
**Thomas J. Watson School of Engineering & Applied Science**
**Department of Electrical & Computer Engineering**

Neural Network & Deep Learning
(EECE680C)

# Homework_3

Solutions

Submitted By

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Submission Date

05 March 2018

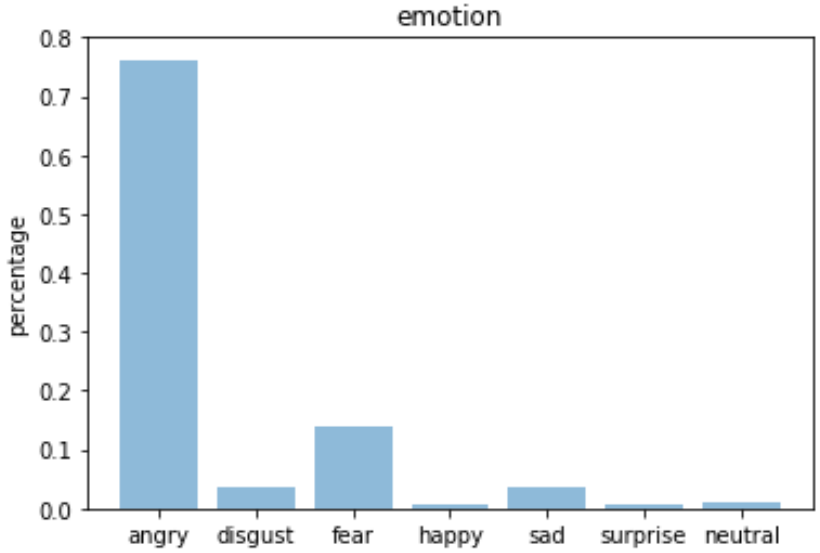
Binghamton, New York

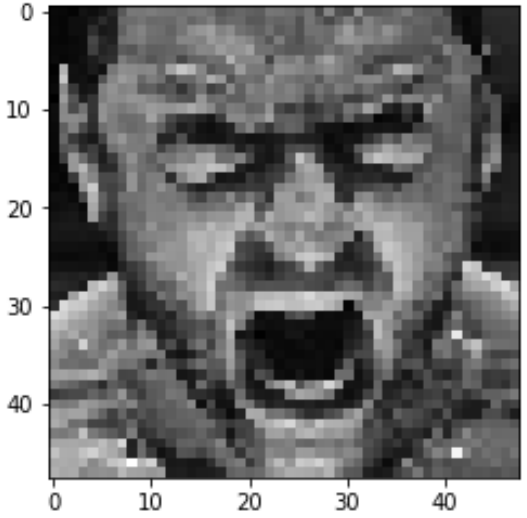
Exercise 12.1: Three flowers (Pink, White, and yellow) classification using CNN model python program. Here is a sample out after the program had been run for 5 epochs.

```
Restarting kernel...

In [1]: runfile('/home/alem/NNDL/Ex_12.1_flowers_Classication.py', wdir='/home/alem/NNDL')

------------------**********----------------------
------------------Traning is running----------------------
************************************************************
Found 210 images belonging to 3 classes.
Found 30 images belonging to 3 classes.
Epoch 1/5
210/210 [==============================] - 199s 949ms/step - loss: -4.8824 - acc: 0.6134 - val_loss: -5.0850 - val_acc: 0.6667
Epoch 2/5
210/210 [==============================] - 199s 950ms/step - loss: -5.3182 - acc: 0.6621 - val_loss: -5.1545 - val_acc: 0.6333
Epoch 3/5
210/210 [==============================] - 216s 1s/step - loss: -5.3444 - acc: 0.6633 - val_loss: -5.2651 - val_acc: 0.6667
Epoch 4/5
210/210 [==============================] - 219s 1s/step - loss: -5.2759 - acc: 0.6641 - val_loss: -5.3065 - val_acc: 0.6667
Epoch 5/5
210/210 [==============================] - 220s 1s/step - loss: -5.2970 - acc: 0.6677 - val_loss: -5.3017 - val_acc: 0.6667
------------------**********----------------------
------------------Traning is over----------------------
************************************************************

In [2]:
```

Exercise 14.1: Classification of seven facial expressions (angry, disgust, fear, happy, sad, surprise, and neutral) using CNN model python program. Here under is a sample training result and a bar graph of a prediction test.

```
Python 3.6.4 |Anaconda custom (64-bit)| (default, Jan 16 2018, 18:10:19)
Type "copyright", "credits" or "license" for more information.

IPython 6.1.0 -- An enhanced Interactive Python.

In [1]: runfile('/home/alem/NNDL/Ex_14.1_FacialExpression.py', wdir='/home/alem/NNDL')
Using TensorFlow backend.
Epoch 1/5
256/256 [==============================] - 628s 2s/step - loss: 1.8099 - acc: 0.2508
Epoch 2/5
256/256 [==============================] - 612s 2s/step - loss: 1.6359 - acc: 0.3406
Epoch 3/5
256/256 [==============================] - 614s 2s/step - loss: 1.4049 - acc: 0.4572
Epoch 4/5
256/256 [==============================] - 641s 3s/step - loss: 1.2740 - acc: 0.5132
Epoch 5/5
256/256 [==============================] - 620s 2s/step - loss: 1.1818 - acc: 0.5524
3589/3589 [==============================] - 12s 3ms/step
------------------**********------------------------
**********Test loss: 1.19384856449 **********
**********Test accuracy: 54.5277236007 **********
------------------**********------------------------
```


emotion
percentage
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
angry
disgust
fear
happy
sad
surprise
neutral


0
10
20
30
40
0
10
20
30
40