Labelling

Demo



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Next Week

Week 1
Neural Network

Week 2
CNN

Week 3
RNN

Week 4
Attention Mechanism &
Transformer

See You...