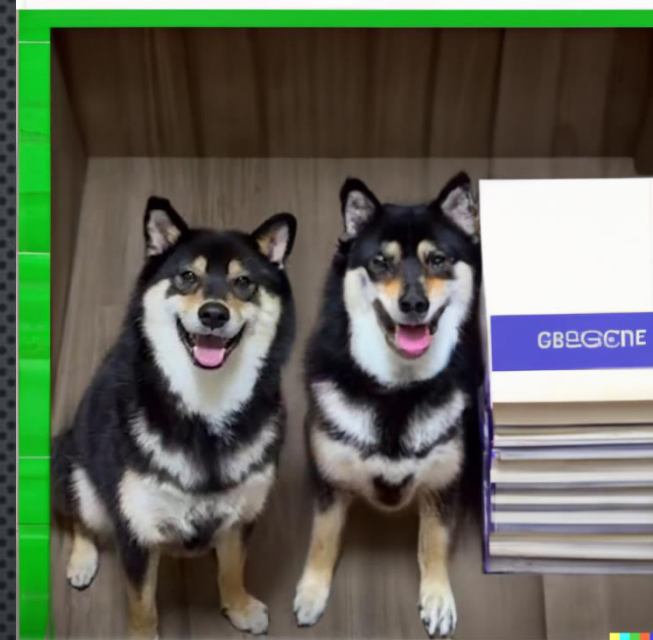


AI人工智慧— CNN卷積神經網路



CNN卷積神經網路
learning by doing

von anwendeng

改善神經網路



github.com/tflearn/tflearn/issues/1172

tflearn import issue #1172

Open

krinali1901 opened this issue on Jun 11 · 5 comments



krinali1901 commented on Jun 11

Hello,

I am trying to run a code using tflearn. But even if i just try to import tflearn then it gives the below error

```
WARNING:tensorflow:From /Library/Frameworks/Python.framework/Versions/3.10/lib/python3.10/site-packages/tensorflow/python/compat/v2_compat.py:107: disable_resource_variables (from tensorflow.python.ops.variable_scope) is deprecated and will be removed in a future version.
```

Instructions for updating:

non-resource variables are not supported in the long term

```
ImportError: cannot import name 'is_sequence' from 'tensorflow.python.util.nest'
```

```
(/Library/Frameworks/Python.framework/Versions/3.10/lib/python3.10/site-packages/tensorflow/python/util/nest.py)
```

What can be done to resolve this?



MihaMarkic commented on Jul 27

And as expected, `is_sequence` is imported in [tflearn/layers/recurrent.py](#) file.



MihaMarkic commented on Jul 27

Created a [PR](#)



awsumbill commented on Aug 24

In the meantime you can `pip install tensorflow<2.13` to get around this until it's fixed

```
▶ 1 import keras
2 from keras.models import Sequential
3 from keras.layers import Dense, Dropout, Flatten, Conv2D, MaxPooling2D
4 from keras.layers import BatchNormalization
```

```
[2] 1 !pip install tensorflow==2.12
```

```
Requirement already satisfied: tensorflow==2.12 in /usr/local/lib/python3.10/dist-packages (2.12.0)
Requirement already satisfied: absl-py>=1.0.0 in /usr/local/lib/python3.10/dist-packages (from tensorflow==2.12) (1.4.0)
Requirement already satisfied: astunparse>=1.6.0 in /usr/local/lib/python3.10/dist-packages (from tensorflow==2.12) (1.6.3)
Requirement already satisfied: flatbuffers>=2.0 in /usr/local/lib/python3.10/dist-packages (from tensorflow==2.12) (23.5.26)
Requirement already satisfied: gast<=0.4.0,>=0.2.1 in /usr/local/lib/python3.10/dist-packages (from tensorflow==2.12) (0.4.0)
Requirement already satisfied: google-pasta>=0.1.1 in /usr/local/lib/python3.10/dist-packages (from tensorflow==2.12) (0.2.0)
Requirement already satisfied: grpcio<2.0,>=1.24.3 in /usr/local/lib/python3.10/dist-packages (from tensorflow==2.12) (1.59.3)
Requirement already satisfied: h5py>=2.9.0 in /usr/local/lib/python3.10/dist-packages (from tensorflow==2.12) (3.9.0)
Requirement already satisfied: jax>=0.3.15 in /usr/local/lib/python3.10/dist-packages (from tensorflow==2.12) (0.4.20)
Requirement already satisfied: keras<2.13,>=2.12.0 in /usr/local/lib/python3.10/dist-packages (from tensorflow==2.12) (2.12.0)
Requirement already satisfied: libclang>=13.0.0 in /usr/local/lib/python3.10/dist-packages (from tensorflow==2.12) (16.0.6)
Requirement already satisfied: numpy<1.24,>=1.22 in /usr/local/lib/python3.10/dist-packages (from tensorflow==2.12) (1.23.5)
```

```
1 !pip install tflearn
```

```
Requirement already satisfied: tflearn in /usr/local/lib/python3.10/dist-packages  
Requirement already satisfied: numpy in /usr/local/lib/python3.10/dist-packages  
Requirement already satisfied: six in /usr/local/lib/python3.10/dist-packages  
Requirement already satisfied: Pillow in /usr/local/lib/python3.10/dist-packages
```

▼ Load *and preprocess* data

```
[4] 1 import tflearn.datasets.oxflower17 as oxflower17  
    2 X, Y = oxflower17.load_data(one_hot=True)
```

```
WARNING:tensorflow:From /usr/local/lib/python3.10/dist-packages/tflearn/training_utils.py:100: tf.nn.conv2d is deprecated and will be removed in a future version.  
Instructions for updating:  
non-resource variables are not supported in the long term
```

6472b8588e

10 branches 8 tags

Go to file

Code



MihaMarkic Replaces is_sequence() with is_sequence_or_composite()

docs	Extract method from duplicate
examples	Fix syntax warning over compa
tests	Fixes for 0.5.0 (tflearn#1158)
tflearn	Replaces is_sequence() with is_
tutorials	Update quickstart.md (tflearn#
.gitignore	add pytest cov for test coverag
.travis.yml	fix bug
ACKNOWLEDGMENTS	[WIP] new estimators (tflearn#994) 6 years ago

Local

Codespaces

Clone

HTTPS GitHub CLI

<https://github.com/MihaMarkic/tflearn.git>

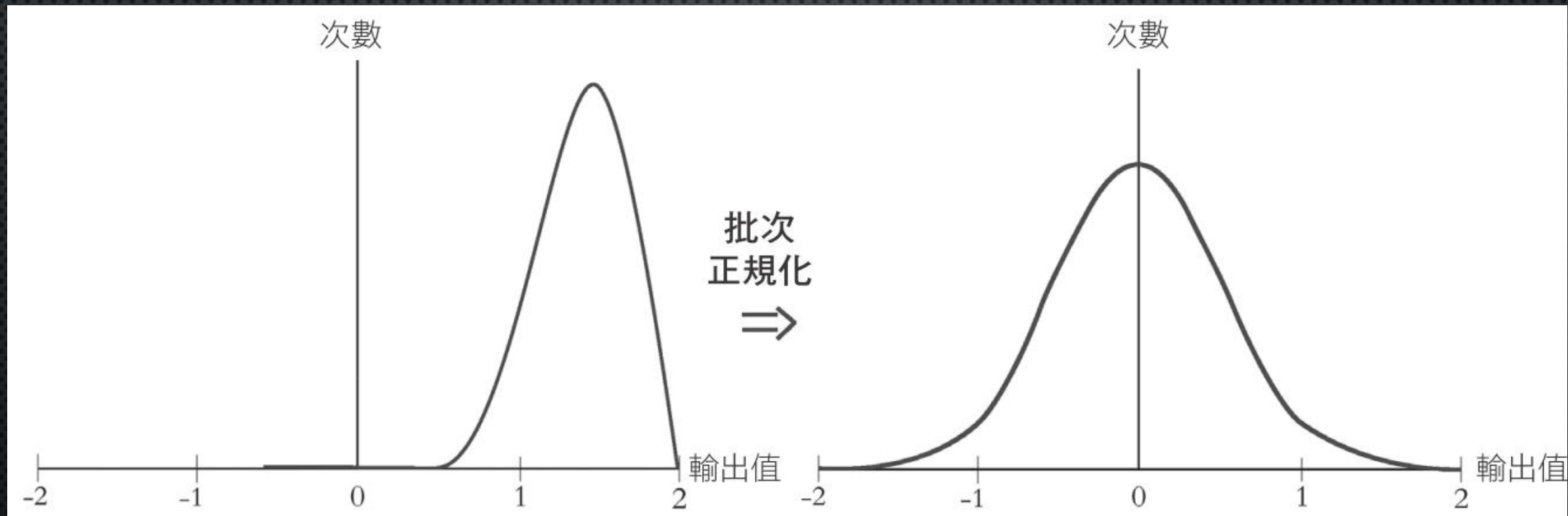
Open with GitHub Desktop

Download ZIP

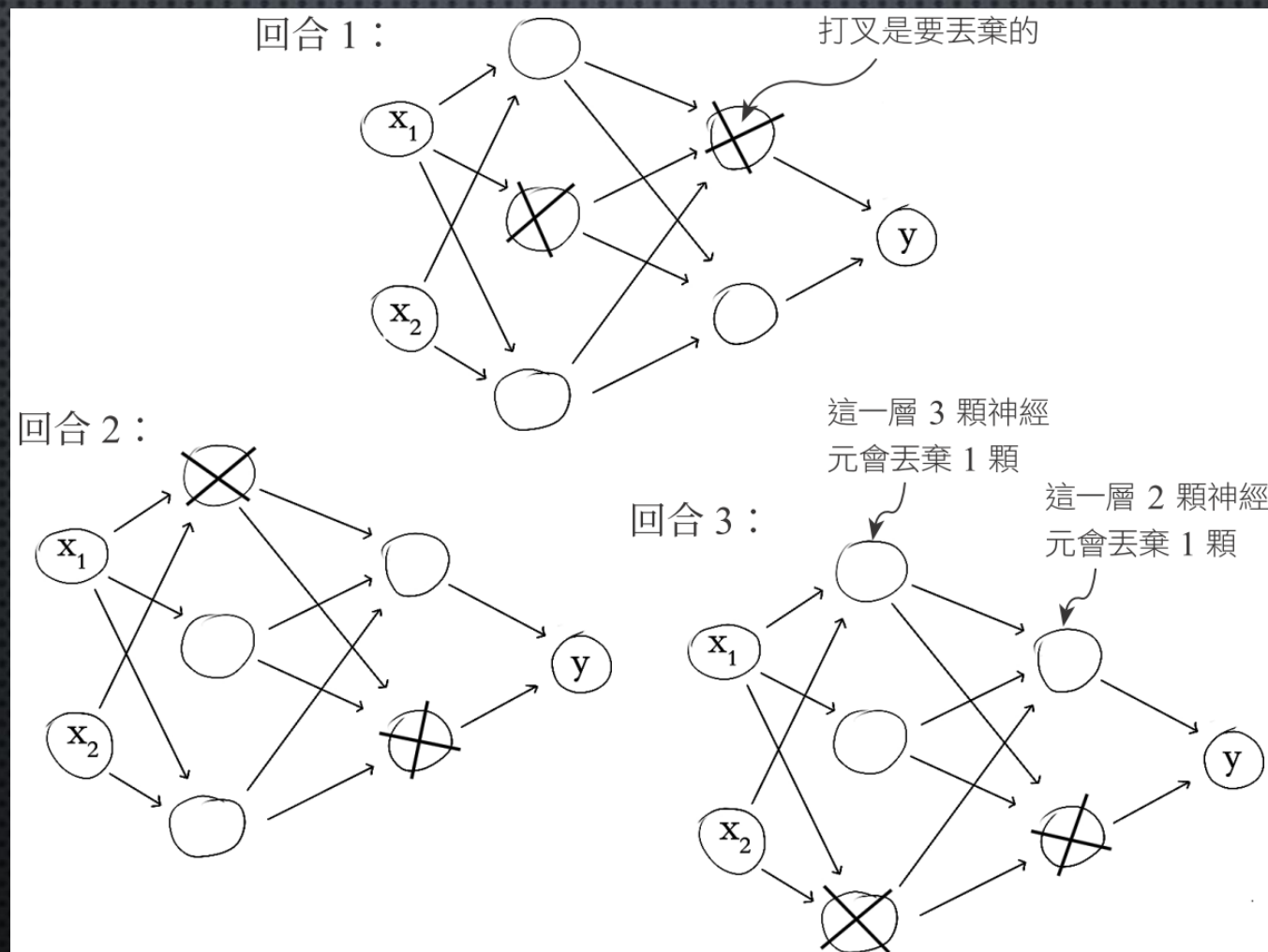
梯度爆炸 (exploding gradients)

- 從最末隱藏層往第 1 隱藏層做反向傳播運算時，損失函數對「最靠近輸入端權重參數的偏導數」反而會越來越誇張

用批次正規化 (batch normalization) 解決梯度不穩定的問題



dropout (丟棄法) 避免過度配適 (overfitting) 的技巧



Adam

```
1 print('Loss function修改')
2 model.compile(
3     loss='categorical_crossentropy',
4     optimizer='adam',
5     metrics=['accuracy']
6 )
```

- Adam 在訓練後期較能發揮作用。
- Adam 保留了 Momentum 對過去梯度的方向做梯度速度調整與Adam對過去梯度的平方值做learning rate的調整，再加上Adam有做參數的”偏離校正”，使得每一次的學習率都會有個確定的範圍，會讓參數的更新較為平穩。

單純的卷積convolution計算就有下列的效果



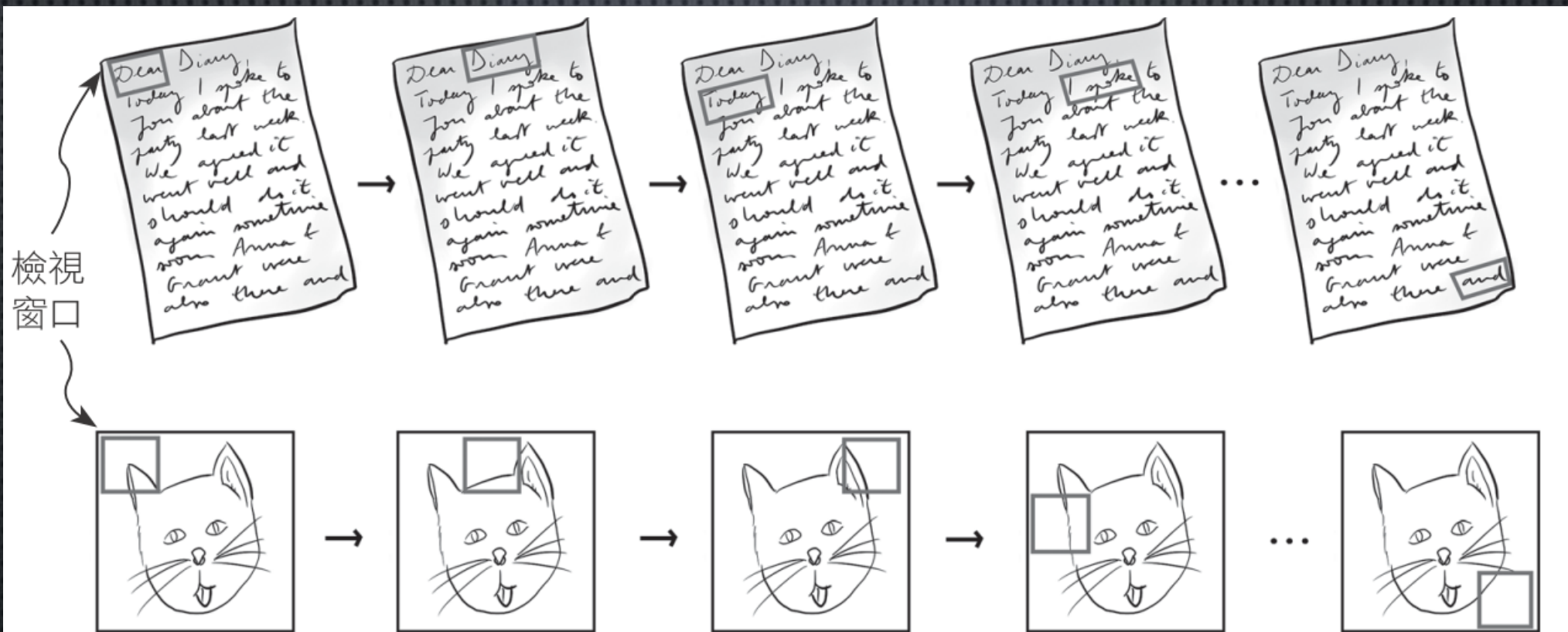
卷積神經網路

- 指的是含有一或多個卷積層 (**convolutional layer**) 的神經網路

卷積層的基本概念

- 主要負責做影像的特徵萃取 (feature extraction)

認識卷積核 (convolutional kernel)



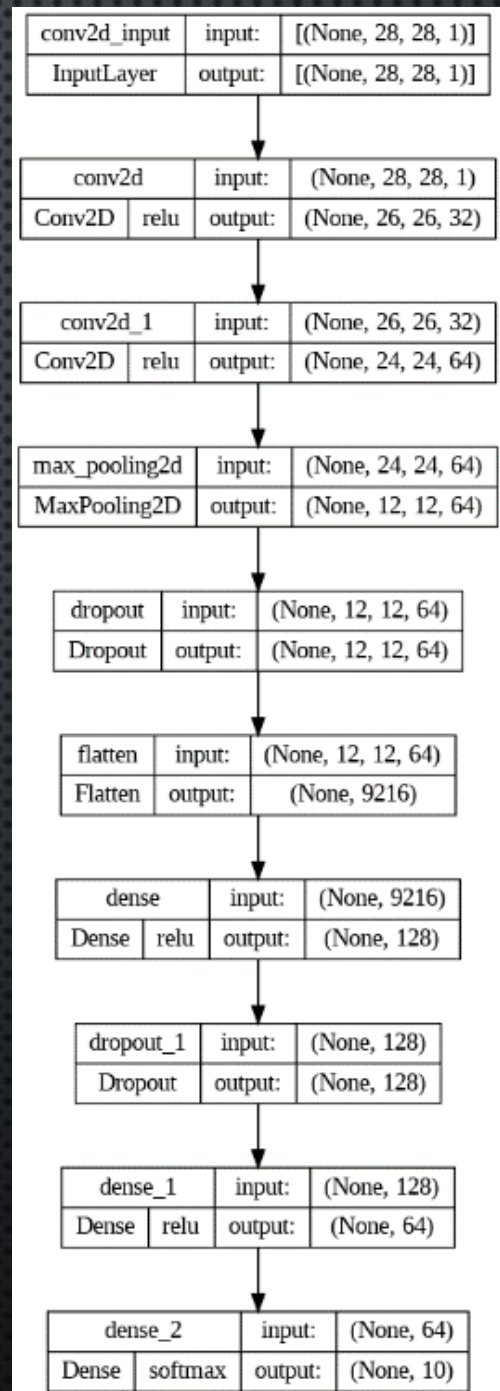
▲ 圖 10.1: 橫排書籍 (上圖) 一般的閱讀順序是從左到右, 由上而下, 整頁讀完後視線剛好會停留在右下角。卷積核 (下圖) 的運作與此類似, 像素檢視窗口從影像左上角出發, 從第 1 列開始從左掃到右, 然後下一列以同樣方式接著掃, 抵達右下角代表所有像素都掃完

1 model.summary()

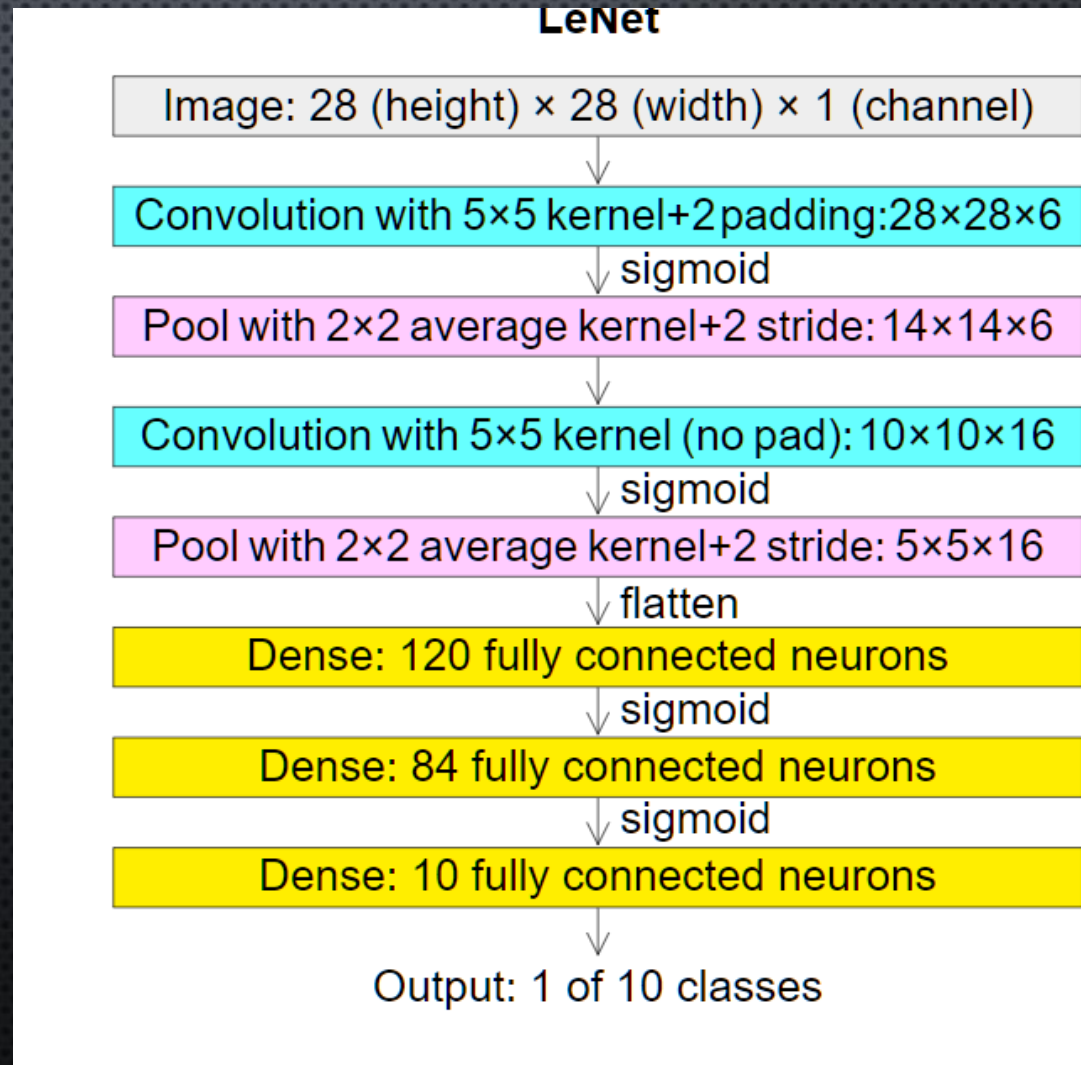
Model: "sequential"

Layer (type)	Output Shape	Param #
conv2d (Conv2D)	(None, 26, 26, 32)	320
conv2d_1 (Conv2D)	(None, 24, 24, 64)	18496
max_pooling2d (MaxPooling2D)	(None, 12, 12, 64)	0
dropout (Dropout)	(None, 12, 12, 64)	0
flatten (Flatten)	(None, 9216)	0
dense (Dense)	(None, 128)	1179776
dropout_1 (Dropout)	(None, 128)	0
dense_1 (Dense)	(None, 64)	8256
dense_2 (Dense)	(None, 10)	650

Total params: 1207498 (4.61 MB)
Trainable params: 1207498 (4.61 MB)



LeNet: By Cmglee - Own work, CC BY-SA 4.0,
<https://commons.wikimedia.org/w/index.php?curid=104937230>



用多個濾鏡 (FILTER) 萃取不同的特徵

- 多濾鏡的概念

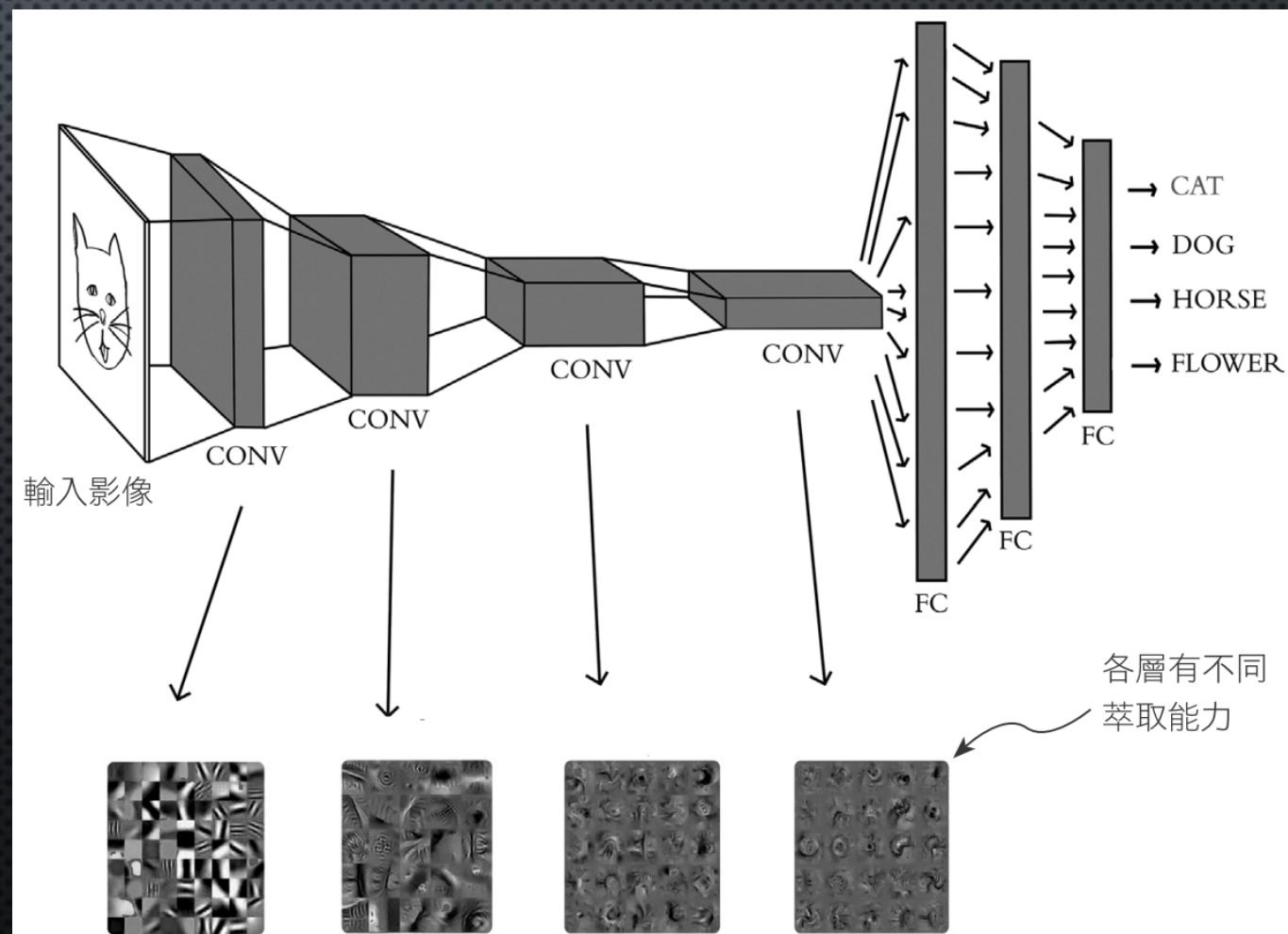


圖 10.2: 從人眼看到的各種層之產圖

濾鏡的數量建議

- 資料的複雜度來調整。
- 越後面的卷積層用的濾鏡越多。
- 計算複雜度越低越好。

```
13
14     int main()
15     try
16     {
17         cout << "卷積計算練習!\n";
18         Mat x = imread("123.jpg"), im, im2;
19         imshow("原圖", x);
20
21         Mat k0 = (Mat_<double>(3, 3) << 1,2,1,2,4,2,1,2,1);
22         k0 = k0 / 16.0;
23         kernel(x, im, k0, "高斯模糊");
24
```



```
13
14     int main()
15     try
16     {
17         cout << "卷積計算練習!\n";
18         Mat x = imread("123.jpg"), im, im2;
19         imshow("原圖", x);
20
21         Mat k0 = (Mat_<double>(3, 3) << 1,2,1,2,4,2,1,2,1);
22         k0 = k0 / 16.0;
23         kernel(x, im, k0, "高斯模糊");
24
25         Mat k1 = (Mat_<double>(3, 3) << 0, -1, 0,
26                 kernel(x, im, k1, "Laplac邊緣");
```



```
14 int main()
15 try
16 {
17     cout << "卷積計算練習!\n";
18     Mat x = imread("123.jpg"), im, im2;
19     imshow("原圖", x);
20
21     Mat k0 = (Mat_<double>(3, 3) << 1,2,1,2,4,2,1,2,1);
22     k0 = k0 / 16.0;
23     kernel(x, im, k0, "高斯模糊");
24
25     Mat k1 = (Mat_<double>(3, 3) << 0, -1, 0, -1, 4, -1, 0, -1, 0);
26     kernel(x, im, k1, "Laplac邊緣");
27     Mat k2 = (Mat_<double>(3, 3) << 0, -1, 0, -1, 5, -1, 0, -1, 0);
28     kernel(x, im, k2, "Laplac銳利");
29     Mat k3 = (Mat_<double>(3, 3) << -1, -1, -1, -1, 5, -1, -1, -1, -1);
30     kernel(x, im, k3, "邊緣2", 1);
31     kernel(x, im, k3, "邊緣2^2");
```




```

14     int main()
15     try
16     {
17         cout << "卷積計算練習!\n";
18         Mat x = imread("123.jpg"), im, im2;
19         imshow("原圖", x);
20
21         Mat k0 = (Mat_<double>(3, 3) << 1,2,1,2,4,2,1,2,1);
22         k0 = k0 / 16.0;
23         kernel(x, im, k0, "高斯模糊");
24
25         Mat k1 = (Mat_<double>(3, 3) << 0, -1, 0, -1, 4, -1, 0, -1, 0);
26         kernel(x, im, k1, "Laplac邊緣");
27         Mat k2 = (Mat_<double>(3, 3) << 0, -1, 0, -1, 5, -1, 0, -1, 0);
28         kernel(x, im, k2, "Laplac銳利");
29         Mat k3 = (Mat_<double>(3, 3) << -1, -1, -1, -1, 8, -1, -1, -1, -1);
30         kernel(x, im, k3, "邊緣2", 1);
31         kernel(x, im, k3, "邊緣");

```



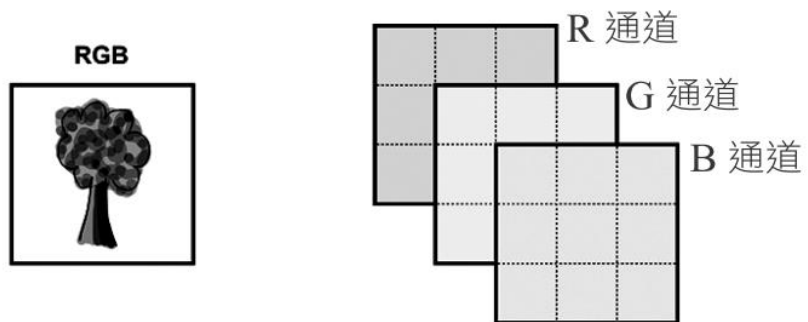
```

14     int main()
15     try
16     {
17         cout << "卷積計算練習!\n";
18         Mat x = imread("123.jpg"), im, im2;
19         imshow("原圖", x);
20
21         Mat k0 = (Mat_<double>(3, 3) << 1,2,1,2,4,2,1,2,1);
22         k0 = k0 / 16.0;
23         kernel(x, im, k0, "高斯模糊");
24
25         Mat k1 = (Mat_<double>(3, 3) << 0, -1, 0, -1, 4, -1, 0, -1, 0);
26         kernel(x, im, k1, "Laplac邊緣");
27         Mat k2 = (Mat_<double>(3, 3) << 0, -1, 0, -1, 5, -1, 0, -1, 0);
28         kernel(x, im, k2, "Laplac銳利");
29         Mat k3 = (Mat_<double>(3, 3) << -1, -1, -1, -1, 8, -1, -1, -1, -1);
30         kernel(x, im, k3, "邊緣2", 1);
31         kernel(x, im, k3, "邊緣2^2");
32         Mat k4 = (Mat_<double>(3, 3) <<
33         kernel(x, im, k4, "銳利2");
34         kernel(x, im, k4, "銳利2^2");
35
36         waitKey(0);
37
38         destroyAllWindows();
39
40         return 0;
41     }

```



圖解看卷積運算



影像：
像素：

R 通道

0.00	0.00	0.00	0.00	0.00
0.00	0.20	0.40	0.30	0.00
0.00	0.30	0.90	0.60	0.00
0.00	0.90	0.10	0.20	0.00
0.00	0.00	0.00	0.00	0.00

G 通道

0.00	0.00	0.00	0.00	0.00
0.00	0.60	0.60	0.90	0.00
0.00	0.40	0.70	0.40	0.00
0.00	0.70	0.50	0.30	0.00
0.00	0.00	0.00	0.00	0.00

B 通道

0.00	0.00	0.00	0.00	0.00
0.00	0.80	0.40	0.90	0.00
0.00	0.30	0.10	0.60	0.00
0.00	0.80	0.60	0.40	0.00
0.00	0.00	0.00	0.00	0.00

權重：

0.10	0.20	0.60
0.60	0.80	0.70
0.50	0.40	0.30

0.60	0.60	0.90
0.40	0.70	0.40
0.70	0.50	0.30

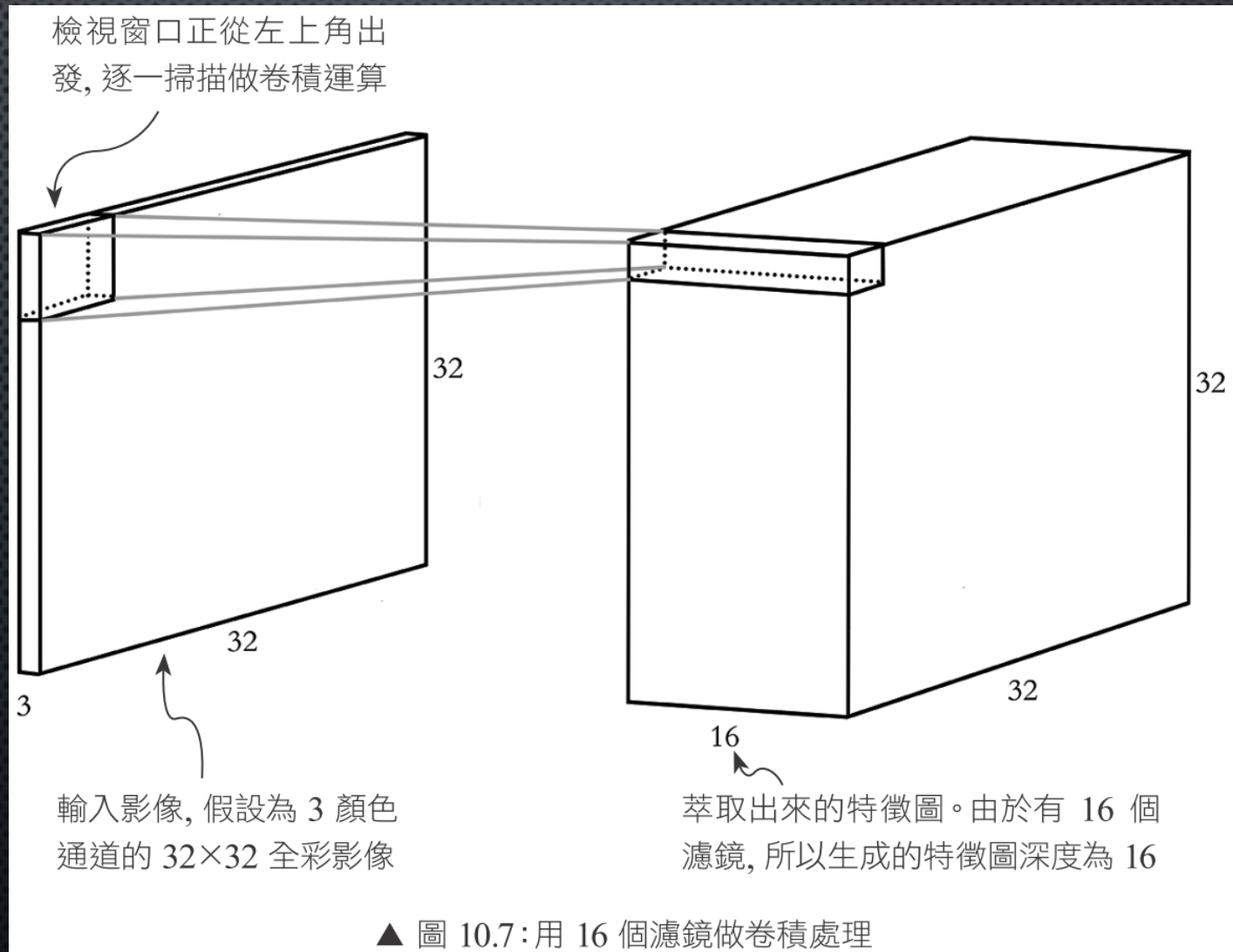
0.80	0.40	0.90
0.30	0.10	0.60
0.80	0.60	0.40

偏值：0.20

Z 值：

$$\sum \left(\begin{matrix} 0.00 & 0.00 & 0.00 \\ 0.00 & 0.16 & 0.28 \\ 0.00 & 0.12 & 0.27 \end{matrix} + \begin{matrix} 0.00 & 0.00 & 0.00 \\ 0.00 & 0.42 & 0.24 \\ 0.00 & 0.20 & 0.21 \end{matrix} + \begin{matrix} 0.00 & 0.00 & 0.00 \\ 0.00 & 0.08 & 0.24 \\ 0.00 & 0.18 & 0.04 \end{matrix} \right) + 0.2 = \begin{matrix} 2.64 & & \\ & & \\ & & \end{matrix}$$


特徵圖的深度 (通道數) 會與濾鏡的數量一致



- 可在任何局部區域檢測是否有其鎖定的特徵。
- 各像值與其周圍像素的關聯可被保留下來。
- 避免過度配適。

卷積核的超參數

- 濾鏡的尺寸大小
 - 一律將濾鏡設為 3×3
- 步長 (stride)
 - 設為 1 或 2 就好。
- 填補 (padding)

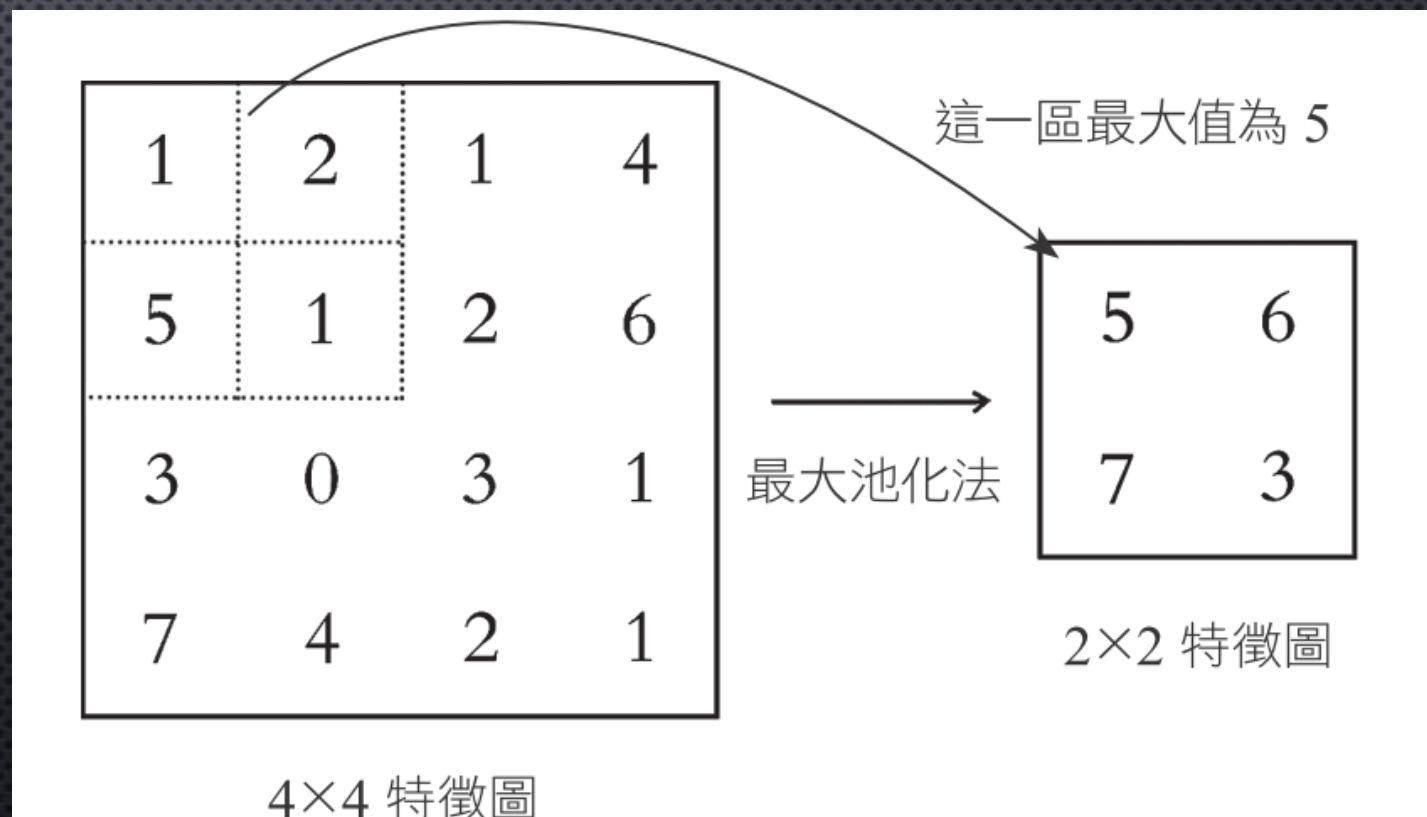
$$\text{特徵圖寬 (高) 的計算} = \frac{D - F + 2P}{S} + 1$$


$$\text{特徵圖的寬 (或高)} = \frac{D - F + 2P}{S} + 1$$

$$\text{特徵圖的寬 (或高)} = \frac{28 - 5 + 2 \times 2}{1} + 1$$

$$\text{特徵圖的寬 (或高)} = 28$$

池化層 (pooling layer)



池化層的設定經驗

- 檢視窗口尺寸為 2×2 ，步長則設 2

軟體實作

von anwendeng

感謝觀賞

Herzlichen Dank für die
Aufmerksamkeit

von anwendeng