Cifar-10 성능 비교

성　명	Epoch 수	Batch size	Optimizer	Test Accuracy	총 파라메터 수
신은총	128	64	adam	0.8913	1,462,346
박진원	120	128	Adam(0.0002, 0.5)	0.8535	1,874,922
임원기	200(ES)	100	adam	0.8340	552,362
오진영	50	50	adam	0.8137	5,626,378
최용호	50	50	Adam(lr=1e-4)	0.8111	756,298
김희범	100	64	adam	0.7965	2,168,362
이웅희	50(ES)	50	adadelta	0.7920	756,298
김준성	1,000(ES)	200	adam	0.7908	760,522
안수현	100(ES)	50	adam	0.7795	1,669,578
민다희	200	32	adam	0.5510	1,253,674
류경민	30	32	adam	0.8330	1,253,674
조병무(TF)		128	Rmsprop(0.001)	0.6800	
선생님	125	64	rmsprop(0.001, 1e-6)	0.8793	309,290

Model Summary

```
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
conv2d_7 (Conv2D)            (None, 32, 32, 32)        896
_________________________________________________________________
activation_7 (Activation)    (None, 32, 32, 32)        0
_________________________________________________________________
batch_normalization_7 (BatchNormal (None, 32, 32, 32)  128
_________________________________________________________________
conv2d_8 (Conv2D)            (None, 32, 32, 32)        9248
_________________________________________________________________
activation_8 (Activation)    (None, 32, 32, 32)        0
_________________________________________________________________
batch_normalization_8 (BatchNormal (None, 32, 32, 32)  128
_________________________________________________________________
max_pooling2d_4 (MaxPooling2D) (None, 16, 16, 32)      0
_________________________________________________________________
dropout_4 (Dropout)          (None, 16, 16, 32)        0
_________________________________________________________________
conv2d_9 (Conv2D)            (None, 16, 16, 64)        18496
_________________________________________________________________
activation_9 (Activation)    (None, 16, 16, 64)        0
_________________________________________________________________
batch_normalization_9 (BatchNormal (None, 16, 16, 64)  256
_________________________________________________________________
conv2d_10 (Conv2D)           (None, 16, 16, 64)        36928
_________________________________________________________________
activation_10 (Activation)   (None, 16, 16, 64)        0
_________________________________________________________________
batch_normalization_10 (BatchNorma (None, 16, 16, 64)  256
_________________________________________________________________
max_pooling2d_5 (MaxPooling2D) (None, 8, 8, 64)        0
_________________________________________________________________
dropout_5 (Dropout)          (None, 8, 8, 64)          0
_________________________________________________________________
```

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_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
conv2d_11 (Conv2D)           (None, 8, 8, 128)         73856
_________________________________________________________________
activation_11 (Activation)   (None, 8, 8, 128)         0
_________________________________________________________________
batch_normalization_11 (BatchNorma (None, 8, 8, 128)   512
_________________________________________________________________
conv2d_12 (Conv2D)           (None, 8, 8, 128)         147584
_________________________________________________________________
activation_12 (Activation)   (None, 8, 8, 128)         0
_________________________________________________________________
batch_normalization_12 (BatchNorma (None, 8, 8, 128)   512
_________________________________________________________________
max_pooling2d_6 (MaxPooling2D) (None, 4, 4, 128)       0
_________________________________________________________________
dropout_6 (Dropout)          (None, 4, 4, 128)         0
_________________________________________________________________
flatten_2 (Flatten)          (None, 2048)              0
_________________________________________________________________
dense_2 (Dense)              (None, 10)                20490
=================================================================
Total params: 309,290
Trainable params: 308,394
Non-trainable params: 896
_________________________________________________________________
```

Model 실행

```
opt_rms = rmsprop(lr=0.001, decay=1e-6)
model.compile(loss='categorical_crossentropy', optimizer=opt_rms, metrics=['accuracy'])

def lr_schedule(epoch):
    lrate = 0.001
    if epoch > 75:
        lrate = 0.0005
    if epoch > 100:
        lrate = 0.0003
    return lrate

#data augmentation
datagen = ImageDataGenerator(
    rotation_range=15, width_shift_range=0.1,
    height_shift_range=0.1, horizontal_flip=True,
)
datagen.fit(X_train)

history = model.fit_generator(datagen.flow(X_train, Y_train, batch_size=64),
                    steps_per_epoch=X_train.shape[0] // 64, epochs=125,
                    verbose=1, validation_data=(X_test, Y_test),
                    callbacks=[LearningRateScheduler(lr_schedule)])
```