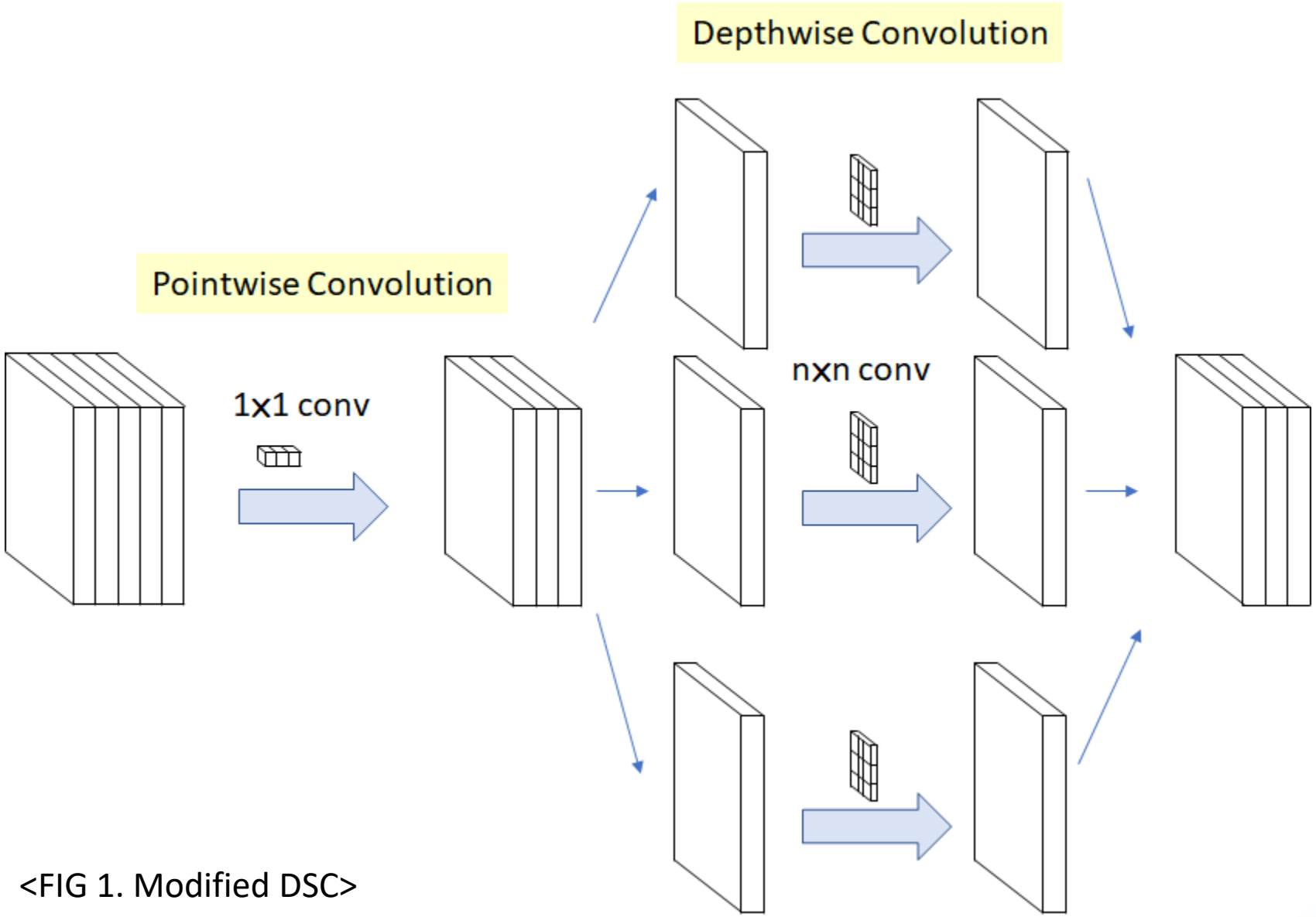
Xception

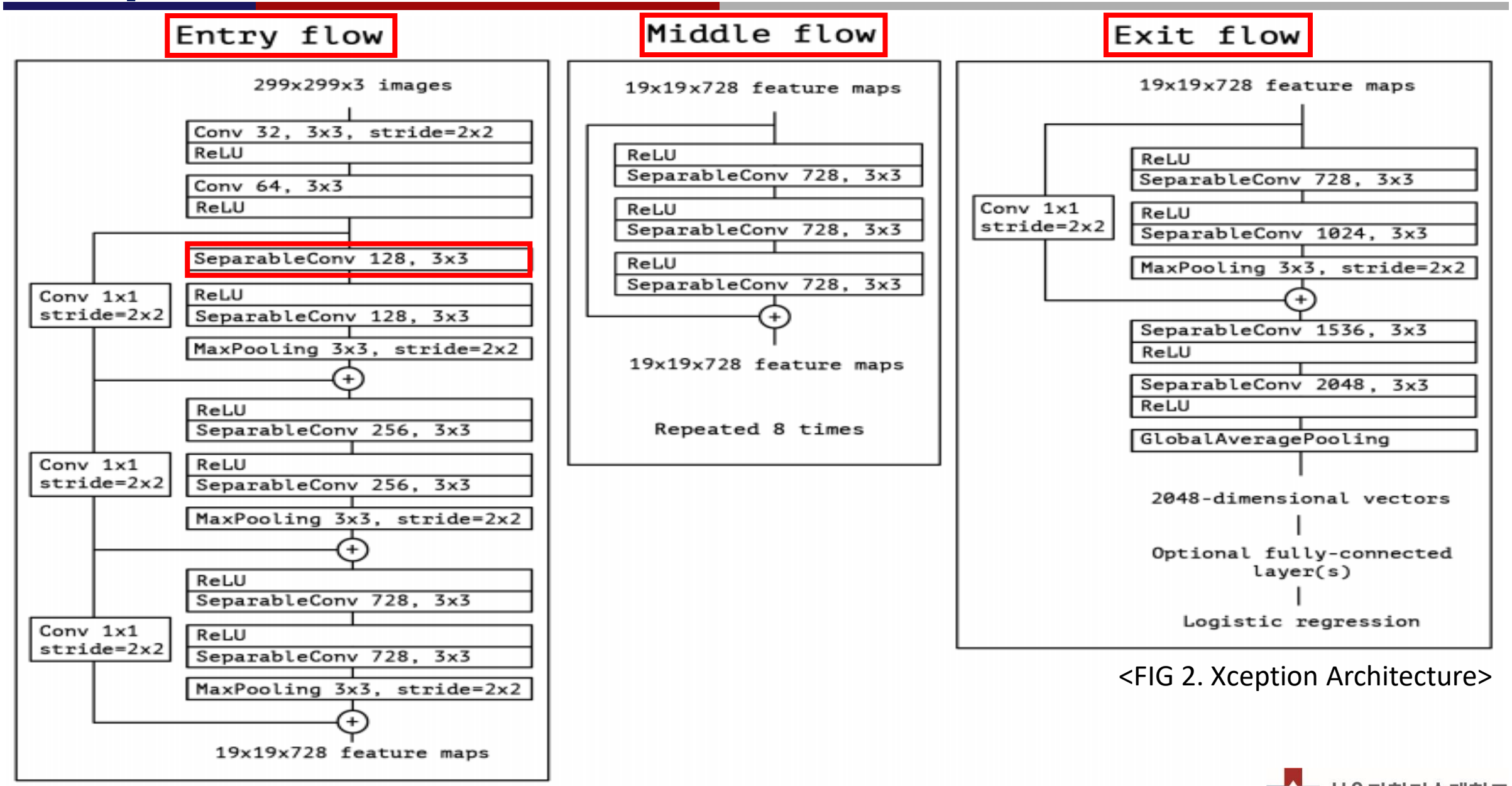
이찬호
국방인공지능응용학과

Xception – Depthwise Separable Convolution



<FIG 1. Modified DSC>

Xception – Architecture



<FIG 2. Xception Architecture>

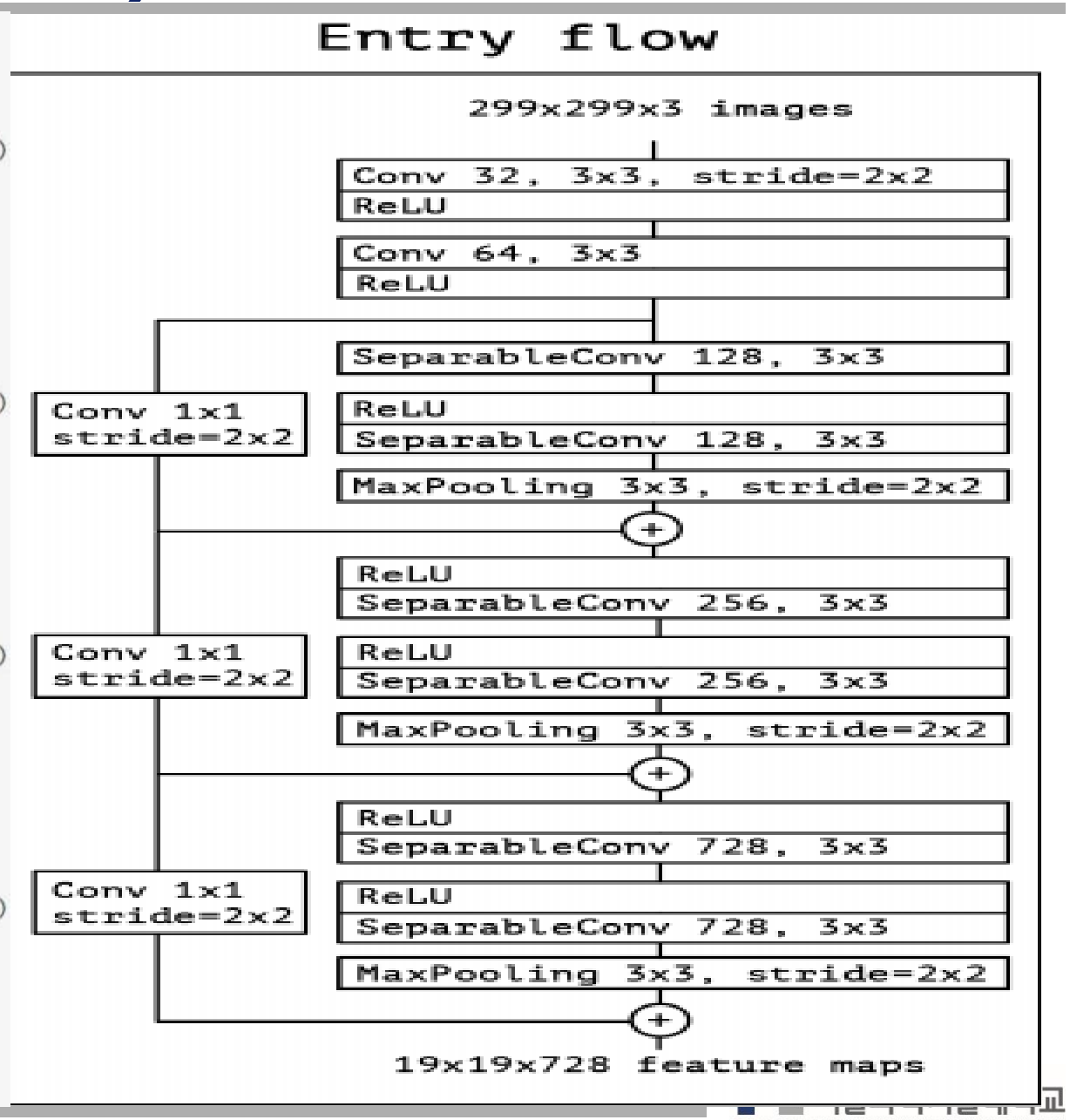
Xception – Code (SeparableConv)

```
def block(input_tensor, filters, kernel_size=3, strides=1, padding='same', use_bias=False):
    x = SeparableConv2D(filters, kernel_size, strides=strides, padding=padding, use_bias=use_bias)(input_tensor)
    x = BatchNormalization()(x)
    x = Activation('relu')(x)
    return x
```

<FIG 3. SeparableConv Code>

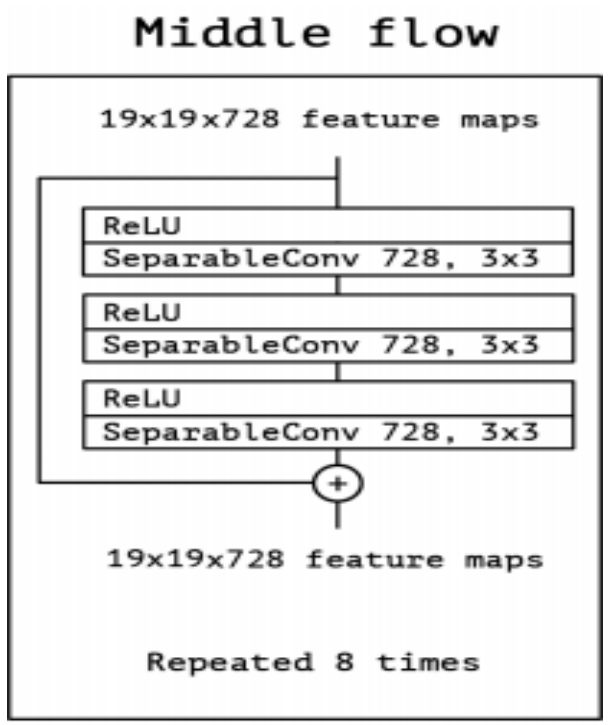
Xception – Code (Entry Flow)

```python
def Custom(input_shape=(299, 299, 3), num_classes=100):
    img_input = Input(shape=input_shape)

    # Entry flow
    x = Conv2D(32, 3, strides=2, padding='same', use_bias=False)(img_input)
    x = BatchNormalization()(x)
    x = Activation('relu')(x)

    x = Conv2D(64, 3, padding='same', use_bias=False)(x)
    x = BatchNormalization()(x)
    x = Activation('relu')(x)

    residual = Conv2D(128, 1, strides=2, padding='same', use_bias=False)(x)
    residual = BatchNormalization()(residual)

    x = block(x, 128)
    x = block(x, 128)
    x = MaxPooling2D(3, strides=2, padding='same')(x)
    x = Add()([x, residual])

    residual = Conv2D(256, 1, strides=2, padding='same', use_bias=False)(x)
    residual = BatchNormalization()(residual)

    x = block(x, 256)
    x = block(x, 256)
    x = MaxPooling2D(3, strides=2, padding='same')(x)
    x = Add()([x, residual])

    residual = Conv2D(728, 1, strides=2, padding='same', use_bias=False)(x)
    residual = BatchNormalization()(residual)

    x = block(x, 728)
    x = block(x, 728)
    x = MaxPooling2D(3, strides=2, padding='same')(x)
    x = Add()([x, residual])
```



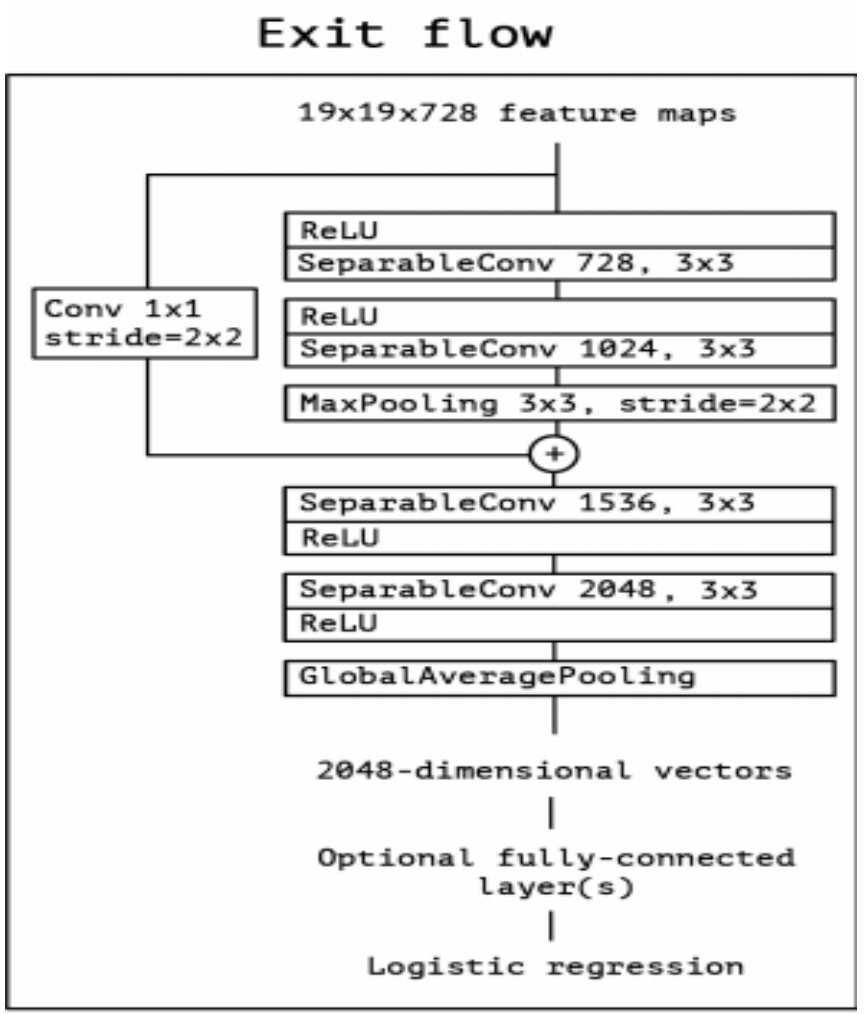
Xception – Code (Middle Flow)

```
# Middle flow
for _ in range(8):
    residual = x
    x = block(x, 728)
    x = block(x, 728)
    x = block(x, 728)
    x = Add()([x, residual])
```

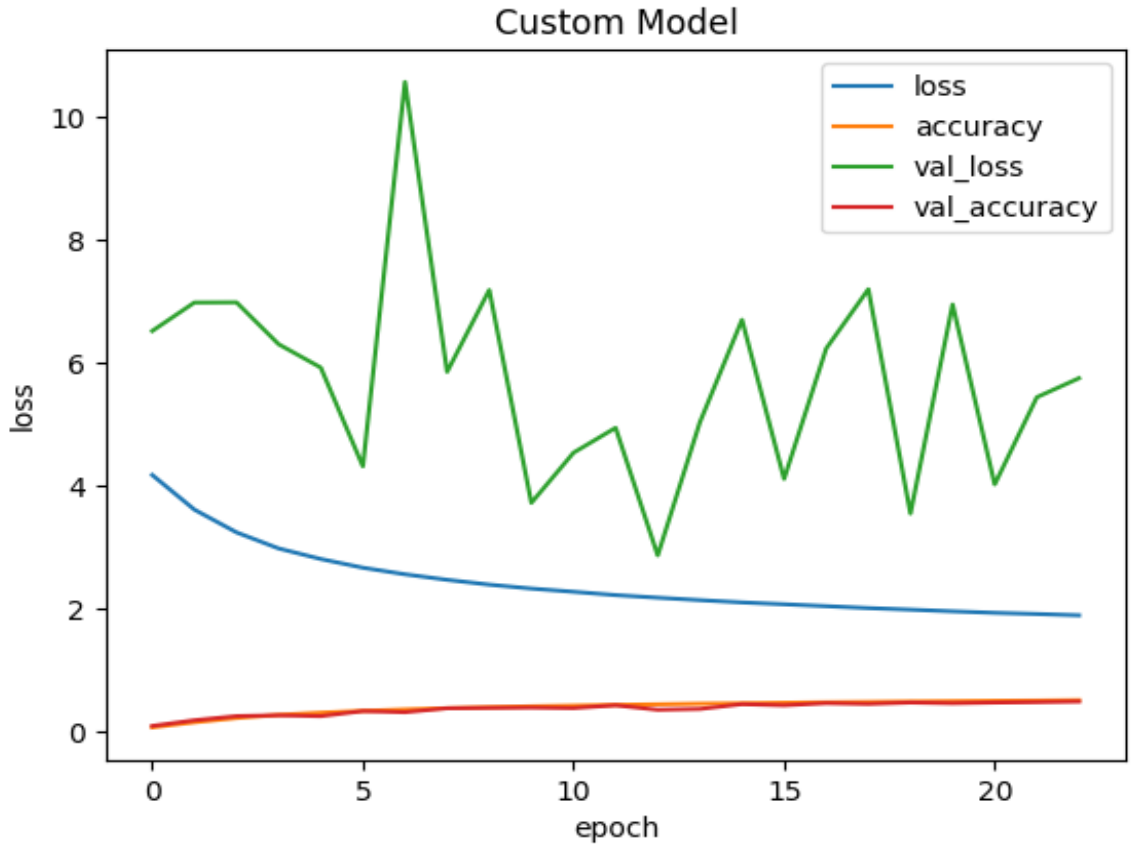


Xception – Code (Entry Flow)

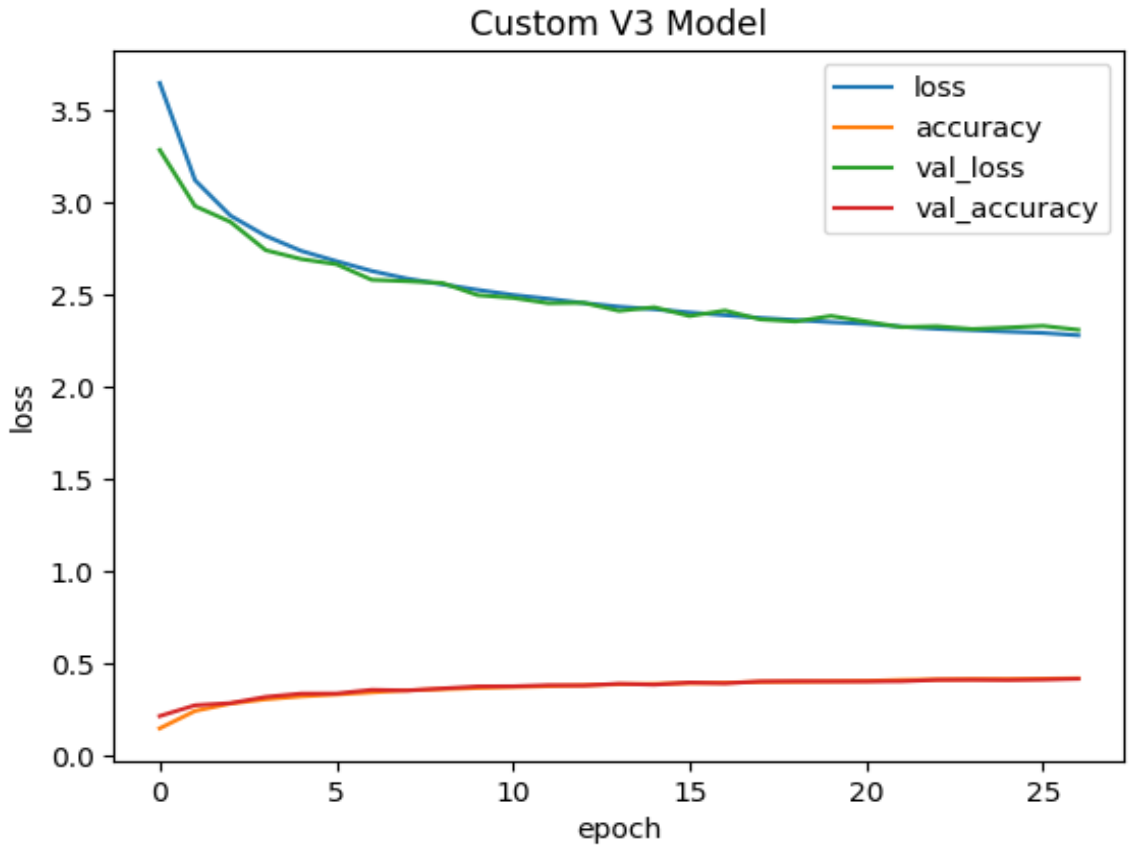
```
# Exit flow
residual = Conv2D(1024, 1, strides=2, padding='same', use_bias=False)(x)
residual = BatchNormalization()(residual)

x = block(x, 728)
x = block(x, 1024)
x = MaxPooling2D(3, strides=2, padding='same')(x)
x = Add()([x, residual])

x = block(x, 1536, kernel_size=3, strides=1)
x = block(x, 2048, kernel_size=3, strides=1)

x = GlobalAveragePooling2D()(x)
output = Dense(num_classes, activation='softmax')(x)
```



Xception – Result (Compare Last Week)

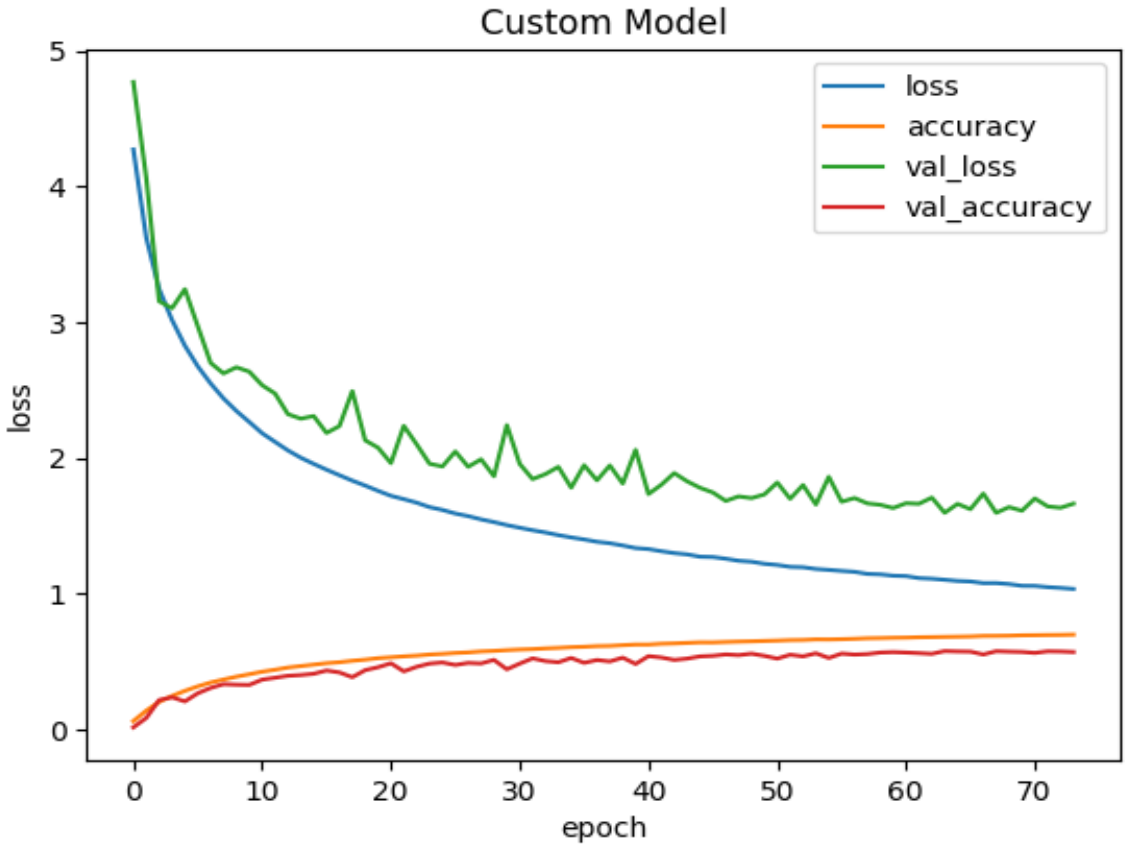


Params	Loss	Val_Loss	ACC	Val_ACC
23,858,788	2.1762	2.8649	0.4408	0.4858

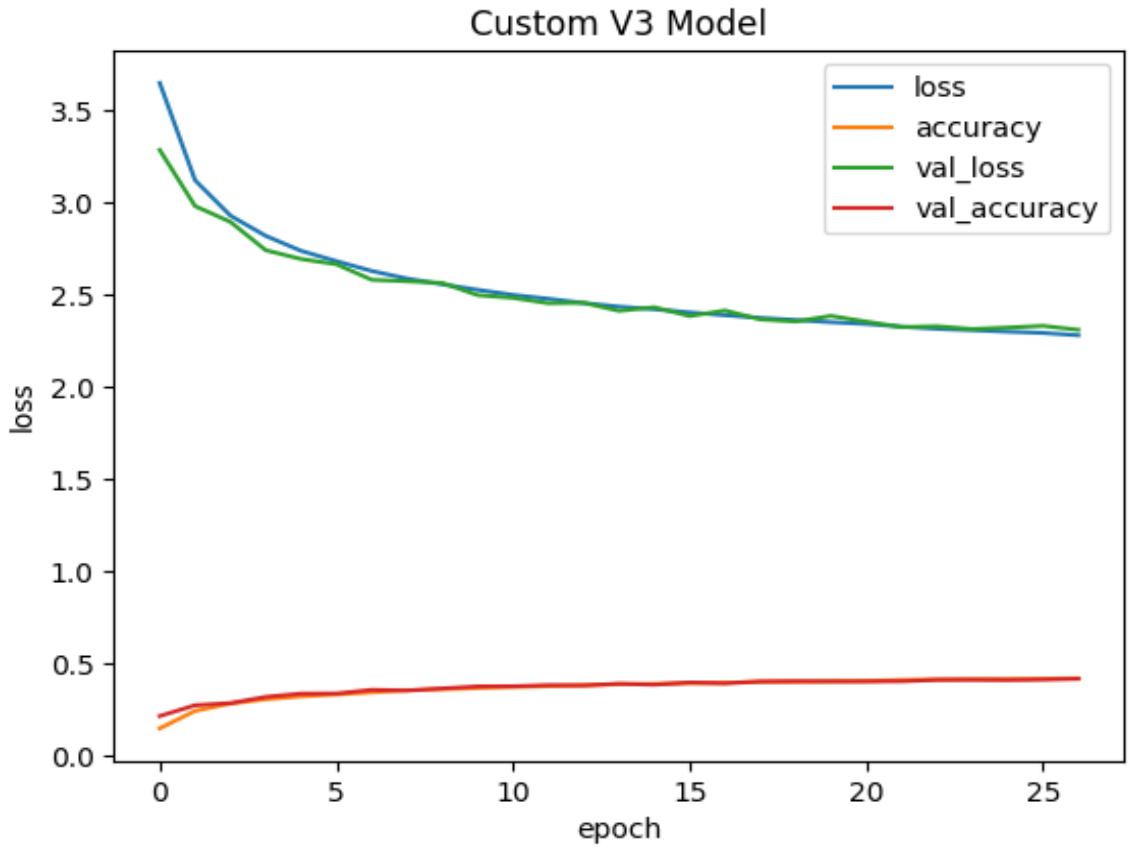


Params	Loss	Val_Loss	ACC	Val_ACC
21,066,380	2.2750	2.2833	0.4211	0.4208

Xception – Result (Compare Best Result)



Params	Loss	Val_Loss	ACC	Val_ACC
45,295,884	1.1039	1.5973	0.6834	0.5788



Params	Loss	Val_Loss	ACC	Val_ACC
21,066,380	2.2750	2.2833	0.4211	0.4208

THANKS FOR YOUR ATTENTION

이찬호
국방인공지능응용학과