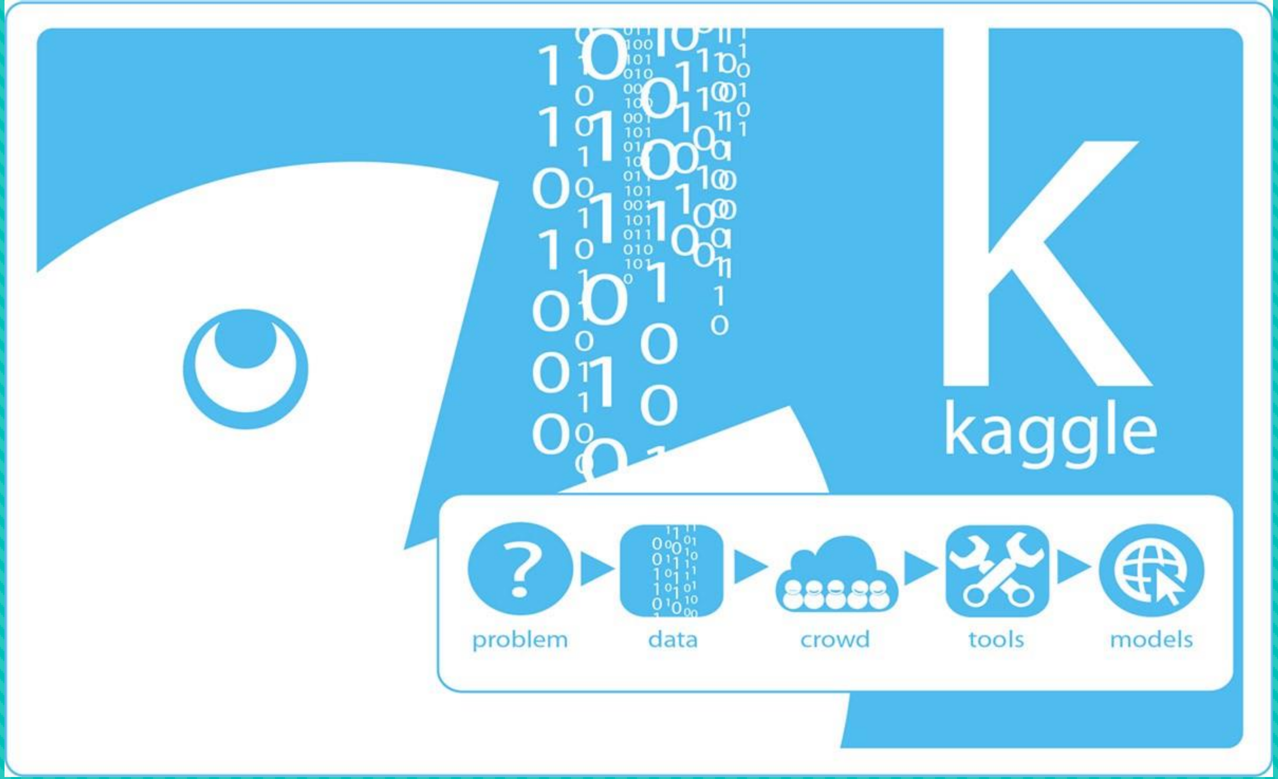
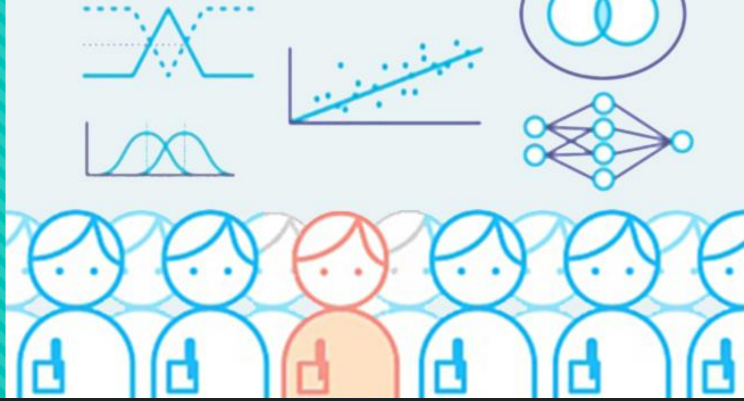


Image Recognition Competition

Presenter: Li, Chia-Chun

Task: DAMAGE LEVEL



- Training data
  - ➢ 2132 RGB images
  - ➢ Target: 4 classes(no/minor/moderate/heavy)

- Testing data
  - ➢ 500 RGB images

No damage

Minor damage

Moderate damage

Heavy damage

OUTLINE

Model 1

- SVM(支持向量機)
- PCA(主成分分析)
- Grid Search(網格搜尋)

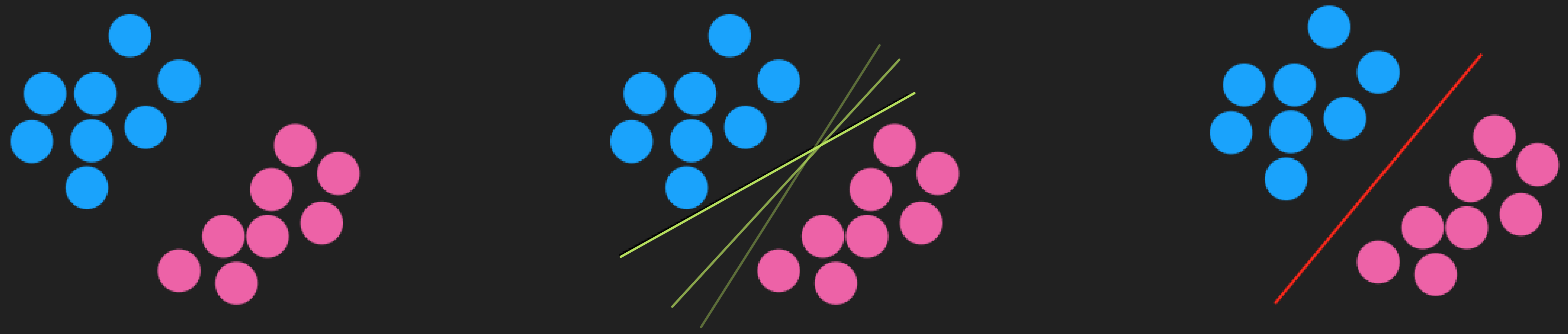
Accuracy: 0.35~0.48

Model 2

- CNN(卷積神經網路)
- Data Generator
- Pre-trained Model

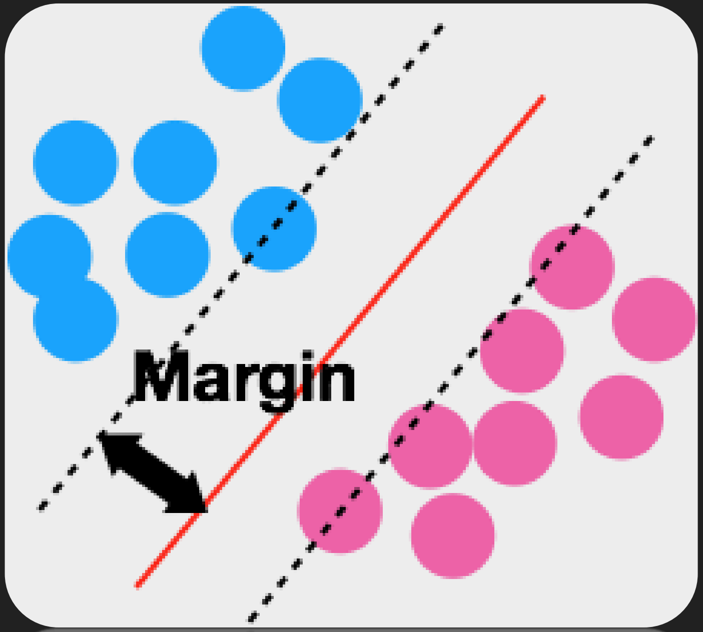
Accuracy: 0.76~0.89

MODEL 1 --- SVM(support vector machine)



SVM用來幫忙找出最適的這條線

MODEL 1 --- SVM(support vector machine)

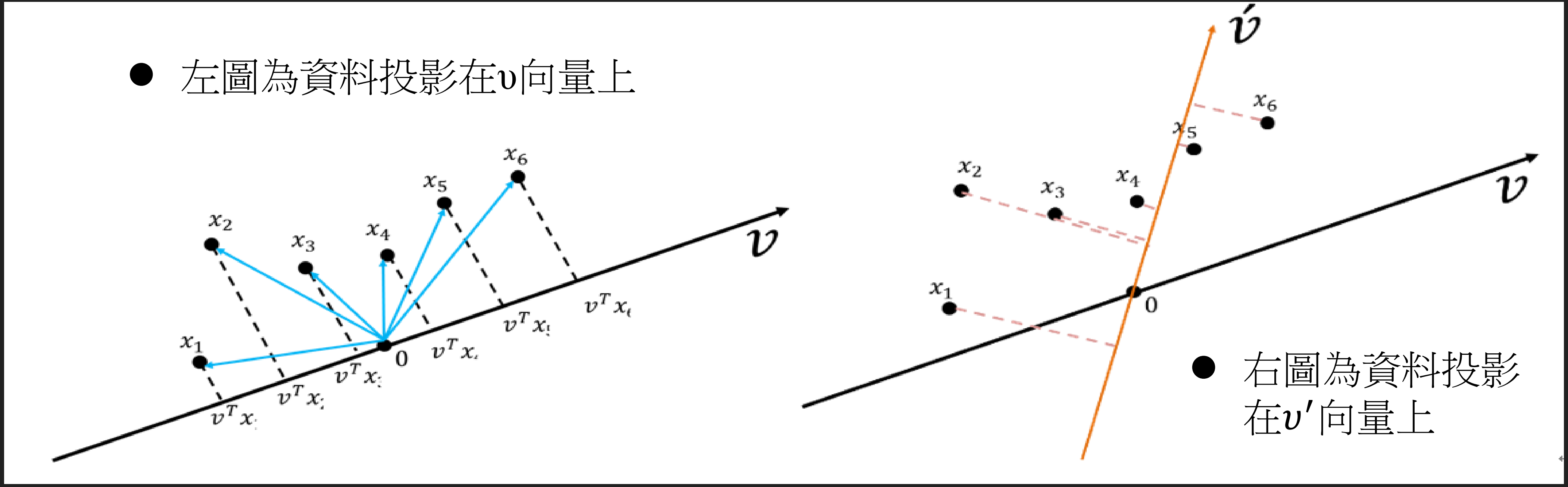


- SVM就是透過最大的Margin來找出最好的線

MODEL 1 --- PCA(Principal Component Analysis)

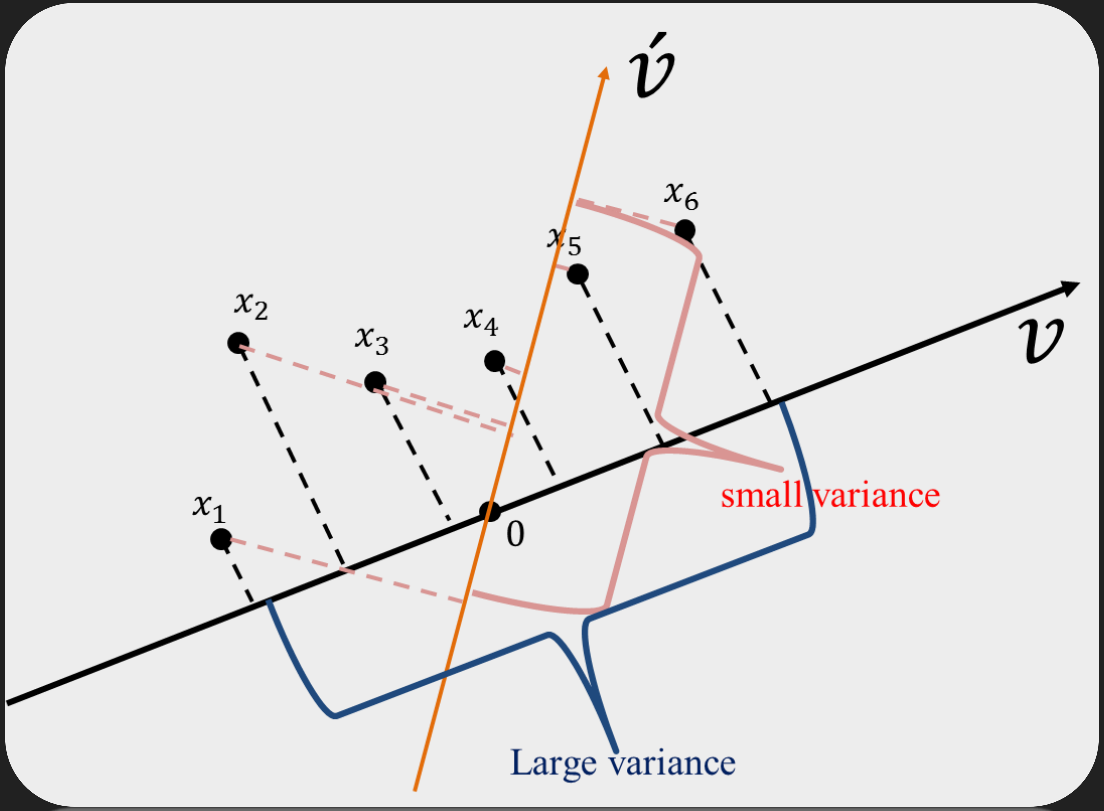
維度: 1207*1244*3

- PCA主要為降維與特徵擷取的方法
- 在features的空間中找到一個投影軸投影後可以得到這組資料的最大變異量



- 左圖為資料投影在υ向量上
- 右圖為資料投影在v'向量上

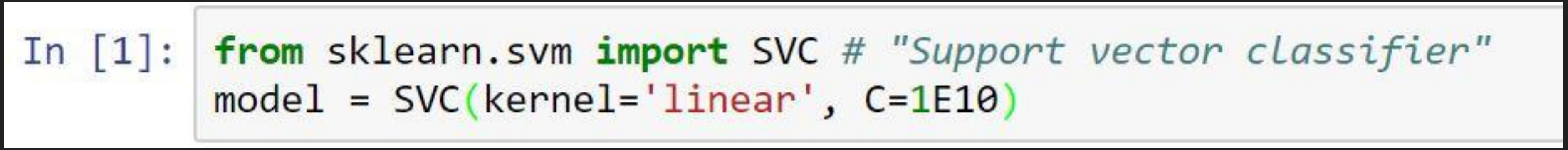
MODEL 1 --- PCA(Principal Component Analysis)



- ➢ υ向量資料投影後有較大的變異量

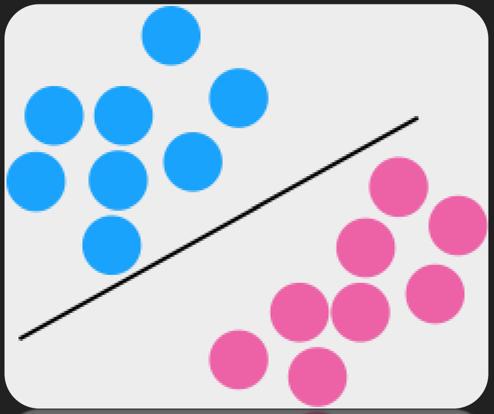
MODEL 1 --- Grid Search

- ➢ Grid Search為網格搜尋，其實就是列舉搜尋
- ➢ 用來尋找模型中好的超參數

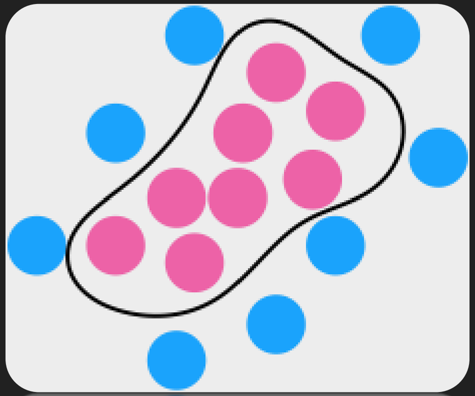


```
In [1]: from sklearn.svm import SVC # "Support vector classifier"
        model = SVC(kernel='linear', C=1E10)
```

- linear



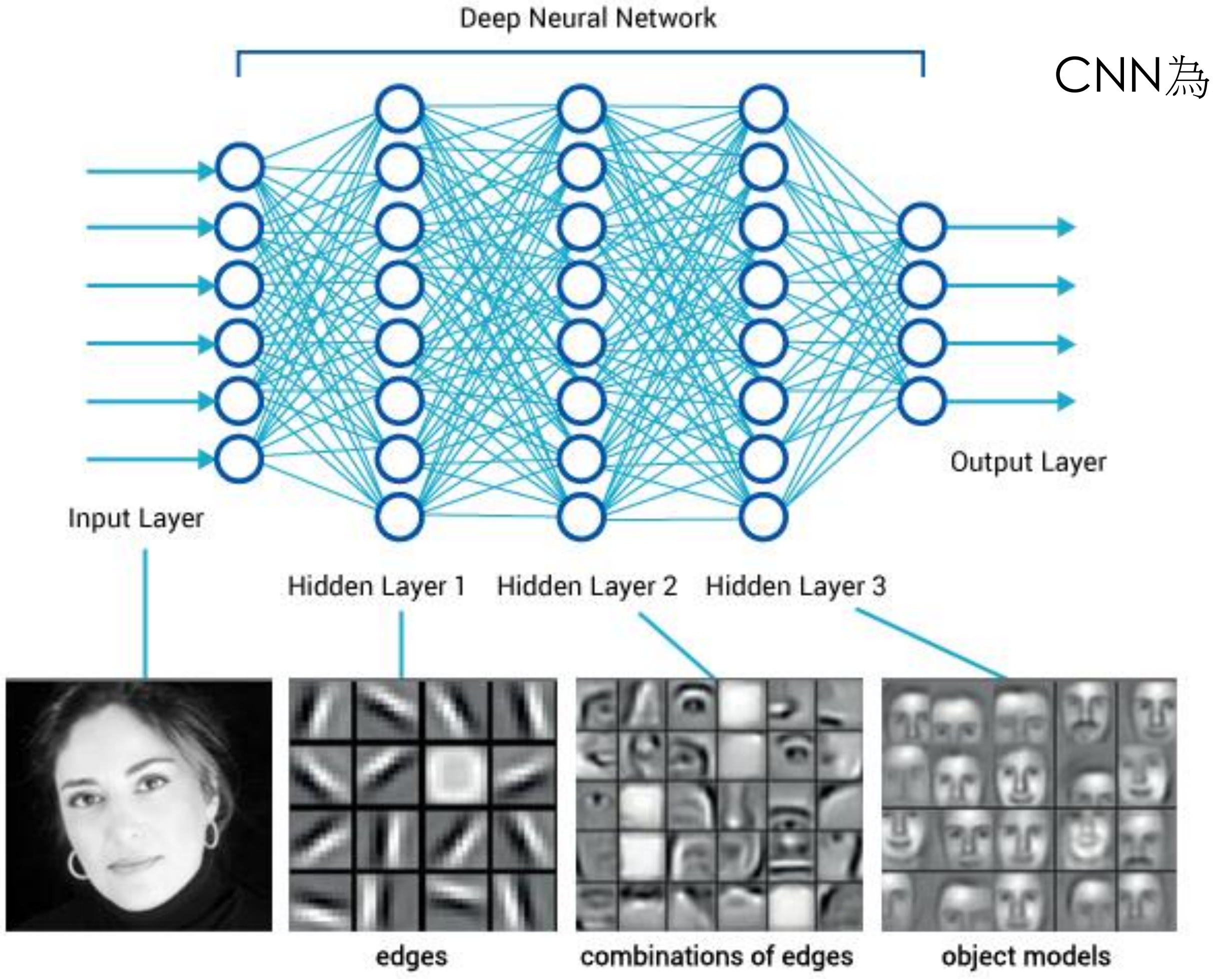
- rbf



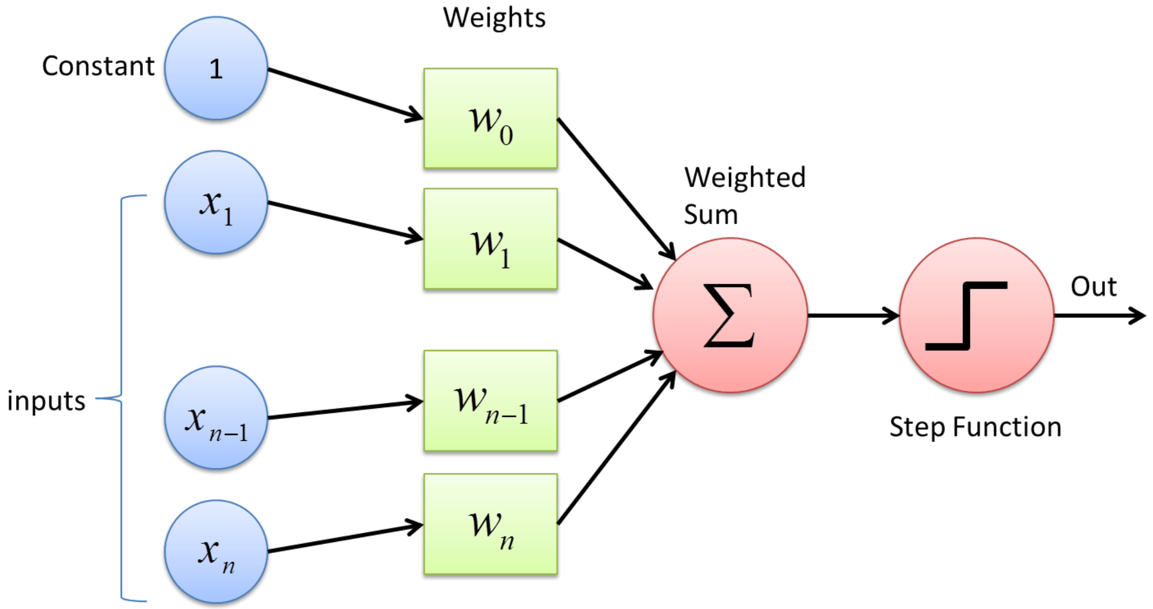
MODEL 1 --- Grid Search

kernel		C		Gamma	
linear	rbf	0.1	10	0.0001	0.005
poly	sigmoid	50	100	0.001	0.01

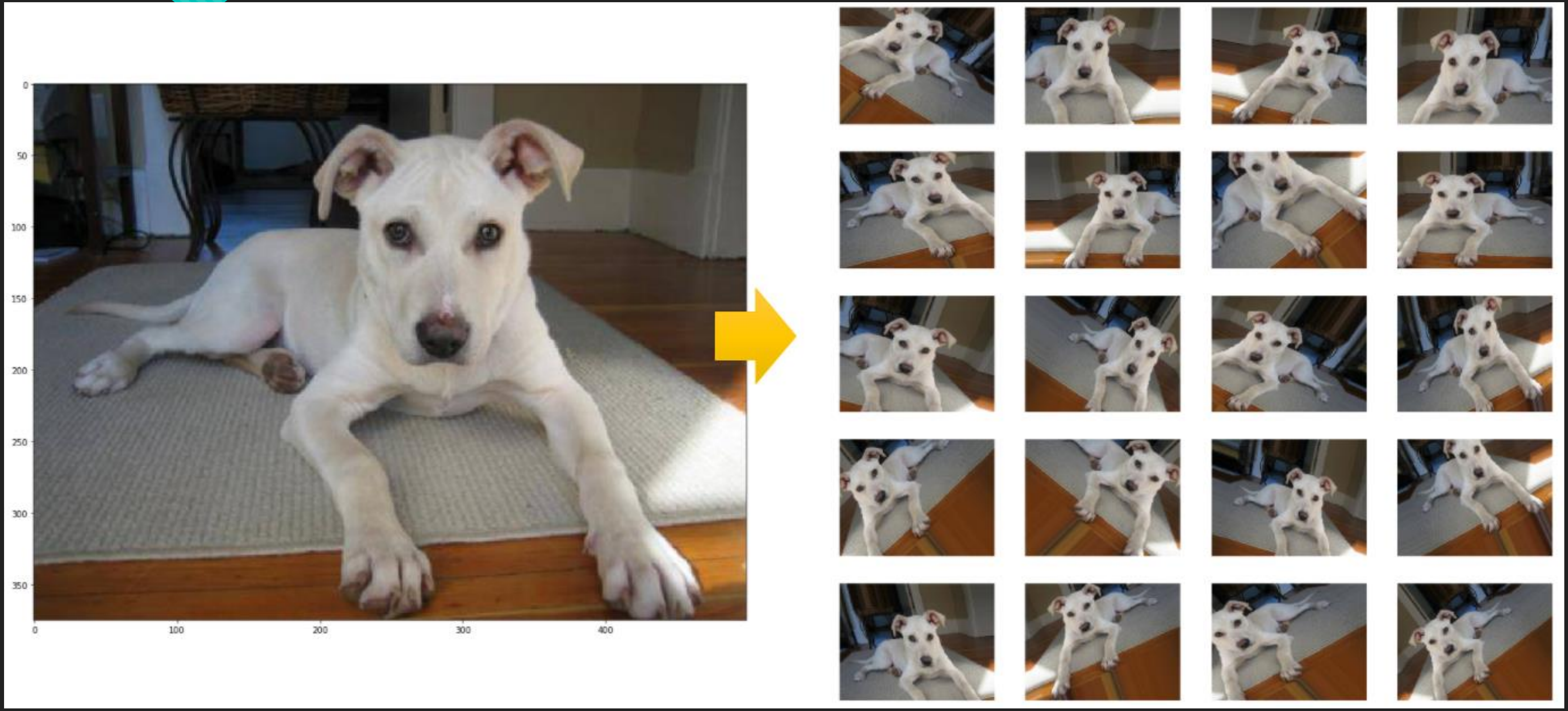
MODEL 2 --- CNN(卷積神經網路)



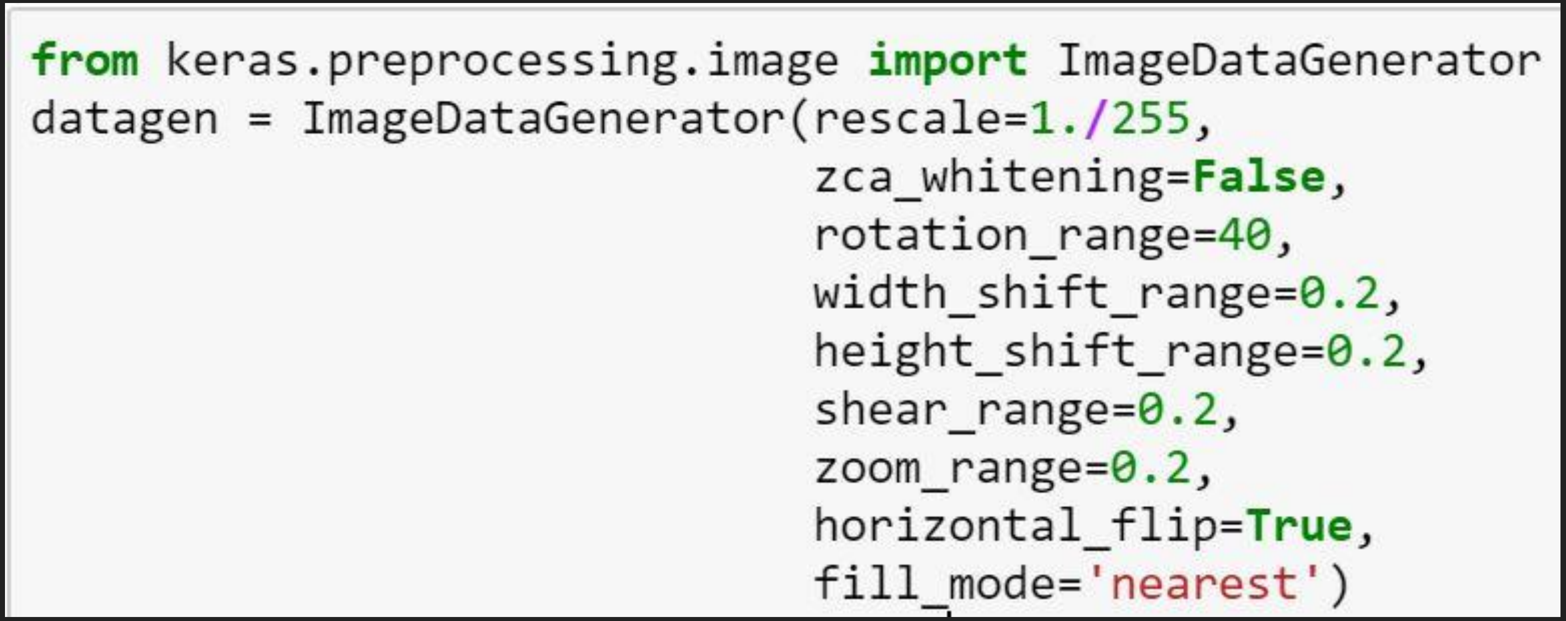
CNN為ANN(人工神經網路)的應用，主要應用在影像辨識



MODEL 2 --- Data Generator



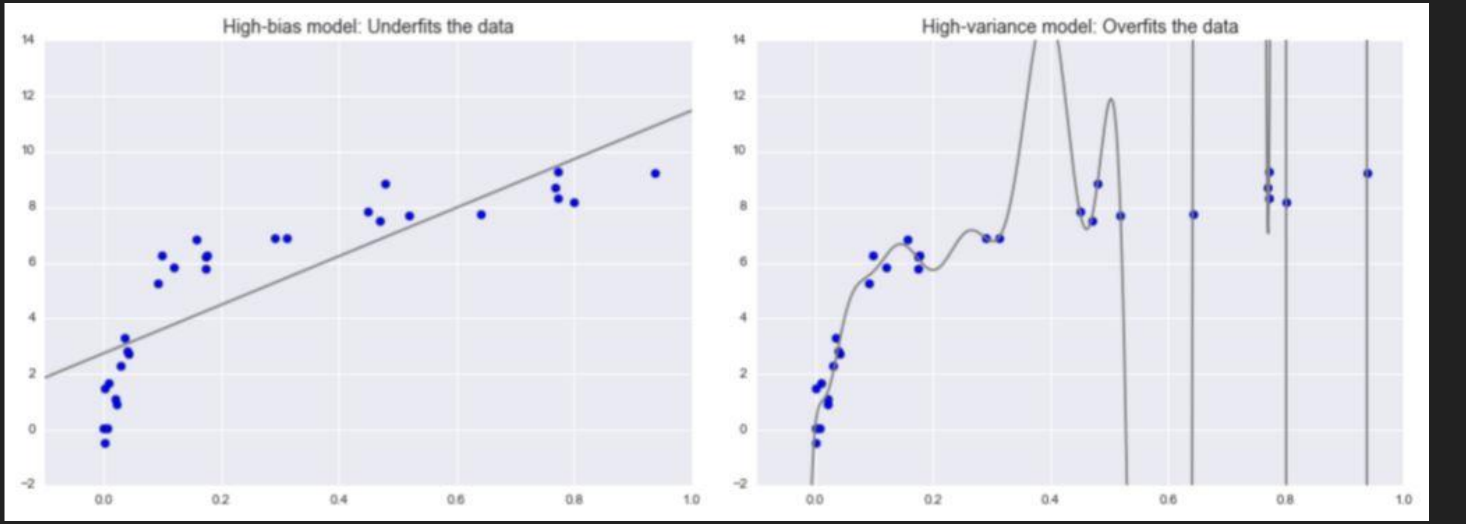
MODEL 2 --- Data Generator

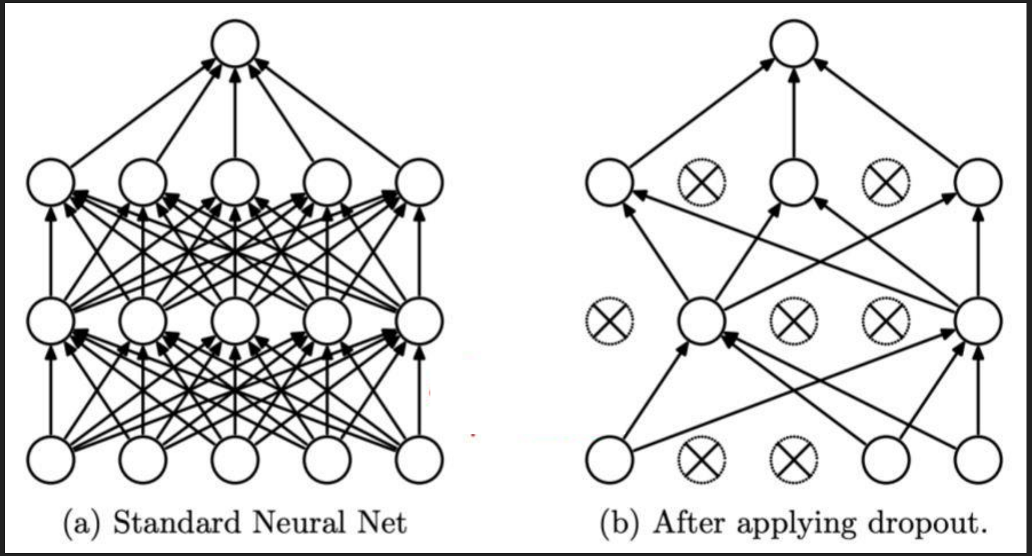


```
from keras.preprocessing.image import ImageDataGenerator
datagen = ImageDataGenerator(rescale=1./255,
                             zca_whitening=False,
                             rotation_range=40,
                             width_shift_range=0.2,
                             height_shift_range=0.2,
                             shear_range=0.2,
                             zoom_range=0.2,
                             horizontal_flip=True,
                             fill_mode='nearest')
```

MODEL 2 --- Dropout

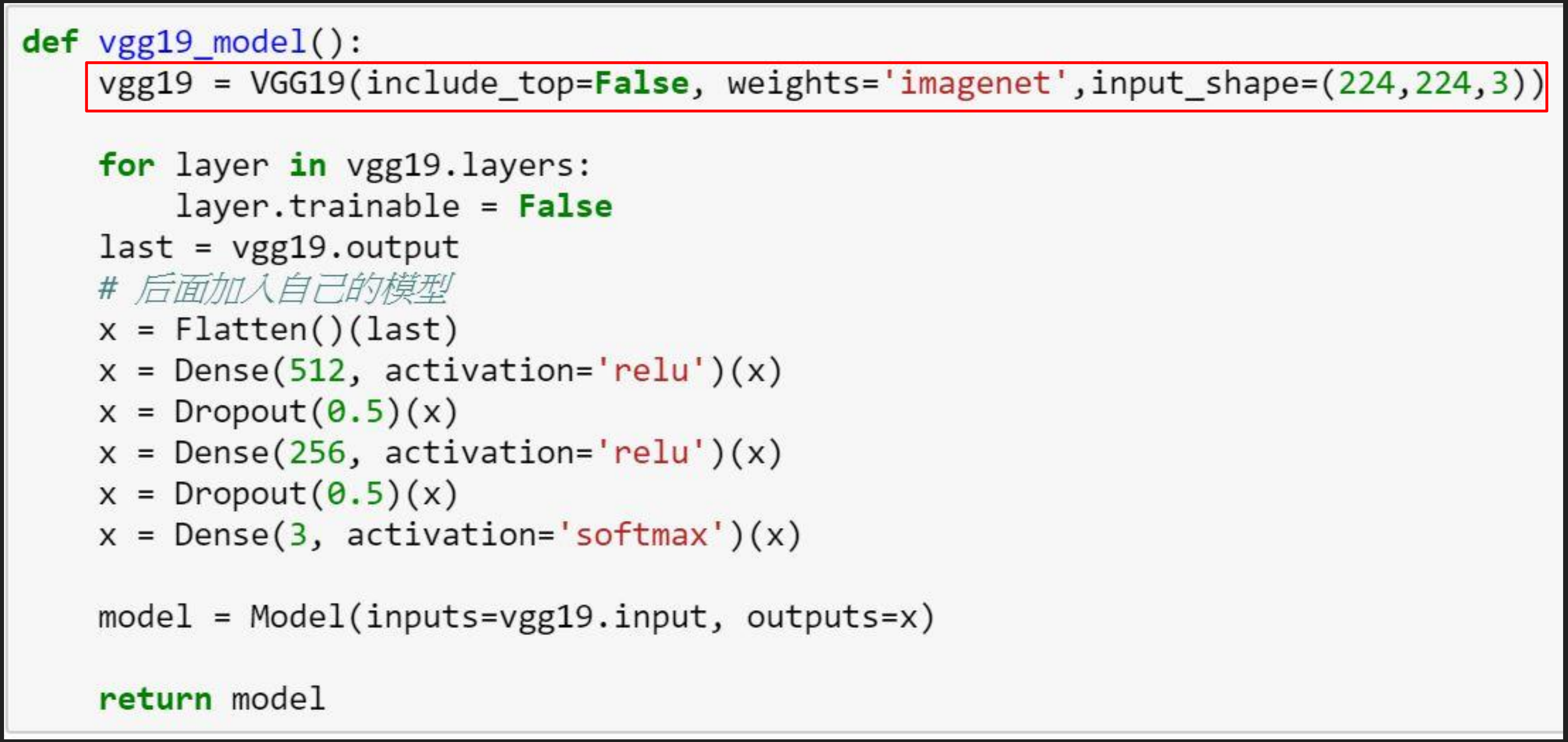
- 用Validation Curve檢查發現模型有overfitting的問題




(a) Standard Neural Net

(b) After applying dropout.

MODEL 2 --- Pretrained Model(VGG19)



```
def vgg19_model():
    vgg19 = VGG19(include_top=False, weights='imagenet',input_shape=(224,224,3))

    for layer in vgg19.layers:
        layer.trainable = False
    last = vgg19.output
    # 后面加入自己的模型
    x = Flatten()(last)
    x = Dense(512, activation='relu')(x)
    x = Dropout(0.5)(x)
    x = Dense(256, activation='relu')(x)
    x = Dropout(0.5)(x)
    x = Dense(3, activation='softmax')(x)

    model = Model(inputs=vgg19.input, outputs=x)

    return model
```

Conclusion

SVM:

1. PCA
2. Grid Search

CNN:

1. Data Generator
2. Dropout
3. VGG19

Best Model !!!!!!!!!!

Thank you for your listening!