오후 10:31 5월 1일 토요일 100%

환환 colab.research.google.com

네이버 메일 8-2.ipynb - Colaboratory

8-2.ipynb

파일 수정 보기 삽입 런타임 도구 도움말

공유

+ 코드 + 텍스트 Drive로 복사 연결 수정 가능

```
[ ] model = keras.Sequential()
```

```
[ ] model.add(keras.layers.Conv2D(32, kernel_size=3, activation='relu',
                                  padding='same', input_shape=(28,28,1)))
```

```
[ ] model.add(keras.layers.MaxPooling2D(2))
```

```
[ ] model.add(keras.layers.Conv2D(64, kernel_size=(3,3), activation='relu',
                                  padding='same'))
    model.add(keras.layers.MaxPooling2D(2))
```

```
[ ] model.add(keras.layers.Flatten())
    model.add(keras.layers.Dense(100, activation='relu'))
    model.add(keras.layers.Dropout(0.4))
    model.add(keras.layers.Dense(10, activation='softmax'))
```

```
[ ] model.summary()
```

```
Model: "sequential"
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
conv2d (Conv2D)              (None, 28, 28, 32)        320
_________________________________________________________________
max_pooling2d (MaxPooling2D) (None, 14, 14, 32)        0
_________________________________________________________________
conv2d_1 (Conv2D)            (None, 14, 14, 64)        18496
_________________________________________________________________
max_pooling2d_1 (MaxPooling2 (None, 7, 7, 64)          0
_________________________________________________________________
flatten (Flatten)            (None, 3136)              0
_________________________________________________________________
dense (Dense)                (None, 100)               313700
_________________________________________________________________
dropout (Dropout)            (None, 100)               0
_________________________________________________________________
dense_1 (Dense)              (None, 10)                1010
=================================================================
Total params: 333,526
Trainable params: 333,526
```

```
Model: "sequential"
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
conv2d (Conv2D)              (None, 28, 28, 32)        320
_________________________________________________________________
max_pooling2d (MaxPooling2D) (None, 14, 14, 32)        0
_________________________________________________________________
conv2d_1 (Conv2D)            (None, 14, 14, 64)        18496
_________________________________________________________________
max_pooling2d_1 (MaxPooling2 (None, 7, 7, 64)          0
_________________________________________________________________
flatten (Flatten)            (None, 3136)              0
_________________________________________________________________
dense (Dense)                (None, 100)               313700
_________________________________________________________________
dropout (Dropout)            (None, 100)               0
_________________________________________________________________
dense_1 (Dense)              (None, 10)                1010
=================================================================
Total params: 333,526
Trainable params: 333,526
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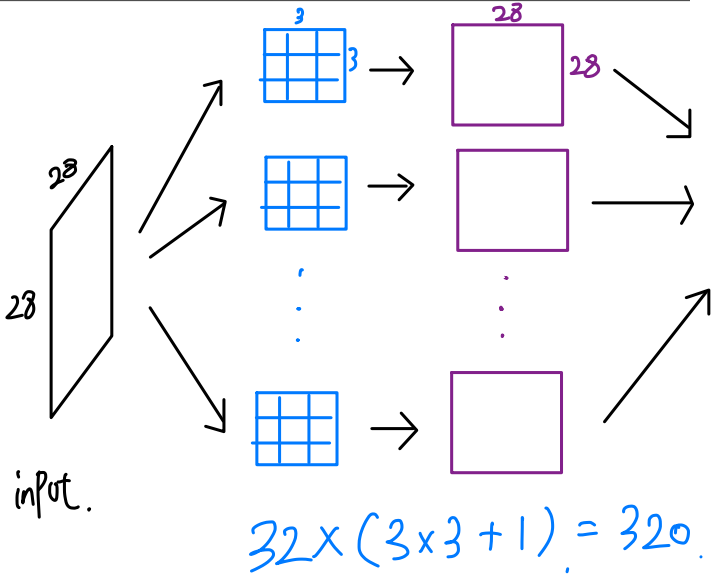

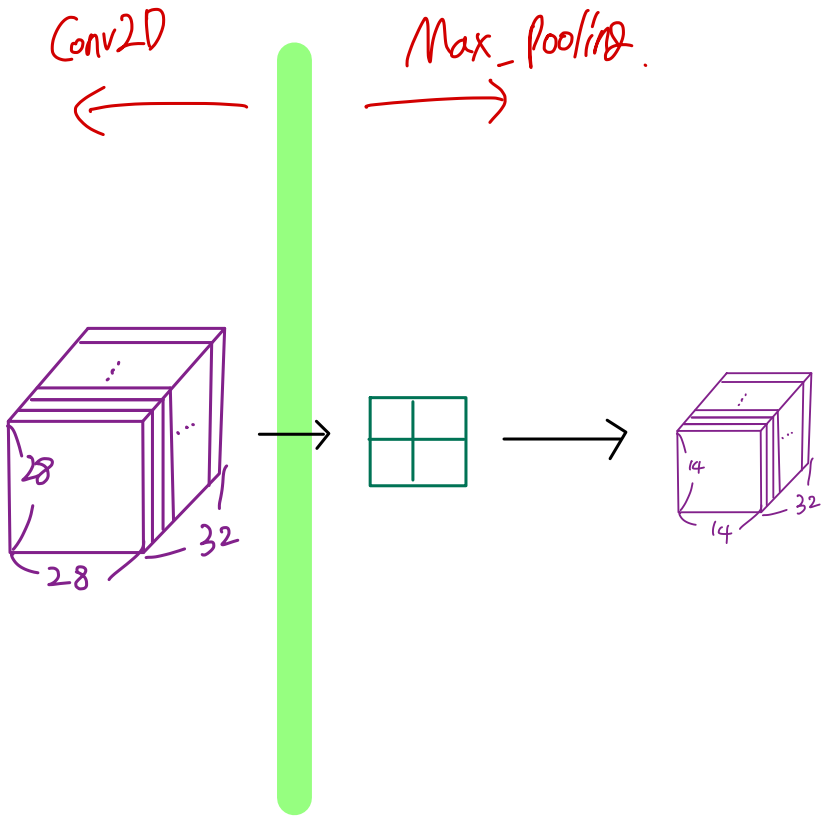

```
Model: "sequential"
_________________________________________________________________
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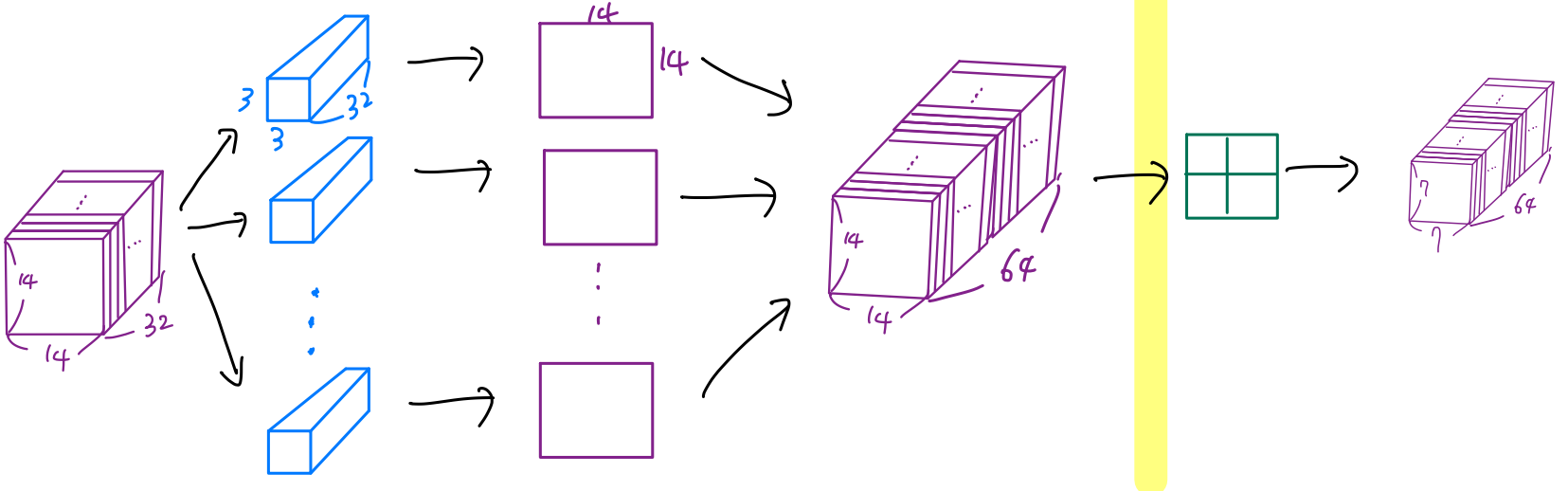
_________________________________________________________________
max_pooling2d (MaxPooling2D) (None, 14, 14, 32)        0
_________________________________________________________________
conv2d_1 (Conv2D)            (None, 14, 14, 64)        18496
_________________________________________________________________
max_pooling2d_1 (MaxPooling2 (None, 7, 7, 64)          0
_________________________________________________________________
flatten (Flatten)            (None, 3136)              0
_________________________________________________________________
dense (Dense)                (None, 100)               313700
_________________________________________________________________
dropout (Dropout)            (None, 100)               0
_________________________________________________________________
dense_1 (Dense)              (None, 10)                1010
=================================================================
Total params: 333,526
Trainable params: 333,526
```

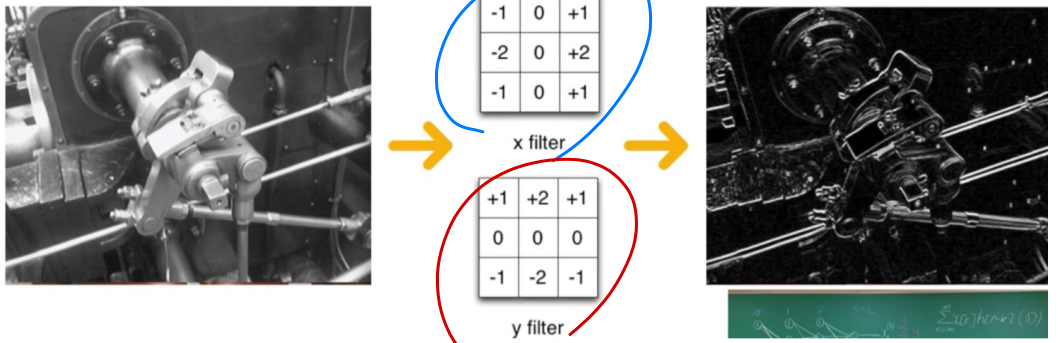
$64 \times (3 \times 3 \times 32 + 1) = 18496$

conv2d_1

max_pooling_1

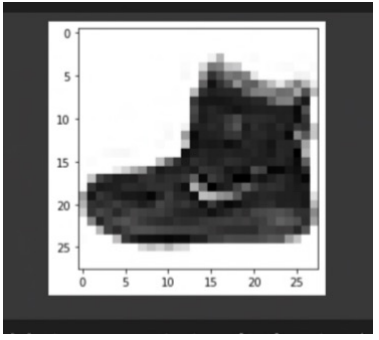


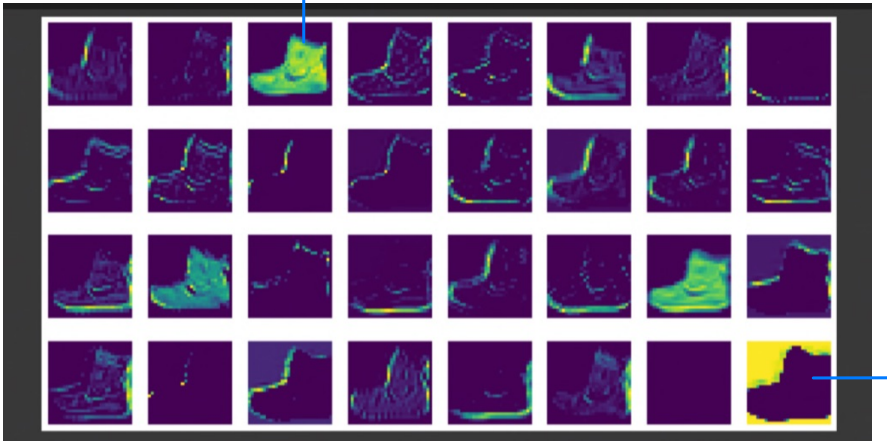
Filter의 시각화.



Find |.

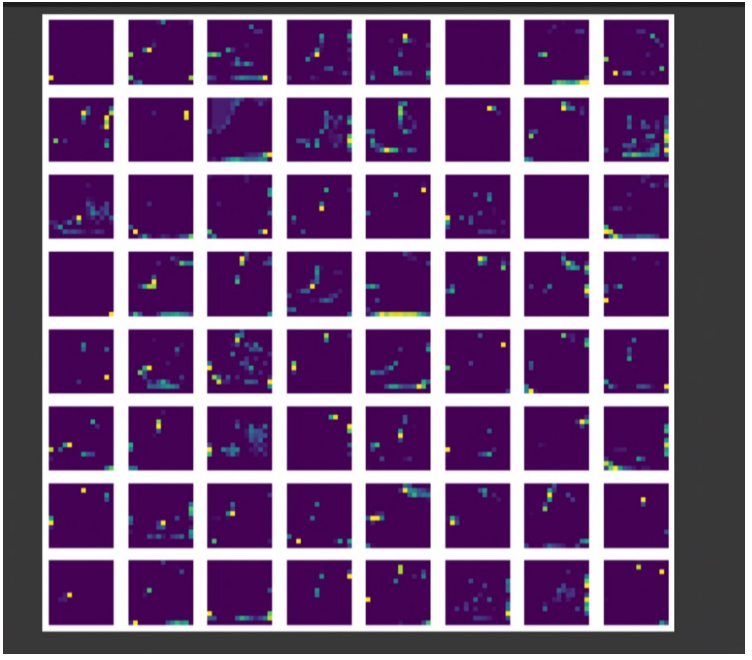
Find —.



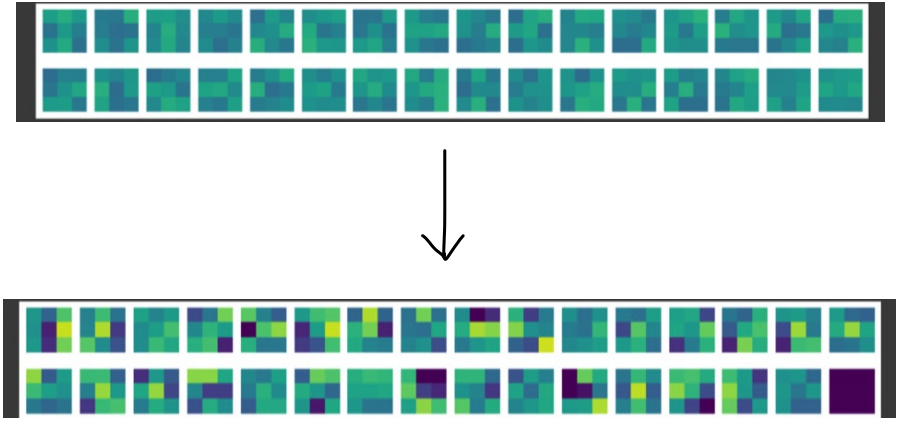


Conv2D.

Conv2D_1 의 Filter는 사실적인 의미 X.



(사실상 첫번째 합성곱 Filter도 마찬가지.)

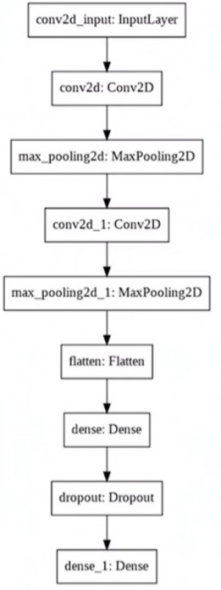


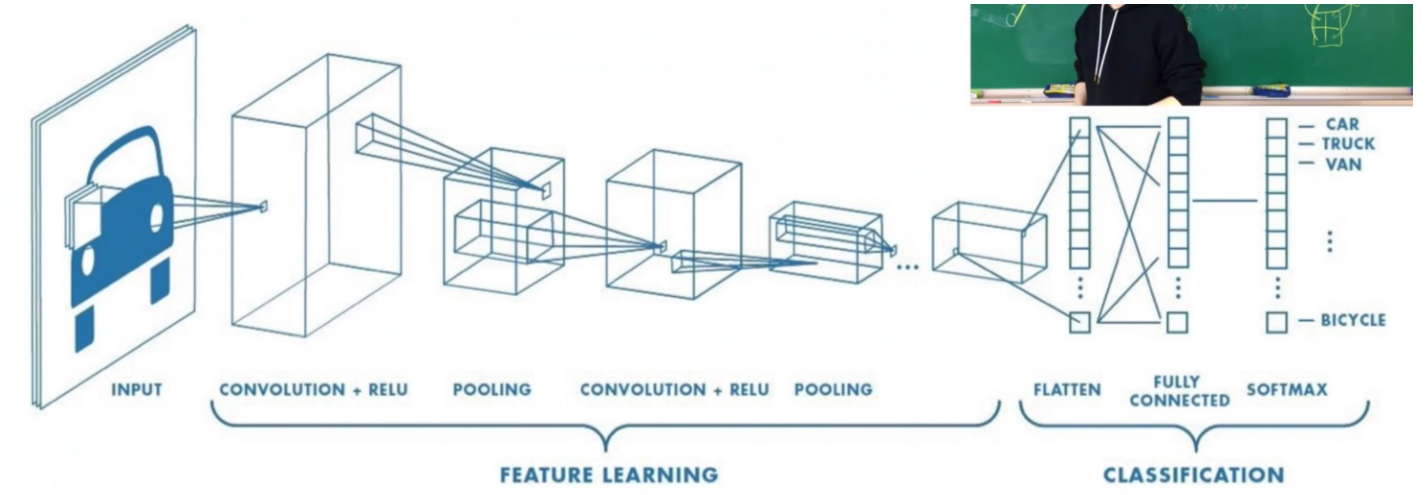
함수형 API

```
dense1 = keras.layers.Dense(100, activation='sigmoid')
dense2 = keras.layers.Dense(10, activation='softmax')

hidden = dense1(inputs)
outputs = dense2(hidden)
model = keras.Model(inputs, outputs)
```

```
inputs = keras.Input(shape=...)
hidden = dense1(inputs)
outputs = dense2(hidden)
model = keras.Model(inputs, outputs)
```




CAR
TRUCK
VAN
BICYCLE
INPUT
CONVOLUTION + RELU
POOLING
CONVOLUTION + RELU
POOLING
FLATTEN
FULLY CONNECTED
SOFTMAX
FEATURE LEARNING
CLASSIFICATION

Q&A.

출처.

https://www.youtube.com/watch?v=_IDVf8jDKHg&list=PLJN246lAkhQjoU0C4v8FgtbjOIXxSs_4Q&index=22

https://www.youtube.com/watch?v=_WRIvAx-5Dw&list=PL_iJu012NOxdDZEygsVG4jS8srnSdIgdn&index=21