

# FACIAL EMOTION RECOGNITION USING CONVOLUTIONAL NEURAL NETWORKS

## INTRODUCTION:

facial emotions are the main source for human beings to detect the emotions in real life. But in case of machines it would be a quite tough task.

So helping the machine to learn and detect the emotions will help us in many ways.

Now I will train the machine to detect the following emotions:

1. Happiness
2. Anger
3. Sadness
4. Surprise
5. Fear
6. Disgust
7. Neutral

## DATASET:

Now let us use the dataset source available in internet Fer2013. It is an open-source dataset which is first, created for an ongoing project by Pierre-Luc Carrier and Aaron Courville, then

shared publicly for a Kaggle competition, shortly before ICML 2013. This dataset consists of 35.887 grayscale, 48x48 sized face images. Each image is preprocessed i.e, background is removed.

This data set contains the csv files with 3 tabular columns.

1. Emotions
2. Pixels
3. Usage

1. Emotions(integer data type):7 emotions are labeled with numbers 0 to 6.

2. Pixels(object):this contains an array of pixels (48x48) of a picture corresponding to that particular emotion

3. Usage(object):This column will give us the data that whether the row is used for either training or private test or public test.

## **CLASSIFICATION OF DATASET:**

considering the Usage column we will divide the data set into 2 parts

1. Training dataset
2. Testing dataset

### **1. Training data:**

80% of the data is used for training the model.

2. Testing data:rest of the data is used for testing the model.

Let us consider number of features be 64 and as we know number of labels are 7(i.e,7 emotions)

### TRAINING THE MODEL:

We will use convolutional neural networks to train our model.

We will give the 48x48 pixel image as input and we will give features as input to the first **convolutional layer** with kernel size(3x3) and activation function as **relu**.every convolution layer is followed by a **maxpooling layer** so that it reduces the size simultaneously.

**Dropout** is used to avoid overfitting of our dataset.So that some neurons in the middle of the layers were dropped.

We will use 5 convolutional layers to train our model of which each and every one is followed by maxpooling layer.

Now we will Flatten the maxpooling layer to **fully connected layer** with associated dropout to avoid overfitting and activation function as **relu** .we will add 3 more fully connected layers.

To the last layer activation function is changed to **softmax** ,so that the output is produced in terms of percentage.

## OUTPUT:

Softmax gives the percentage of matching of each picture with each of the emotion. The emotion with highest percentage is the required label(i.e, emotion).

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Modules imported:

1. NUMPY
2. PANDAS
3. TENSORFLOW
4. KERAS
5. OS
6. WAVE
7. OPENCV
- 8.