Convolution Neural Networks

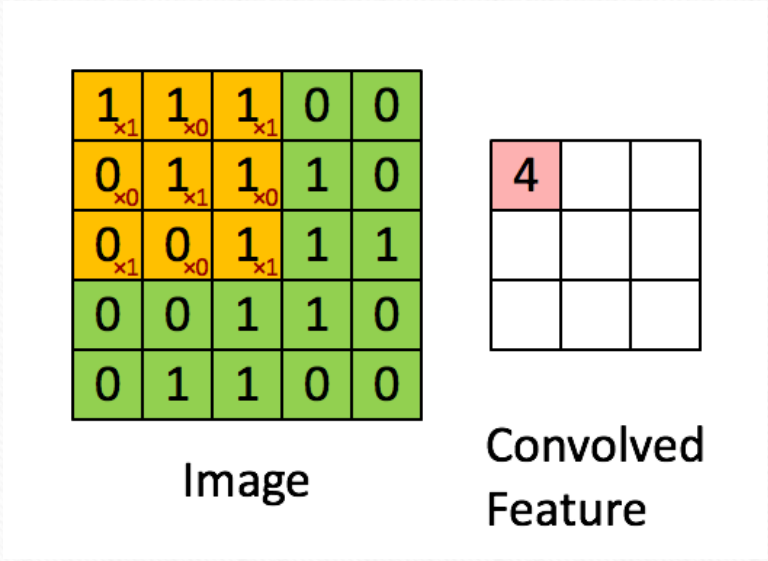
Date	**2018.04.25**
TA	Yen
Mail	Mail : a94763075@163.com

kernel = filter = feature

- Conv2D(filters=9,kernel_size=(3,3), strides=1,padding='same')

步伐

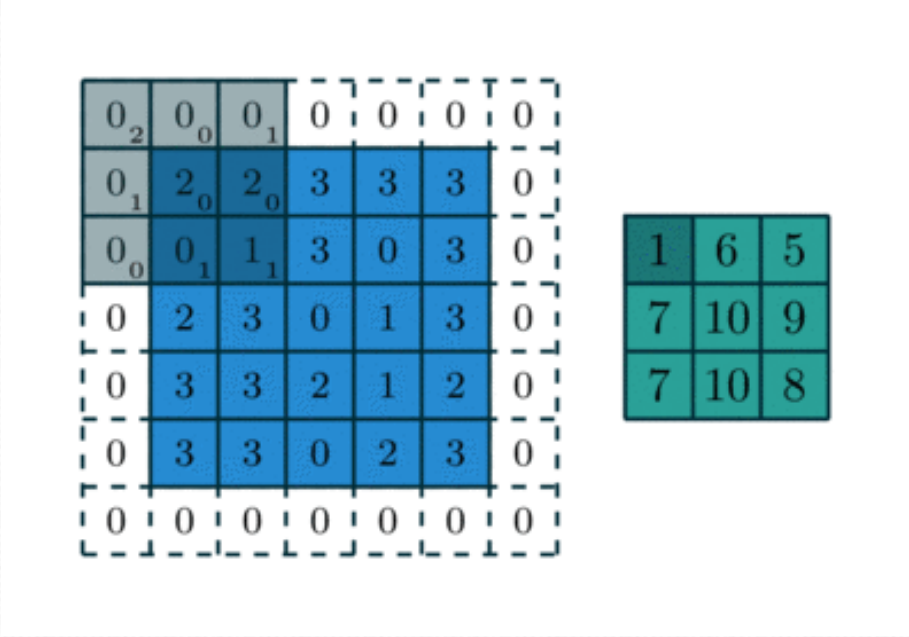
- $\begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 1 \end{bmatrix}$



padding

- Conv2D(filters=9,kernel_size=(3,3), strides=1, padding='same'

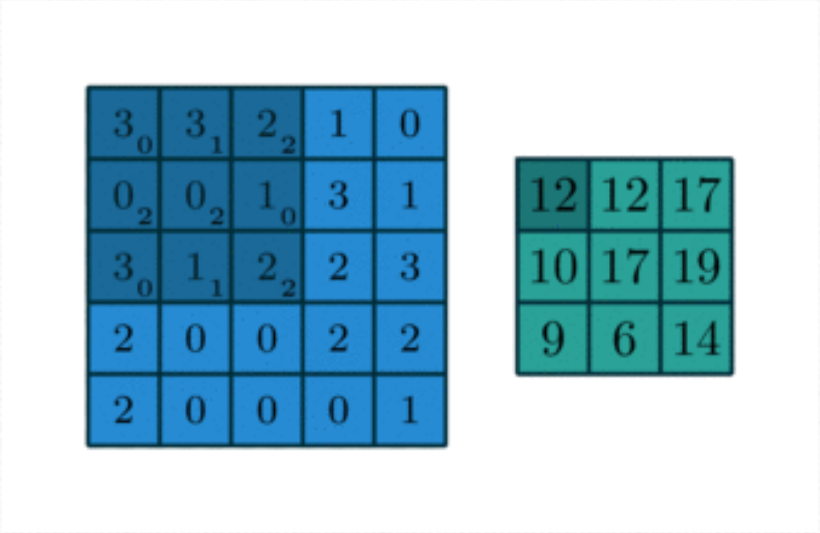
with zero padding:



padding

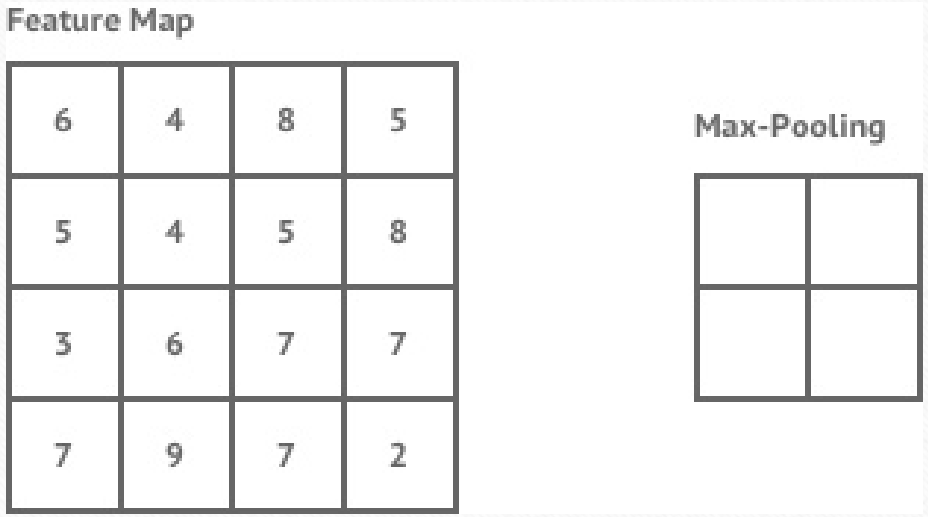
- Conv2D(filters=9,kernel_size=(3,3), strides=1, padding='valid'

without padding:



Pooling layer

- MaxPooling2D((2, 2),padding='same')



Define loss function_L1_norm

```
from keras import backend as K
```

- def loss(y_true,y_pred):
- return (K.mean(K.abs(y_true-y_pred)))

$$S = \frac{1}{n} * \sum_{\{i=1\}}^{n} |y_i - f(x_i)|$$

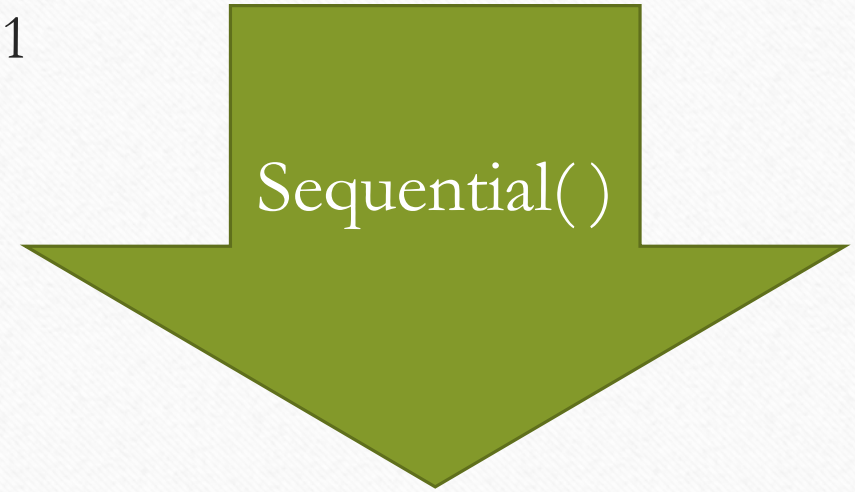
Mean Square Error(MSE)

$$S = \frac{1}{n} * \sum_{\{i=1\}}^{n} |y_i - f(x_i)|^2$$

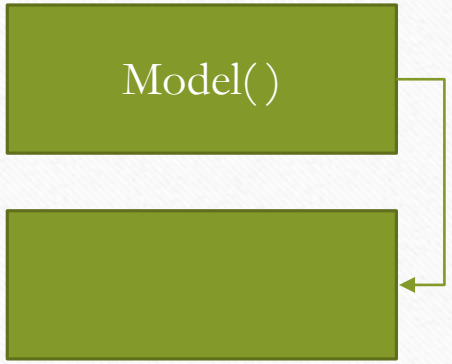
Model

- 2 ways to build model

- 1



2



```
image_width=256
image_height=256
input_channel=3

model = Sequential()
model.add(Conv2D(
            filters=9,
            kernel_size=(3,3),
            padding='same',
            input_shape=(image_width,image_height,input_channel),
            activation='relu'
            )
            )
model.add(MaxPooling2D(pool_size=(2,2)))
model.add(Flatten())
model.add(Dense(10))
model.add(Activation('softmax'))

model.summary()
```

```
image_width=256
image_height=256
input_channel=3

input_shape = (image_width, image_height, input_channel)

inputs = Input(shape=input_shape)
Layer1 = Conv2D(9, (3, 3), strides=1,padding='same',activation='relu')(inputs)
Layer2 = MaxPooling2D(pool_size=(2,2))(Layer1)
Layer3 = Flatten()(Layer2)
Layer4 = Dense(10)(Layer3)
Layer5 = Activation('softmax')(Layer4)
model = Model(inputs=inputs, outputs=Layer5)

model.summary()
```

model.summary( )

```
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
conv2d_1 (Conv2D)            (None, 256, 256, 9)       252
_________________________________________________________________
max_pooling2d_1 (MaxPooling2 (None, 128, 128, 9)       0
_________________________________________________________________
flatten_1 (Flatten)          (None, 147456)            0
_________________________________________________________________
dense_1 (Dense)              (None, 10)                1474570
_________________________________________________________________
activation_1 (Activation)    (None, 10)                0
=================================================================
Total params: 1,474,822
Trainable params: 1,474,822
Non-trainable params: 0
_________________________________________________________________
```

HW4: Predict “Push”and”Down”

Scoring 15%

- Code: must
- Report: 7%
- Kaggle: 8%

HW4: Predict “Push”and”Down”

Kaggle:

- Kaggle: https://goo.gl/DQNxN4
- **Deadline: 5/13 23:59**
- Upload limit 5 times/day
- Must over baseline
- Final Score=$3 + 5 * \frac{Baseline - YourScore}{Baseline - MinScore}$

HW4: Predict “Push”

Data

- :PTT(training:1800*20,testing:4000)

推 5 噓0

HW4: Predict “Push”and”Down”

Setting About Baseline:

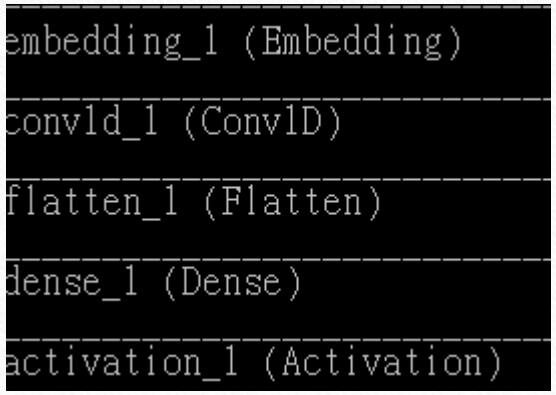
HW3 Embedding

+Conv1D

+Flatten

+Dense

+Activation



HW4: Predict “Push”and”Down”

Submission Format

- id, good , bad

```
id,good,bad
0,41,0
1,38,3
2,23,2
3,37,0
4,15,2
5,43,5
6,16,3
```

HW4: Predict “Push”and”Down”

Loss LIMIT

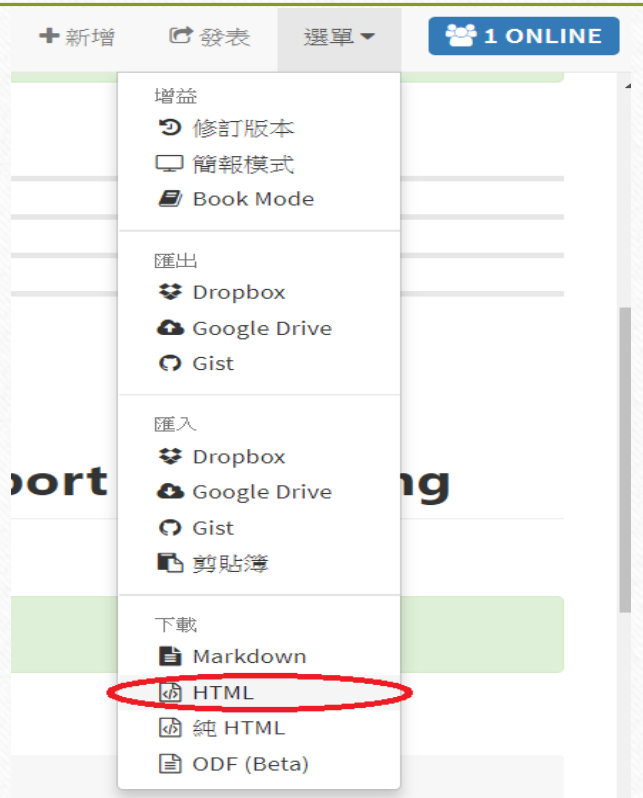
- You should define loss **by yorself**:
- $\alpha\ ,\beta,\gamma\ you\ can\ free\ to\ adjust$

$$loss = \frac{1}{n}\sum_{i=0}^{n}(\alpha|y_i - f(x_i)| + \beta|y_i - f(x_i)|^2 + \gamma|y_i - f(x_i)|^3)$$

HW4: Predict “Push”and”Down”

Report: 7%

- Don’t submit **word**
- **You have to submit .html**
- Here is the report’s example
- https://hackmd.io/s/Byn-DMnnz
- **Word,No TypeSetting Report will get 0 %**



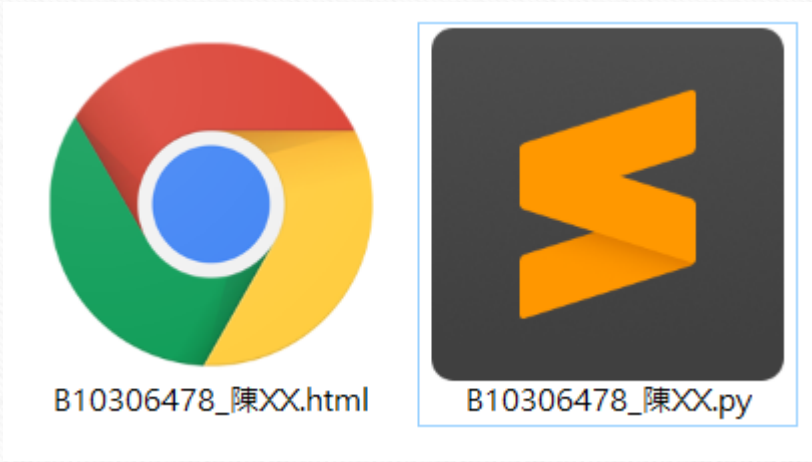
HW4: Predict “Push”and”Down”

Report: 7%

- Model description (Draw and Explain and Loss)(3%)
- Preprocessing Explain(3%)
- How do you improve your performance (1%)

HW4: Predict “Push”and”Down”

Final Submission should be like as follow:



Q&A?