

In [1]:

```
from keras.models import Sequential
from keras.layers import Dense
from keras.layers import Convolution2D
from keras.layers import MaxPooling2D
from keras.layers import Flatten
```

Using TensorFlow backend.

In [64]:

```
model=Sequential()
```

In [65]:

```
model.add(Convolution2D(32,3,3,input_shape=(64,64,3),activation = 'relu'))
```

C:\ProgramData\Anaconda3\lib\site-packages\ipykernel_launcher.py:1: UserWarning: Update your `Conv2D` call to the Keras 2 API: `Conv2D(32, (3, 3), input_shape=(64, 64, 3..., activation="relu")`
 """Entry point for launching an IPython kernel.

In [66]:

```
model.add(MaxPooling2D(pool_size=(2,2)))
```

In [67]:

```
#input layer
model.add(Flatten())
```

In [68]:

```
#hidden layers
model.add(Dense(init='uniform',activation='relu',units=500))
```

C:\ProgramData\Anaconda3\lib\site-packages\ipykernel_launcher.py:2: UserWarning: Update your `Dense` call to the Keras 2 API: `Dense(activation="relu", units=500, kernel_initializer="uniform")`

In [69]:

```
model.add(Dense(init='uniform',activation='softmax',units=5))
```

C:\ProgramData\Anaconda3\lib\site-packages\ipykernel_launcher.py:1: UserWarning: Update your `Dense` call to the Keras 2 API: `Dense(activation="softmax", units=5, kernel_initializer="uniform")`
 """Entry point for launching an IPython kernel.

In [70]:

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

In [71]:

```
from keras.preprocessing.image import ImageDataGenerator
train_datagen = ImageDataGenerator(rescale = 1./255, shear_range = 0.2, zoom_range = 0.2, horizontal_flip = True)
test_datagen = ImageDataGenerator(rescale = 1./255)
```

In [72]:

```
x_train = train_datagen.flow_from_directory(r"C:\Users\Admin\Desktop\dataset_1\train_set", target_size=(28, 28))
x_test = test_datagen.flow_from_directory(r"C:\Users\Admin\Desktop\dataset_1\test_set", target_size=(28, 28))
```

Found 360 images belonging to 5 classes.

Found 160 images belonging to 5 classes.

In [73]:

```
model.fit_generator(x_train, steps_per_epoch = 12, epochs=50, validation_data = x_test, validat
```

```
Epoch 1/50
12/12 [=====] - 10s 861ms/step - loss: 3.2578 - acc: 0.2114 - val_loss: 1.7715 - val_acc: 0.1938
Epoch 2/50
12/12 [=====] - 7s 616ms/step - loss: 1.7013 - acc: 0.2291 - val_loss: 1.5070 - val_acc: 0.3375
Epoch 3/50
12/12 [=====] - 7s 619ms/step - loss: 1.5092 - acc: 0.4058 - val_loss: 1.4010 - val_acc: 0.5188
Epoch 4/50
12/12 [=====] - 8s 626ms/step - loss: 1.4266 - acc: 0.4064 - val_loss: 1.2876 - val_acc: 0.5437
Epoch 5/50
12/12 [=====] - 7s 616ms/step - loss: 1.3474 - acc: 0.4621 - val_loss: 1.2208 - val_acc: 0.5437
Epoch 6/50
12/12 [=====] - 8s 629ms/step - loss: 1.3034 - acc: 0.4601 - val_loss: 1.1517 - val_acc: 0.5250
Epoch 7/50
12/12 [=====] - 7s 619ms/step - loss: 1.1980 - acc: 0.5262 - val_loss: 1.0935 - val_acc: 0.6125
Epoch 8/50
12/12 [=====] - 7s 620ms/step - loss: 1.1750 - acc: 0.5504 - val_loss: 1.0595 - val_acc: 0.6438
Epoch 9/50
12/12 [=====] - 7s 624ms/step - loss: 1.1133 - acc: 0.5811 - val_loss: 1.0489 - val_acc: 0.6000
Epoch 10/50
12/12 [=====] - 7s 619ms/step - loss: 1.0711 - acc: 0.5805 - val_loss: 0.9981 - val_acc: 0.6562
Epoch 11/50
12/12 [=====] - 8s 626ms/step - loss: 1.0401 - acc: 0.6610 - val_loss: 0.9319 - val_acc: 0.6750
Epoch 12/50
12/12 [=====] - 8s 627ms/step - loss: 0.9518 - acc: 0.6361 - val_loss: 0.9150 - val_acc: 0.6937
Epoch 13/50
12/12 [=====] - 7s 624ms/step - loss: 0.8963 - acc: 0.7016 - val_loss: 0.9209 - val_acc: 0.7000
Epoch 14/50
12/12 [=====] - 8s 637ms/step - loss: 0.9002 - acc: 0.6492 - val_loss: 0.9470 - val_acc: 0.5875
Epoch 15/50
12/12 [=====] - 7s 617ms/step - loss: 0.9122 - acc: 0.6577 - val_loss: 0.9329 - val_acc: 0.6750
Epoch 16/50
12/12 [=====] - 7s 624ms/step - loss: 0.8894 - acc: 0.6963 - val_loss: 0.9946 - val_acc: 0.6312
Epoch 17/50
12/12 [=====] - 8s 626ms/step - loss: 0.8972 - acc: 0.6387 - val_loss: 1.0322 - val_acc: 0.6188
Epoch 18/50
12/12 [=====] - 8s 626ms/step - loss: 0.8755 - acc: 0.6996 - val_loss: 0.8713 - val_acc: 0.7125
Epoch 19/50
12/12 [=====] - 8s 632ms/step - loss: 0.8239 - acc:
```

```
c: 0.7081 - val_loss: 0.8723 - val_acc: 0.7250
Epoch 20/50
12/12 [=====] - 8s 637ms/step - loss: 0.8153 - ac
c: 0.7081 - val_loss: 0.9047 - val_acc: 0.7188
Epoch 21/50
12/12 [=====] - 8s 668ms/step - loss: 0.7283 - ac
c: 0.7598 - val_loss: 0.8452 - val_acc: 0.7250
Epoch 22/50
12/12 [=====] - 8s 643ms/step - loss: 0.7355 - ac
c: 0.7415 - val_loss: 0.8304 - val_acc: 0.7375
Epoch 23/50
12/12 [=====] - 8s 668ms/step - loss: 0.7059 - ac
c: 0.7585 - val_loss: 0.9139 - val_acc: 0.6687
Epoch 24/50
12/12 [=====] - 7s 625ms/step - loss: 0.6411 - ac
c: 0.7912 - val_loss: 0.9108 - val_acc: 0.7125
Epoch 25/50
12/12 [=====] - 8s 632ms/step - loss: 0.6611 - ac
c: 0.7834 - val_loss: 0.8094 - val_acc: 0.7375
Epoch 26/50
12/12 [=====] - 8s 630ms/step - loss: 0.6796 - ac
c: 0.7448 - val_loss: 0.8247 - val_acc: 0.7188
Epoch 27/50
12/12 [=====] - 8s 631ms/step - loss: 0.6080 - ac
c: 0.7840 - val_loss: 0.8177 - val_acc: 0.7375
Epoch 28/50
12/12 [=====] - 7s 617ms/step - loss: 0.5747 - ac
c: 0.8069 - val_loss: 0.8366 - val_acc: 0.7312
Epoch 29/50
12/12 [=====] - 8s 640ms/step - loss: 0.5666 - ac
c: 0.8200 - val_loss: 0.8824 - val_acc: 0.7312
Epoch 30/50
12/12 [=====] - 8s 637ms/step - loss: 0.5825 - ac
c: 0.8181 - val_loss: 0.9258 - val_acc: 0.6813
Epoch 31/50
12/12 [=====] - 8s 628ms/step - loss: 0.5336 - ac
c: 0.8534 - val_loss: 0.8486 - val_acc: 0.7000
Epoch 32/50
12/12 [=====] - 8s 626ms/step - loss: 0.5416 - ac
c: 0.8200 - val_loss: 0.9665 - val_acc: 0.6875
Epoch 33/50
12/12 [=====] - 7s 624ms/step - loss: 0.5629 - ac
c: 0.7840 - val_loss: 0.8933 - val_acc: 0.7188
Epoch 34/50
12/12 [=====] - 8s 629ms/step - loss: 0.5031 - ac
c: 0.8436 - val_loss: 0.8962 - val_acc: 0.7375
Epoch 35/50
12/12 [=====] - 8s 628ms/step - loss: 0.4911 - ac
c: 0.8161 - val_loss: 0.9641 - val_acc: 0.7125
Epoch 36/50
12/12 [=====] - 8s 627ms/step - loss: 0.4774 - ac
c: 0.8259 - val_loss: 0.9217 - val_acc: 0.7125
Epoch 37/50
12/12 [=====] - 8s 625ms/step - loss: 0.4640 - ac
c: 0.8331 - val_loss: 0.8889 - val_acc: 0.7500
Epoch 38/50
12/12 [=====] - 8s 628ms/step - loss: 0.4152 - ac
c: 0.8724 - val_loss: 0.9182 - val_acc: 0.7375
Epoch 39/50
12/12 [=====] - 7s 617ms/step - loss: 0.4375 - ac
c: 0.8613 - val_loss: 0.9790 - val_acc: 0.7312
```

```
Epoch 40/50
12/12 [=====] - 8s 650ms/step - loss: 0.4278 - acc: 0.8613 - val_loss: 0.9740 - val_acc: 0.6687
Epoch 41/50
12/12 [=====] - 7s 624ms/step - loss: 0.3886 - acc: 0.8665 - val_loss: 0.9295 - val_acc: 0.7125
Epoch 42/50
12/12 [=====] - 7s 613ms/step - loss: 0.3613 - acc: 0.8907 - val_loss: 0.9383 - val_acc: 0.7438
Epoch 43/50
12/12 [=====] - 8s 633ms/step - loss: 0.3646 - acc: 0.8881 - val_loss: 0.9224 - val_acc: 0.7625
Epoch 44/50
12/12 [=====] - 7s 615ms/step - loss: 0.2988 - acc: 0.9136 - val_loss: 0.9539 - val_acc: 0.7438
Epoch 45/50
12/12 [=====] - 7s 624ms/step - loss: 0.3423 - acc: 0.8927 - val_loss: 1.0476 - val_acc: 0.6937
Epoch 46/50
12/12 [=====] - 8s 632ms/step - loss: 0.3314 - acc: 0.8953 - val_loss: 1.0669 - val_acc: 0.7125
Epoch 47/50
12/12 [=====] - 8s 633ms/step - loss: 0.3078 - acc: 0.8986 - val_loss: 1.0645 - val_acc: 0.6875
Epoch 48/50
12/12 [=====] - 7s 624ms/step - loss: 0.2517 - acc: 0.9221 - val_loss: 0.9831 - val_acc: 0.7625
Epoch 49/50
12/12 [=====] - 7s 622ms/step - loss: 0.2423 - acc: 0.9221 - val_loss: 1.0127 - val_acc: 0.7438
Epoch 50/50
12/12 [=====] - 8s 626ms/step - loss: 0.2989 - acc: 0.9090 - val_loss: 0.9707 - val_acc: 0.7688
```

Out[73]:

<keras.callbacks.History at 0x1b3838acb38>

In [74]:

```
model.save("cnn2.h5")
```

In [75]:

```
print(x_train.class_indices)
```

```
{'Acne': 0, 'Melanoma': 1, 'Peeling skin': 2, 'Ring worm': 3, 'Vitiligo': 4}
```

In []: