Performance Comparison with Pre-trained Model

Summary of Introduction to Neural Network

- Basics of Neural Network

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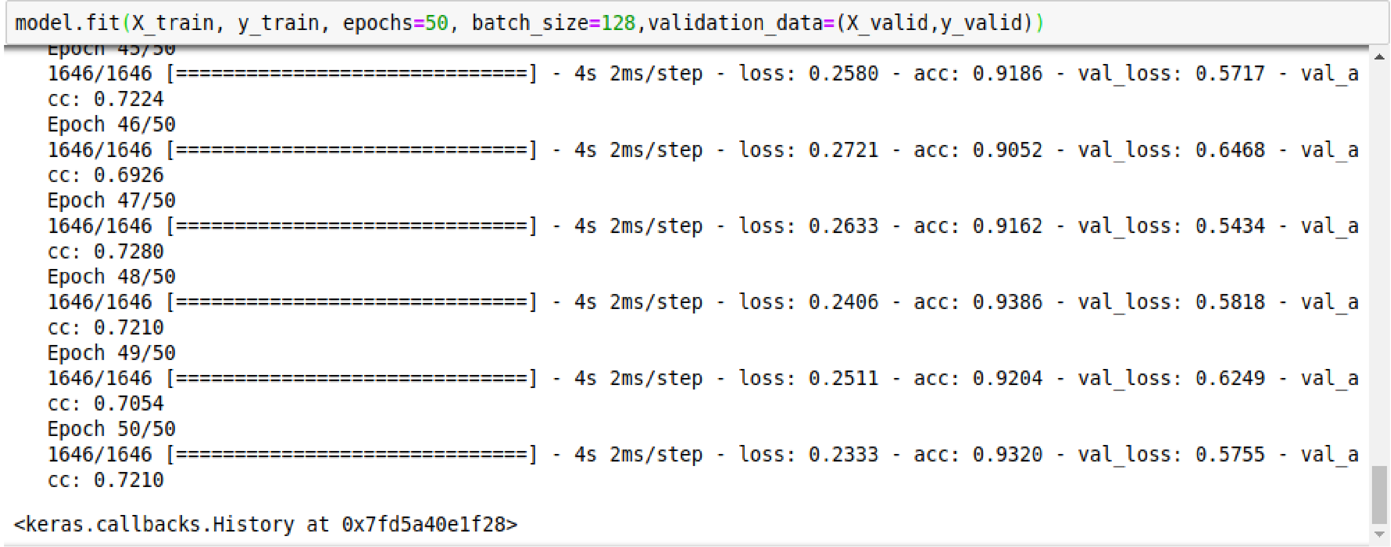
- Components of Neural Network
- Built Neural Networks from Scratch in Numpy/ Keras
- Solved Emergency Classification problem in Keras

Comparison with Pre-trained model



```
model.fit(X_train, y_train, epochs=50, batch_size=128,validation_data=(X_valid,y_valid))
```

```
   Epoch 45/50
   1646/1646 [==============================] - 4s 2ms/step - loss: 0.2580 - acc: 0.9186 - val_loss: 0.5717 - val_a
   cc: 0.7224
   Epoch 46/50
   1646/1646 [==============================] - 4s 2ms/step - loss: 0.2721 - acc: 0.9052 - val_loss: 0.6468 - val_a
   cc: 0.6926
   Epoch 47/50
   1646/1646 [==============================] - 4s 2ms/step - loss: 0.2633 - acc: 0.9162 - val_loss: 0.5434 - val_a
   cc: 0.7280
   Epoch 48/50
   1646/1646 [==============================] - 4s 2ms/step - loss: 0.2406 - acc: 0.9386 - val_loss: 0.5818 - val_a
   cc: 0.7210
   Epoch 49/50
   1646/1646 [==============================] - 4s 2ms/step - loss: 0.2511 - acc: 0.9204 - val_loss: 0.6249 - val_a
   cc: 0.7054
   Epoch 50/50
   1646/1646 [==============================] - 4s 2ms/step - loss: 0.2333 - acc: 0.9320 - val_loss: 0.5755 - val_a
   cc: 0.7210

<keras.callbacks.History at 0x7fd5a40e1f28>
```

Best Neural Network model

Result

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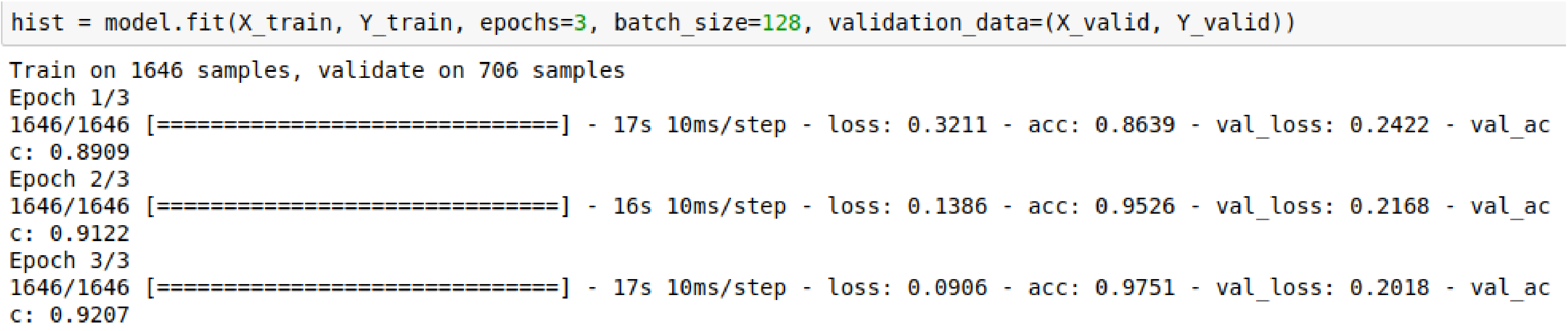
Comparison with Pre-trained model



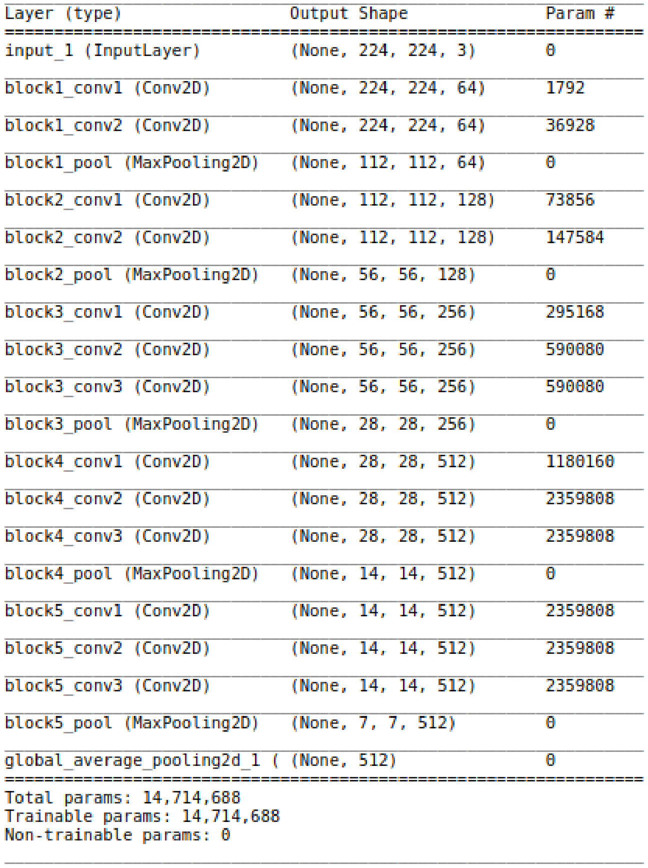
```
hist = model.fit(X_train, Y_train, epochs=3, batch_size=128, validation_data=(X_valid, Y_valid))
```

```
Train on 1646 samples, validate on 706 samples
Epoch 1/3
1646/1646 [==============================] - 17s 10ms/step - loss: 0.3211 - acc: 0.8639 - val_loss: 0.2422 - val_ac
c: 0.8909
Epoch 2/3
1646/1646 [==============================] - 16s 10ms/step - loss: 0.1386 - acc: 0.9526 - val_loss: 0.2168 - val_ac
c: 0.9122
Epoch 3/3
1646/1646 [==============================] - 17s 10ms/step - loss: 0.0906 - acc: 0.9751 - val_loss: 0.2018 - val_ac
c: 0.9207
```

Pre-trained model

Result

Comparison with Pre-trained model



```
Layer (type)                 Output Shape              Param #
=================================================================
input_1 (InputLayer)         (None, 224, 224, 3)       0
_________________________________________________________________
block1_conv1 (Conv2D)        (None, 224, 224, 64)      1792
_________________________________________________________________
block1_conv2 (Conv2D)        (None, 224, 224, 64)      36928
_________________________________________________________________
block1_pool (MaxPooling2D)   (None, 112, 112, 64)      0
_________________________________________________________________
block2_conv1 (Conv2D)        (None, 112, 112, 128)     73856
_________________________________________________________________
block2_conv2 (Conv2D)        (None, 112, 112, 128)     147584
_________________________________________________________________
block2_pool (MaxPooling2D)   (None, 56, 56, 128)       0
_________________________________________________________________
block3_conv1 (Conv2D)        (None, 56, 56, 256)       295168
_________________________________________________________________
block3_conv2 (Conv2D)        (None, 56, 56, 256)       590080
_________________________________________________________________
block3_conv3 (Conv2D)        (None, 56, 56, 256)       590080
_________________________________________________________________
block3_pool (MaxPooling2D)   (None, 28, 28, 256)       0
_________________________________________________________________
block4_conv1 (Conv2D)        (None, 28, 28, 512)       1180160
_________________________________________________________________
block4_conv2 (Conv2D)        (None, 28, 28, 512)       2359808
_________________________________________________________________
block4_conv3 (Conv2D)        (None, 28, 28, 512)       2359808
_________________________________________________________________
block4_pool (MaxPooling2D)   (None, 14, 14, 512)       0
_________________________________________________________________
block5_conv1 (Conv2D)        (None, 14, 14, 512)       2359808
_________________________________________________________________
block5_conv2 (Conv2D)        (None, 14, 14, 512)       2359808
_________________________________________________________________
block5_conv3 (Conv2D)        (None, 14, 14, 512)       2359808
_________________________________________________________________
block5_pool (MaxPooling2D)   (None, 7, 7, 512)         0
_________________________________________________________________
global_average_pooling2d_1 ( (None, 512)               0
=================================================================
Total params: 14,714,688
Trainable params: 14,714,688
Non-trainable params: 0
_________________________________________________________________
```

Thank you!