

Narendra Modi vs Rahul Gandhi Recognizer

Structure your datasets into a directory structure like this,

replace the `class_A` and `class_B` names with whatever you want to show your CNN model as the y-label

```
dataset
- training_set
  - class_A
  - class_B
- test_set
  - class_A
  - class_B
```

importing libraries

In [14]:

```
from keras.models import Sequential
from keras.layers import Dense
from keras.layers import Conv2D, MaxPool2D, Flatten

import numpy as np
from keras.preprocessing.image import ImageDataGenerator
from keras.preprocessing import image
```

building the CNN

In [3]:

```
classifier = Sequential()

# convolution layer - 32 feature detectors of 3x3 shape plus a rectifier on top of our
# convolved feature map
classifier.add(Conv2D(32, (3,3), input_shape=(64, 64, 3), activation='relu'))

# max pooling layer - of 2x2 shape
classifier.add(MaxPool2D(pool_size=(2, 2)))

# another convolution layer
classifier.add(Conv2D(32, (3,3), activation='relu'))

# another max pooling layer
classifier.add(MaxPool2D(pool_size=(2, 2)))

# flattening layer
classifier.add(Flatten())

# fully connected layer
classifier.add(Dense(units=128, activation='relu'))

# output layer
classifier.add(Dense(units=1, activation='sigmoid'))
```

WARNING:tensorflow:From C:\ProgramData\Anaconda3\lib\site-packages\tensorflow\python\framework\op_def_library.py:263: colocate_with (from tensorflow.python.framework.ops) is deprecated and will be removed in a future version.

Instructions for updating:

Colocations handled automatically by placer.

compiling the CNN

In [4]:

```
classifier.compile(optimizer='adam', loss='binary_crossentropy', metrics=['accuracy'])
```

Image Augmentation

using Keras' ImageDataGenerator - shearing, zooming, horizontally flipping

In [7]:

```
train_datagen = ImageDataGenerator(rescale=1./255,
                                   shear_range=0.2,
                                   zoom_range=0.2,
                                   horizontal_flip=True)

test_datagen = ImageDataGenerator(rescale=1./255)

training_set = train_datagen.flow_from_directory("dataset/modi_vs_papu/training_set",
                                                target_size=(64, 64),
                                                batch_size=32,
                                                class_mode='binary')
testing_set = test_datagen.flow_from_directory("dataset/modi_vs_papu/test_set",
                                              target_size=(64, 64),
                                              batch_size=32,
                                              class_mode='binary')
```

Found 40 images belonging to 2 classes.

Found 8 images belonging to 2 classes.

how to save the best weights of your model while its training

In [11]:

```
# by creating checkpoint

from keras.callbacks import ModelCheckpoint

filepath = "dataset/modi_vs_papu/saved_model/weights-improvement-{epoch:02d}-{loss:.4f}.hdf5"
checkpoint = ModelCheckpoint(filepath, monitor='loss', verbose=1, save_best_only=True,
                             mode='min')
callbacks_list = [checkpoint]
```

training our CNN

In [12]:

```
classifier.fit_generator(training_set,
                        steps_per_epoch=20,           # 8000, bcz i had
                        8000 (4000+4000) images of cats & dogs
                        epochs=100,                   # 500 for cats vs
                        dogs
                        validation_data=testing_set,
                        validation_steps=4,           # 2000, bcz i had
                        2000 (1000+1000) images of cats & dogs
                        callbacks=callbacks_list)      # callback for mod
el checkpoints
```

Epoch 1/100

20/20 [=====] - 4s 179ms/step - loss: 1.8706e-04
- acc: 1.0000 - val_loss: 2.5250 - val_acc: 0.5000

Epoch 00001: loss improved from inf to 0.00019, saving model to dataset/modi_vs_papu/saved_model/weights-improvement-01- 0.0002.hdf5

Epoch 2/100

20/20 [=====] - 3s 175ms/step - loss: 1.9778e-04
- acc: 1.0000 - val_loss: 2.5180 - val_acc: 0.5000

Epoch 00002: loss did not improve from 0.00019

Epoch 3/100

20/20 [=====] - 3s 174ms/step - loss: 2.1043e-04
- acc: 1.0000 - val_loss: 2.4681 - val_acc: 0.6250

Epoch 00003: loss improved from 0.00019 to 0.00019, saving model to dataset/modi_vs_papu/saved_model/weights-improvement-03- 0.0002.hdf5

Epoch 4/100

20/20 [=====] - 3s 171ms/step - loss: 1.3104e-04
- acc: 1.0000 - val_loss: 2.5210 - val_acc: 0.6250

Epoch 00004: loss improved from 0.00019 to 0.00014, saving model to dataset/modi_vs_papu/saved_model/weights-improvement-04- 0.0001.hdf5

Epoch 5/100

20/20 [=====] - 3s 174ms/step - loss: 1.0859e-04
- acc: 1.0000 - val_loss: 2.4534 - val_acc: 0.6250

Epoch 00005: loss improved from 0.00014 to 0.00011, saving model to dataset/modi_vs_papu/saved_model/weights-improvement-05- 0.0001.hdf5

Epoch 6/100

20/20 [=====] - 3s 168ms/step - loss: 1.7632e-04
- acc: 1.0000 - val_loss: 2.3695 - val_acc: 0.6250

Epoch 00006: loss did not improve from 0.00011

Epoch 7/100

20/20 [=====] - 3s 172ms/step - loss: 1.3872e-04
- acc: 1.0000 - val_loss: 2.9186 - val_acc: 0.5000

Epoch 00007: loss did not improve from 0.00011

Epoch 8/100

20/20 [=====] - 3s 173ms/step - loss: 2.6215e-04
- acc: 1.0000 - val_loss: 2.7258 - val_acc: 0.5000

Epoch 00008: loss did not improve from 0.00011

Epoch 9/100

20/20 [=====] - 3s 171ms/step - loss: 1.4388e-04
- acc: 1.0000 - val_loss: 2.3966 - val_acc: 0.6250

Epoch 00009: loss did not improve from 0.00011

Epoch 10/100

20/20 [=====] - 3s 169ms/step - loss: 1.1871e-04
- acc: 1.0000 - val_loss: 2.4813 - val_acc: 0.6250

Epoch 00010: loss did not improve from 0.00011

Epoch 11/100

20/20 [=====] - 3s 173ms/step - loss: 8.6372e-05
- acc: 1.0000 - val_loss: 2.3128 - val_acc: 0.5000

Epoch 00011: loss improved from 0.00011 to 0.00009, saving model to dataset/modi_vs_papu/saved_model/weights-improvement-11- 0.0001.hdf5

Epoch 12/100

20/20 [=====] - 3s 166ms/step - loss: 1.1870e-04
- acc: 1.0000 - val_loss: 2.3383 - val_acc: 0.5000

Epoch 00012: loss did not improve from 0.00009

Epoch 13/100

20/20 [=====] - 3s 166ms/step - loss: 1.0326e-04
- acc: 1.0000 - val_loss: 2.5659 - val_acc: 0.5000

Epoch 00013: loss did not improve from 0.00009

Epoch 14/100

20/20 [=====] - 3s 169ms/step - loss: 2.3802e-04
- acc: 1.0000 - val_loss: 2.7369 - val_acc: 0.5000

Epoch 00014: loss did not improve from 0.00009

Epoch 15/100

20/20 [=====] - 3s 166ms/step - loss: 3.1527e-04
- acc: 1.0000 - val_loss: 2.5158 - val_acc: 0.5000

Epoch 00015: loss did not improve from 0.00009

Epoch 16/100

20/20 [=====] - 3s 166ms/step - loss: 7.0860e-05
- acc: 1.0000 - val_loss: 2.5240 - val_acc: 0.5000

Epoch 00016: loss improved from 0.00009 to 0.00008, saving model to dataset/modi_vs_papu/saved_model/weights-improvement-16- 0.0001.hdf5

Epoch 17/100

20/20 [=====] - 3s 163ms/step - loss: 8.9617e-05
- acc: 1.0000 - val_loss: 2.4383 - val_acc: 0.6250

Epoch 00017: loss did not improve from 0.00008

Epoch 18/100

20/20 [=====] - 3s 161ms/step - loss: 4.9919e-05
- acc: 1.0000 - val_loss: 2.5570 - val_acc: 0.6250

Epoch 00018: loss improved from 0.00008 to 0.00005, saving model to dataset/modi_vs_papu/saved_model/weights-improvement-18- 0.0001.hdf5

Epoch 19/100

20/20 [=====] - 3s 162ms/step - loss: 1.8747e-04
- acc: 1.0000 - val_loss: 2.5871 - val_acc: 0.5000

Epoch 00019: loss did not improve from 0.00005

Epoch 20/100

20/20 [=====] - 3s 162ms/step - loss: 2.0986e-04
- acc: 1.0000 - val_loss: 2.2301 - val_acc: 0.5000

Epoch 00020: loss did not improve from 0.00005

Epoch 21/100

20/20 [=====] - 3s 163ms/step - loss: 1.5925e-04
- acc: 1.0000 - val_loss: 3.0731 - val_acc: 0.5000

Epoch 00021: loss did not improve from 0.00005

Epoch 22/100

20/20 [=====] - 3s 164ms/step - loss: 7.0777e-05
- acc: 1.0000 - val_loss: 2.7035 - val_acc: 0.5000

Epoch 00022: loss did not improve from 0.00005

Epoch 23/100

20/20 [=====] - 3s 164ms/step - loss: 4.7976e-05
- acc: 1.0000 - val_loss: 2.7897 - val_acc: 0.5000

Epoch 00023: loss improved from 0.00005 to 0.00005, saving model to dataset/modi_vs_papu/saved_model/weights-improvement-23- 0.0001.hdf5

t/modi_vs_papu/saved_model/weights-improvement-23- 0.0001.hdf5

Epoch 24/100

20/20 [=====] - 3s 174ms/step - loss: 5.9637e-05
- acc: 1.0000 - val_loss: 2.8495 - val_acc: 0.5000

Epoch 00024: loss did not improve from 0.00005

Epoch 25/100

20/20 [=====] - 3s 174ms/step - loss: 4.2167e-05
- acc: 1.0000 - val_loss: 2.7184 - val_acc: 0.5000

Epoch 00025: loss improved from 0.00005 to 0.00004, saving model to dataset
t/modi_vs_papu/saved_model/weights-improvement-25- 0.0000.hdf5

Epoch 26/100

20/20 [=====] - 3s 167ms/step - loss: 4.9048e-05
- acc: 1.0000 - val_loss: 2.7867 - val_acc: 0.5000

Epoch 00026: loss improved from 0.00004 to 0.00004, saving model to dataset
t/modi_vs_papu/saved_model/weights-improvement-26- 0.0000.hdf5

Epoch 27/100

20/20 [=====] - 3s 161ms/step - loss: 4.5888e-05
- acc: 1.0000 - val_loss: 2.6931 - val_acc: 0.5000

Epoch 00027: loss did not improve from 0.00004

Epoch 28/100

20/20 [=====] - 3s 165ms/step - loss: 3.9577e-05
- acc: 1.0000 - val_loss: 2.8573 - val_acc: 0.5000

Epoch 00028: loss did not improve from 0.00004

Epoch 29/100

20/20 [=====] - 3s 164ms/step - loss: 4.4059e-05
- acc: 1.0000 - val_loss: 2.8564 - val_acc: 0.5000

Epoch 00029: loss did not improve from 0.00004

Epoch 30/100

20/20 [=====] - 3s 169ms/step - loss: 4.8121e-05
- acc: 1.0000 - val_loss: 2.6769 - val_acc: 0.5000

Epoch 00030: loss did not improve from 0.00004

Epoch 31/100

20/20 [=====] - 3s 164ms/step - loss: 4.4523e-05
- acc: 1.0000 - val_loss: 2.8679 - val_acc: 0.5000

Epoch 00031: loss did not improve from 0.00004

Epoch 32/100

20/20 [=====] - 3s 163ms/step - loss: 3.3582e-05
- acc: 1.0000 - val_loss: 2.9339 - val_acc: 0.5000

Epoch 00032: loss improved from 0.00004 to 0.00004, saving model to dataset
t/modi_vs_papu/saved_model/weights-improvement-32- 0.0000.hdf5

Epoch 33/100

20/20 [=====] - 3s 159ms/step - loss: 3.6400e-05
- acc: 1.0000 - val_loss: 2.7530 - val_acc: 0.5000

Epoch 00033: loss did not improve from 0.00004

Epoch 34/100

20/20 [=====] - 3s 163ms/step - loss: 3.0777e-05
- acc: 1.0000 - val_loss: 2.8705 - val_acc: 0.5000

Epoch 00034: loss did not improve from 0.00004

Epoch 35/100

20/20 [=====] - 3s 164ms/step - loss: 4.2212e-05

- acc: 1.0000 - val_loss: 2.6745 - val_acc: 0.5000

Epoch 00035: loss improved from 0.00004 to 0.00003, saving model to dataset/modi_vs_papu/saved_model/weights-improvement-35- 0.0000.hdf5

Epoch 36/100

20/20 [=====] - 4s 181ms/step - loss: 2.9914e-05

- acc: 1.0000 - val_loss: 2.6380 - val_acc: 0.5000

Epoch 00036: loss improved from 0.00003 to 0.00003, saving model to dataset/modi_vs_papu/saved_model/weights-improvement-36- 0.0000.hdf5

Epoch 37/100

20/20 [=====] - 3s 163ms/step - loss: 4.7333e-05

- acc: 1.0000 - val_loss: 2.5838 - val_acc: 0.5000

Epoch 00037: loss did not improve from 0.00003

Epoch 38/100

20/20 [=====] - 3s 160ms/step - loss: 2.7437e-05

- acc: 1.0000 - val_loss: 2.8040 - val_acc: 0.5000

Epoch 00038: loss improved from 0.00003 to 0.00003, saving model to dataset/modi_vs_papu/saved_model/weights-improvement-38- 0.0000.hdf5

Epoch 39/100

20/20 [=====] - 4s 183ms/step - loss: 3.1957e-05

- acc: 1.0000 - val_loss: 3.0011 - val_acc: 0.5000

Epoch 00039: loss improved from 0.00003 to 0.00003, saving model to dataset/modi_vs_papu/saved_model/weights-improvement-39- 0.0000.hdf5

Epoch 40/100

20/20 [=====] - 4s 180ms/step - loss: 5.3278e-05

- acc: 1.0000 - val_loss: 2.4608 - val_acc: 0.6250

Epoch 00040: loss did not improve from 0.00003

Epoch 41/100

20/20 [=====] - 4s 188ms/step - loss: 4.6865e-05

- acc: 1.0000 - val_loss: 2.6133 - val_acc: 0.6250

Epoch 00041: loss did not improve from 0.00003

Epoch 42/100

20/20 [=====] - 3s 174ms/step - loss: 3.1135e-05

- acc: 1.0000 - val_loss: 2.7837 - val_acc: 0.5000

Epoch 00042: loss improved from 0.00003 to 0.00003, saving model to dataset/modi_vs_papu/saved_model/weights-improvement-42- 0.0000.hdf5

Epoch 43/100

20/20 [=====] - 3s 172ms/step - loss: 3.0206e-05

- acc: 1.0000 - val_loss: 2.7271 - val_acc: 0.5000

Epoch 00043: loss did not improve from 0.00003

Epoch 44/100

20/20 [=====] - 3s 165ms/step - loss: 3.2217e-05

- acc: 1.0000 - val_loss: 3.0159 - val_acc: 0.5000

Epoch 00044: loss improved from 0.00003 to 0.00003, saving model to dataset/modi_vs_papu/saved_model/weights-improvement-44- 0.0000.hdf5

Epoch 45/100

20/20 [=====] - 4s 175ms/step - loss: 2.0866e-05

- acc: 1.0000 - val_loss: 3.1563 - val_acc: 0.5000

Epoch 00045: loss improved from 0.00003 to 0.00002, saving model to dataset/modi_vs_papu/saved_model/weights-improvement-45- 0.0000.hdf5

Epoch 46/100

20/20 [=====] - 3s 172ms/step - loss: 2.6029e-05
- acc: 1.0000 - val_loss: 3.1241 - val_acc: 0.5000

Epoch 00046: loss did not improve from 0.00002

Epoch 47/100

20/20 [=====] - 3s 170ms/step - loss: 2.2671e-05
- acc: 1.0000 - val_loss: 2.8695 - val_acc: 0.5000

Epoch 00047: loss did not improve from 0.00002

Epoch 48/100

20/20 [=====] - 3s 165ms/step - loss: 1.2551e-05
- acc: 1.0000 - val_loss: 2.8722 - val_acc: 0.5000

Epoch 00048: loss improved from 0.00002 to 0.00001, saving model to dataset/modi_vs_papu/saved_model/weights-improvement-48- 0.0000.hdf5

Epoch 49/100

20/20 [=====] - 3s 163ms/step - loss: 1.9654e-05
- acc: 1.0000 - val_loss: 3.0680 - val_acc: 0.5000

Epoch 00049: loss did not improve from 0.00001

Epoch 50/100

20/20 [=====] - 4s 181ms/step - loss: 1.7660e-05
- acc: 1.0000 - val_loss: 3.0889 - val_acc: 0.5000

Epoch 00050: loss did not improve from 0.00001

Epoch 51/100

20/20 [=====] - 3s 161ms/step - loss: 1.4951e-05
- acc: 1.0000 - val_loss: 3.0092 - val_acc: 0.5000

Epoch 00051: loss did not improve from 0.00001

Epoch 52/100

20/20 [=====] - 3s 169ms/step - loss: 1.7441e-05
- acc: 1.0000 - val_loss: 2.9762 - val_acc: 0.5000

Epoch 00052: loss did not improve from 0.00001

Epoch 53/100

20/20 [=====] - 3s 161ms/step - loss: 2.1611e-05
- acc: 1.0000 - val_loss: 2.9619 - val_acc: 0.5000

Epoch 00053: loss did not improve from 0.00001

Epoch 54/100

20/20 [=====] - 3s 173ms/step - loss: 4.8069e-05
- acc: 1.0000 - val_loss: 3.1197 - val_acc: 0.5000

Epoch 00054: loss did not improve from 0.00001

Epoch 55/100

20/20 [=====] - 4s 179ms/step - loss: 2.8059e-05
- acc: 1.0000 - val_loss: 2.7900 - val_acc: 0.5000

Epoch 00055: loss did not improve from 0.00001

Epoch 56/100

20/20 [=====] - 3s 174ms/step - loss: 2.6219e-05
- acc: 1.0000 - val_loss: 3.1746 - val_acc: 0.5000

Epoch 00056: loss did not improve from 0.00001

Epoch 57/100

20/20 [=====] - 3s 166ms/step - loss: 1.9987e-05
- acc: 1.0000 - val_loss: 2.8963 - val_acc: 0.5000

Epoch 00057: loss did not improve from 0.00001

Epoch 58/100

20/20 [=====] - 3s 171ms/step - loss: 1.9414e-05
- acc: 1.0000 - val_loss: 2.8806 - val_acc: 0.5000

Epoch 00058: loss did not improve from 0.00001

Epoch 59/100

20/20 [=====] - 4s 179ms/step - loss: 1.5976e-05
- acc: 1.0000 - val_loss: 2.8695 - val_acc: 0.5000

Epoch 00059: loss did not improve from 0.00001

Epoch 60/100

20/20 [=====] - 4s 186ms/step - loss: 2.2732e-05
- acc: 1.0000 - val_loss: 2.6539 - val_acc: 0.6250

Epoch 00060: loss did not improve from 0.00001

Epoch 61/100

20/20 [=====] - 4s 198ms/step - loss: 1.6015e-05
- acc: 1.0000 - val_loss: 2.8260 - val_acc: 0.5000

Epoch 00061: loss did not improve from 0.00001

Epoch 62/100

20/20 [=====] - 3s 173ms/step - loss: 1.3289e-05
- acc: 1.0000 - val_loss: 2.9382 - val_acc: 0.5000

Epoch 00062: loss did not improve from 0.00001

Epoch 63/100

20/20 [=====] - 3s 170ms/step - loss: 2.2693e-05
- acc: 1.0000 - val_loss: 3.1145 - val_acc: 0.5000

Epoch 00063: loss did not improve from 0.00001

Epoch 64/100

20/20 [=====] - 3s 173ms/step - loss: 2.0493e-05
- acc: 1.0000 - val_loss: 3.1306 - val_acc: 0.5000

Epoch 00064: loss did not improve from 0.00001

Epoch 65/100

20/20 [=====] - 3s 174ms/step - loss: 1.6517e-05
- acc: 1.0000 - val_loss: 3.0434 - val_acc: 0.5000

Epoch 00065: loss did not improve from 0.00001

Epoch 66/100

20/20 [=====] - 3s 171ms/step - loss: 1.2180e-05
- acc: 1.0000 - val_loss: 3.0688 - val_acc: 0.5000

Epoch 00066: loss improved from 0.00001 to 0.00001, saving model to dataset/modi_vs_papu/saved_model/weights-improvement-66- 0.0000.hdf5

Epoch 67/100

20/20 [=====] - 4s 177ms/step - loss: 8.1204e-06
- acc: 1.0000 - val_loss: 3.0161 - val_acc: 0.5000

Epoch 00067: loss improved from 0.00001 to 0.00001, saving model to dataset/modi_vs_papu/saved_model/weights-improvement-67- 0.0000.hdf5

Epoch 68/100

20/20 [=====] - 3s 175ms/step - loss: 1.1141e-05
- acc: 1.0000 - val_loss: 3.1294 - val_acc: 0.5000

Epoch 00068: loss did not improve from 0.00001

Epoch 69/100

20/20 [=====] - 3s 172ms/step - loss: 1.2804e-05
- acc: 1.0000 - val_loss: 3.2149 - val_acc: 0.5000

Epoch 00069: loss did not improve from 0.00001

Epoch 70/100

20/20 [=====] - 3s 173ms/step - loss: 1.0676e-05
- acc: 1.0000 - val_loss: 3.0511 - val_acc: 0.5000

Epoch 00070: loss did not improve from 0.00001

Epoch 71/100

20/20 [=====] - 4s 175ms/step - loss: 1.3022e-05
- acc: 1.0000 - val_loss: 3.0995 - val_acc: 0.5000

Epoch 00071: loss did not improve from 0.00001

Epoch 72/100

20/20 [=====] - 4s 185ms/step - loss: 9.1642e-06
- acc: 1.0000 - val_loss: 3.1179 - val_acc: 0.5000

Epoch 00072: loss did not improve from 0.00001

Epoch 73/100

20/20 [=====] - 3s 165ms/step - loss: 9.6957e-06
- acc: 1.0000 - val_loss: 2.9911 - val_acc: 0.5000

Epoch 00073: loss did not improve from 0.00001

Epoch 74/100

20/20 [=====] - 3s 165ms/step - loss: 1.1841e-05
- acc: 1.0000 - val_loss: 2.9718 - val_acc: 0.5000

Epoch 00074: loss did not improve from 0.00001

Epoch 75/100

20/20 [=====] - 3s 163ms/step - loss: 1.2611e-05
- acc: 1.0000 - val_loss: 2.9276 - val_acc: 0.5000

Epoch 00075: loss did not improve from 0.00001

Epoch 76/100

20/20 [=====] - 3s 168ms/step - loss: 1.5729e-05
- acc: 1.0000 - val_loss: 3.1399 - val_acc: 0.5000

Epoch 00076: loss did not improve from 0.00001

Epoch 77/100

20/20 [=====] - 4s 179ms/step - loss: 1.1801e-05
- acc: 1.0000 - val_loss: 2.9939 - val_acc: 0.5000

Epoch 00077: loss did not improve from 0.00001

Epoch 78/100

20/20 [=====] - 3s 163ms/step - loss: 8.2668e-06
- acc: 1.0000 - val_loss: 3.0507 - val_acc: 0.5000

Epoch 00078: loss did not improve from 0.00001

Epoch 79/100

20/20 [=====] - 3s 166ms/step - loss: 9.3974e-06
- acc: 1.0000 - val_loss: 3.0642 - val_acc: 0.5000

Epoch 00079: loss improved from 0.00001 to 0.00001, saving model to dataset/modi_vs_papu/saved_model/weights-improvement-79- 0.0000.hdf5

Epoch 80/100

20/20 [=====] - 3s 164ms/step - loss: 7.2243e-06
- acc: 1.0000 - val_loss: 3.1041 - val_acc: 0.5000

Epoch 00080: loss improved from 0.00001 to 0.00001, saving model to dataset/modi_vs_papu/saved_model/weights-improvement-80- 0.0000.hdf5

Epoch 81/100

20/20 [=====] - 4s 180ms/step - loss: 9.8641e-06
- acc: 1.0000 - val_loss: 3.1440 - val_acc: 0.5000

Epoch 00081: loss did not improve from 0.00001

Epoch 82/100

20/20 [=====] - 4s 183ms/step - loss: 7.4050e-06
- acc: 1.0000 - val_loss: 3.0116 - val_acc: 0.5000

Epoch 00082: loss improved from 0.00001 to 0.00001, saving model to dataset/modi_vs_papu/saved_model/weights-improvement-82- 0.0000.hdf5

Epoch 83/100

20/20 [=====] - 3s 173ms/step - loss: 1.1292e-05
- acc: 1.0000 - val_loss: 2.8673 - val_acc: 0.5000

Epoch 00083: loss did not improve from 0.00001

Epoch 84/100

20/20 [=====] - 3s 172ms/step - loss: 1.2108e-05
- acc: 1.0000 - val_loss: 2.9340 - val_acc: 0.5000

Epoch 00084: loss did not improve from 0.00001

Epoch 85/100

20/20 [=====] - 4s 177ms/step - loss: 2.3463e-05
- acc: 1.0000 - val_loss: 3.4389 - val_acc: 0.5000

Epoch 00085: loss did not improve from 0.00001

Epoch 86/100

20/20 [=====] - 3s 164ms/step - loss: 1.3336e-05
- acc: 1.0000 - val_loss: 3.2683 - val_acc: 0.5000

Epoch 00086: loss did not improve from 0.00001

Epoch 87/100

20/20 [=====] - 3s 162ms/step - loss: 1.3834e-05
- acc: 1.0000 - val_loss: 3.2729 - val_acc: 0.5000

Epoch 00087: loss did not improve from 0.00001

Epoch 88/100

20/20 [=====] - 3s 160ms/step - loss: 2.6690e-05
- acc: 1.0000 - val_loss: 2.4650 - val_acc: 0.5000

Epoch 00088: loss did not improve from 0.00001

Epoch 89/100

20/20 [=====] - 3s 162ms/step - loss: 2.8319e-05
- acc: 1.0000 - val_loss: 3.4165 - val_acc: 0.5000

Epoch 00089: loss did not improve from 0.00001

Epoch 90/100

20/20 [=====] - 3s 163ms/step - loss: 3.3099e-05
- acc: 1.0000 - val_loss: 3.4928 - val_acc: 0.5000

Epoch 00090: loss did not improve from 0.00001

Epoch 91/100

20/20 [=====] - 3s 165ms/step - loss: 1.3503e-05
- acc: 1.0000 - val_loss: 3.1378 - val_acc: 0.3750

Epoch 00091: loss did not improve from 0.00001

Epoch 92/100

20/20 [=====] - 3s 166ms/step - loss: 6.6912e-06
- acc: 1.0000 - val_loss: 3.1302 - val_acc: 0.5000

Epoch 00092: loss improved from 0.00001 to 0.00001, saving model to dataset/modi_vs_papu/saved_model/weights-improvement-92- 0.0000.hdf5

Epoch 93/100

20/20 [=====] - 3s 167ms/step - loss: 7.8504e-06
- acc: 1.0000 - val_loss: 3.1361 - val_acc: 0.5000

```

Epoch 00093: loss did not improve from 0.00001
Epoch 94/100
20/20 [=====] - 3s 162ms/step - loss: 2.6134e-05
- acc: 1.0000 - val_loss: 3.2554 - val_acc: 0.5000

Epoch 00094: loss did not improve from 0.00001
Epoch 95/100
20/20 [=====] - 3s 163ms/step - loss: 1.8182e-05
- acc: 1.0000 - val_loss: 3.6868 - val_acc: 0.5000

Epoch 00095: loss did not improve from 0.00001
Epoch 96/100
20/20 [=====] - 3s 164ms/step - loss: 6.8296e-06
- acc: 1.0000 - val_loss: 3.4108 - val_acc: 0.5000

Epoch 00096: loss did not improve from 0.00001
Epoch 97/100
20/20 [=====] - 3s 167ms/step - loss: 6.7055e-06
- acc: 1.0000 - val_loss: 3.3160 - val_acc: 0.5000

Epoch 00097: loss did not improve from 0.00001
Epoch 98/100
20/20 [=====] - 3s 173ms/step - loss: 8.7794e-06
- acc: 1.0000 - val_loss: 3.2409 - val_acc: 0.5000

Epoch 00098: loss did not improve from 0.00001
Epoch 99/100
20/20 [=====] - 3s 167ms/step - loss: 8.3980e-06
- acc: 1.0000 - val_loss: 3.3458 - val_acc: 0.5000

Epoch 00099: loss did not improve from 0.00001
Epoch 100/100
20/20 [=====] - 3s 160ms/step - loss: 5.7514e-06
- acc: 1.0000 - val_loss: 3.3084 - val_acc: 0.5000

Epoch 00100: loss improved from 0.00001 to 0.00001, saving model to dataset/modi_vs_papu/saved_model/weights-improvement-100- 0.0000.hdf5

```

Out[12]:

```
<keras.callbacks.History at 0x21f20122dd8>
```

testing our CNN model

In [15]:

```

# transform your image to numbers (a 3D array)
test_image = image.load_img("dataset/modi_vs_papu/single_prediction/test1.jpg",
                             target_size = (64, 64))

# converting to a 3D array
test_image = image.img_to_array(test_image)
test_image.shape

```

Out[15]:

```
(64, 64, 3)
```

In [16]:

```
test_image = np.expand_dims(test_image, axis=0)
print(test_image.shape)
```

(1, 64, 64, 3)

In [17]:

```
result = classifier.predict(test_image)
print(result.shape)
```

(1, 1)

In [18]:

```
# Lets see the prediction
result
```

Out[18]:

array([[1.]], dtype=float32)

In [19]:

```
# what do these 0s and 1s actually refer to?
training_set.class_indices
```

Out[19]:

{'modi': 0, 'rahul': 1}

In [20]:

```
from IPython.display import Image
Image(filename='dataset/modi_vs_papu/single_prediction/test1.jpg')
```

Out[20]:



In [29]:

```
# Lets see on another image

def test_single_prediction(filename):
    test_image = image.load_img(filename, target_size = (64, 64))
    # converting to a 3D array
    test_image = image.img_to_array(test_image)
    test_image = np.expand_dims(test_image, axis=0)
    result = classifier.predict(test_image)

    if result[0][0] == 1:
        prediction = "Pappu detected!"
    else:
        prediction = "Modi detected!"

    return prediction
```

In [30]:

```
filename = "dataset/modi_vs_papu/single_prediction/test2.jpg"
test_single_prediction(filename)
```

Out[30]:

'Modi detected!'

In [28]:

```
Image(filename='dataset/modi_vs_papu/single_prediction/test2.jpg')
```

Out[28]:



In [31]:

```
filename = "dataset/modi_vs_papu/single_prediction/test1.jpg"
test_single_prediction(filename)
```

Out[31]:

'Pappu detected!'

In [32]:

```
Image(filename='dataset/modi_vs_papu/single_prediction/test1.jpg')
```

Out[32]:



In []: