In [1]:
```
from tensorflow.keras.preprocessing.image import ImageDataGenerator
```

In [2]:
```
train_datagen=ImageDataGenerator(rescale=1./255,zoom_range=0.2,horizontal_flip=True,vertical_flip=False)
```

In [3]:
```
test_datagen=ImageDataGenerator(rescale=1./255)
```

In [6]:
```
x_train=train_datagen.flow_from_directory('/content/drive/MyDrive/Classroom/Dataset Plant Disease/Veg-dataset/Veg-dataset/train_set',
                                          class_mode='categorical',batch_size=24)
```

```
Found 10410 images belonging to 9 classes.
```

In [7]:
```
x_test=test_datagen.flow_from_directory('/content/drive/MyDrive/Classroom/Dataset Plant Disease/fruit-dataset/fruit-dataset/train', class_mode='catego
```

```
Found 56 images belonging to 6 classes.
```

In [8]:
```
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense,Convolution2D,MaxPooling2D,Flatten
```

In [9]:
```
model=Sequential()
```

In [10]:
```
model.add(Convolution2D(32,(3,3),input_shape=(128,128,3),activation='relu'))
```

In [11]:
```
model.add(MaxPooling2D(pool_size=(2,2)))
```

In [12]:
```
model.add(Flatten())
```

In [13]:
```
model.summary()
```

```
Model: "sequential"
```

```
 Layer (type)                 Output Shape              Param #
=================================================================
 conv2d (Conv2D)              (None, 126, 126, 32)      896

 max_pooling2d (MaxPooling2D  (None, 63, 63, 32)       0
 )

 flatten (Flatten)            (None, 127008)            0

=================================================================
Total params: 896
Trainable params: 896
Non-trainable params: 0
_________________________________________________________________
```

In [14]:
```
model.add(Dense(300,activation='relu'))
model.add(Dense(150,activation='relu'))
```

In [15]:
```
model.add(Dense(9,activation='softmax'))
```

In [16]:
```
model.compile(loss='categorical_crossentropy',optimizer='adam',metrics=['accuracy'])
```

In [17]:
```
len(x_train)
```

Out[17]: 434

In [18]:
```
1238/24
```

Out[18]: 51.583333333333336

In [21]:
```
model.save('vegetabledata.h5')
```

In [22]:
```
import numpy as np
from tensorflow.keras.models import load_model
from tensorflow.keras.preprocessing import image
```

In [23]:
```
model=load_model('vegetabledata.h5')
```

In [25]:
```
img=image.load_img('/content/drive/MyDrive/Classroom/Dataset Plant Disease/Veg-dataset/Veg-dataset/train_set/Pepper,_bell___healthy/00208a93-7687-4e8c
```

In [26]:
```
img
```

Out[26]:

In [27]:
```
x=image.img_to_array(img)
```

In [27]:
```
x=image.img_to_array(img)
```

In [29]:
```
img=image.load_img('/content/drive/MyDrive/Classroom/Dataset Plant Disease/Veg-dataset/Veg-dataset/train_set/Pepper,_bell___healthy/01468dda-44f3-4de8
img
```

Out[29]:

In [30]:
```
x=image.img_to_array(img)
```

In [31]:
```
x
```

Out[31]:
```
array([[[197., 190., 198.],
        [195., 188., 196.],
        [193., 186., 194.],
        ...,
        [208., 197., 203.],
        [211., 200., 206.],
        [212., 201., 207.]],

       [[195., 188., 196.],
        [191., 184., 192.],
        [187., 180., 188.],
```

```
 [187., 186., 186.],
 ...,
 [208., 197., 203.],
 [208., 197., 203.],
 [208., 197., 203.]],

[[199., 192., 200.],
 [195., 188., 196.],
 [190., 183., 191.],
 ...,
 [212., 201., 207.],
 [209., 198., 204.],
 [209., 198., 204.]],

...,

[[183., 172., 178.],
 [184., 173., 179.],
 [186., 175., 181.],
 ...,
 [139., 124., 129.],
 [202., 187., 192.],
 [146., 131., 136.]],

[[182., 171., 177.],
 [183., 172., 178.],
 [184., 173., 179.],
 ...,
 [145., 130., 135.],
 [167., 152., 157.],
 [187., 172., 177.]],

[[191., 180., 186.],
 [191., 180., 186.],
 [191., 180., 186.],
 ...,
 [211., 196., 201.],
 [173., 158., 163.],
 [160., 145., 150.]]], dtype=float32)
```

In [32]:
```
x=np.expand_dims(x,axis=0)
```

In [33]:
```
x
```

```
[[195., 188., 196.],
 [191., 184., 192.],
 [187., 180., 188.],
 ...,
 [208., 197., 203.],
 [208., 197., 203.],
 [208., 197., 203.]],

[[199., 192., 200.],
 [195., 188., 196.],
 [190., 183., 191.],
 ...,
 [212., 201., 207.],
 [209., 198., 204.],
 [209., 198., 204.]],

...,

[[183., 172., 178.],
 [184., 173., 179.],
 [186., 175., 181.],
 ...,
 [139., 124., 129.],
 [202., 187., 192.],
 [146., 131., 136.]],

[[182., 171., 177.],
 [183., 172., 178.],
 [184., 173., 179.],
 ...,
 [145., 130., 135.],
 [167., 152., 157.],
 [187., 172., 177.]],

[[191., 180., 186.],
 [191., 180., 186.],
 [191., 180., 186.],
 ...,
 [211., 196., 201.],
 [173., 158., 163.],
 [160., 145., 150.]]], dtype=float32)
```

In [41]:
```
y=np.expand_dims(x,axis=0)
```

In [36]:
```
x_train.class_indices
```

Out[36]:
```
{'Pepper,_bell___Bacterial_spot': 0,
 'Pepper,_bell___healthy': 1,
 'Potato___Early_blight': 2,
 'Potato___Late_blight': 3,
 'Potato___healthy': 4,
 'Tomato___Bacterial_spot': 5,
 'Tomato___Late_blight': 6,
 'Tomato___Leaf_Mold': 7,
 'Tomato___Septoria_leaf_spot': 8}
```

In [37]:
```
index=['Pepper,bell_Bacterial_spot','Pepper,_bell_healthy','Potato_Early_blight','Potato__Late_blight']
```

In [42]:
```
index[y[0]]
```

```
---------------------------------------------------------------------------
TypeError                                 Traceback (most recent call last)
 in
----> 1 index[y[0]]

TypeError: only integer scalar arrays can be converted to a scalar index
```

In [40]:
```
img=image.load_img('/content/drive/MyDrive/Classroom/Dataset Plant Disease/Veg-dataset/Veg-dataset/train_set/Pepper,_bell___healthy/0119205b-cfac-4322
x=image.img_to_array(img)
x=np.expand_dims(x,axis=0)
y=np.argmax(model.predict(x),axis=1)
index=['Pepper,_bell_Bacterial_spot','Pepper,_bell_healthy','Potato_Early_blight','Potato_Late_blight','Potato_healthy','Tomato_Bacterial_spot','Tomat
index[y[0]]
```