Emotion analysis in video

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Motivation

[IBM Watson creates an algorithmically perfect movie trailer for Morgan(2016)]

[Here is the Link to the trailer]

That's COOL!!

Method:

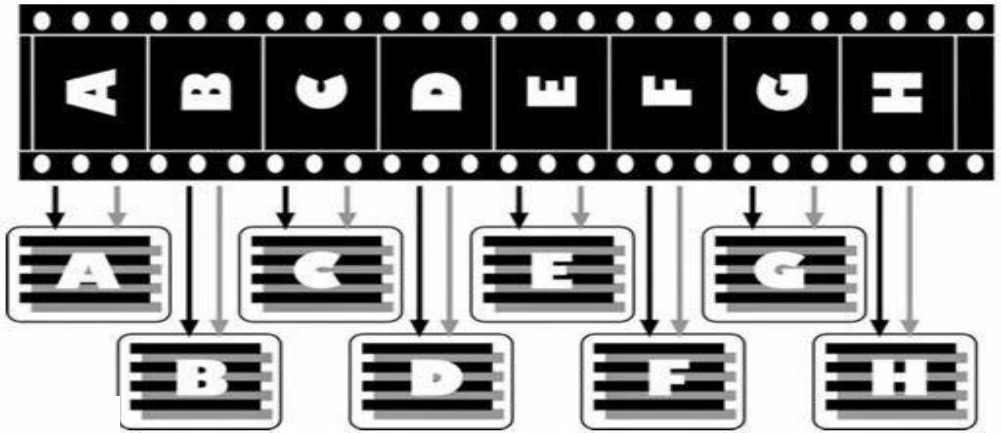
Step1: Divide the Video into Frames

Step 2: Detect the Frames containing faces

Step 3: Extract Faces

Step 4: Train Machine Learning Algorithms and Make Prediction.

1. Dividing Video



2. Detection of Frames containing Faces

2. Detection of Frames containing Faces

- We used python’s dlib library for this task
- Python dlib is HOG(Histogram of Oriented Gradient) based detector combined with linear classifier.
- Drawback :- Looses efficiency with non-frontal human faces.

3. Extracting Faces

- Crop detected Faces
- Resize the faces.
- The size we chose is 48*48 pixels
- Create a raw data from these faces

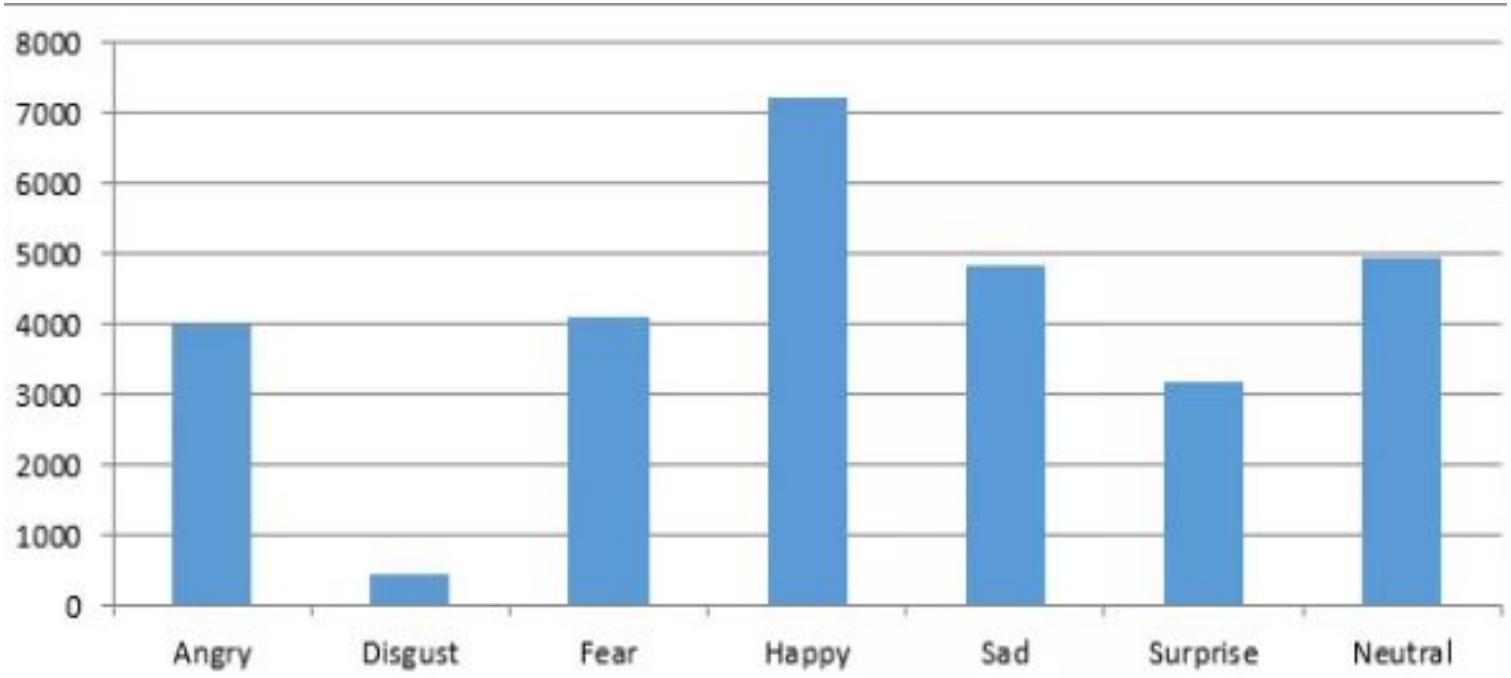
4. Testing

- Standard machine learning processes.
- Classifying image based on the emotion
- Prediction of labels using:
  1. SVM
  2. CNN model

Training the CNN

- Number of Input parameters = 2304
- Number of Output parameters = 7
- Output - [0,1,2,3,4,5,6] = [angry, disgust, fear, happy, sad ,surprise, neutral]
- Number of Hidden-Layers = 2
- We used standard “fer2013” dataset for training the CNN

- The dataset contains 35887 images of faces with their emotion labels



Results

- We calculated accuracy of our model using the fer2013 data.

Accuracy:

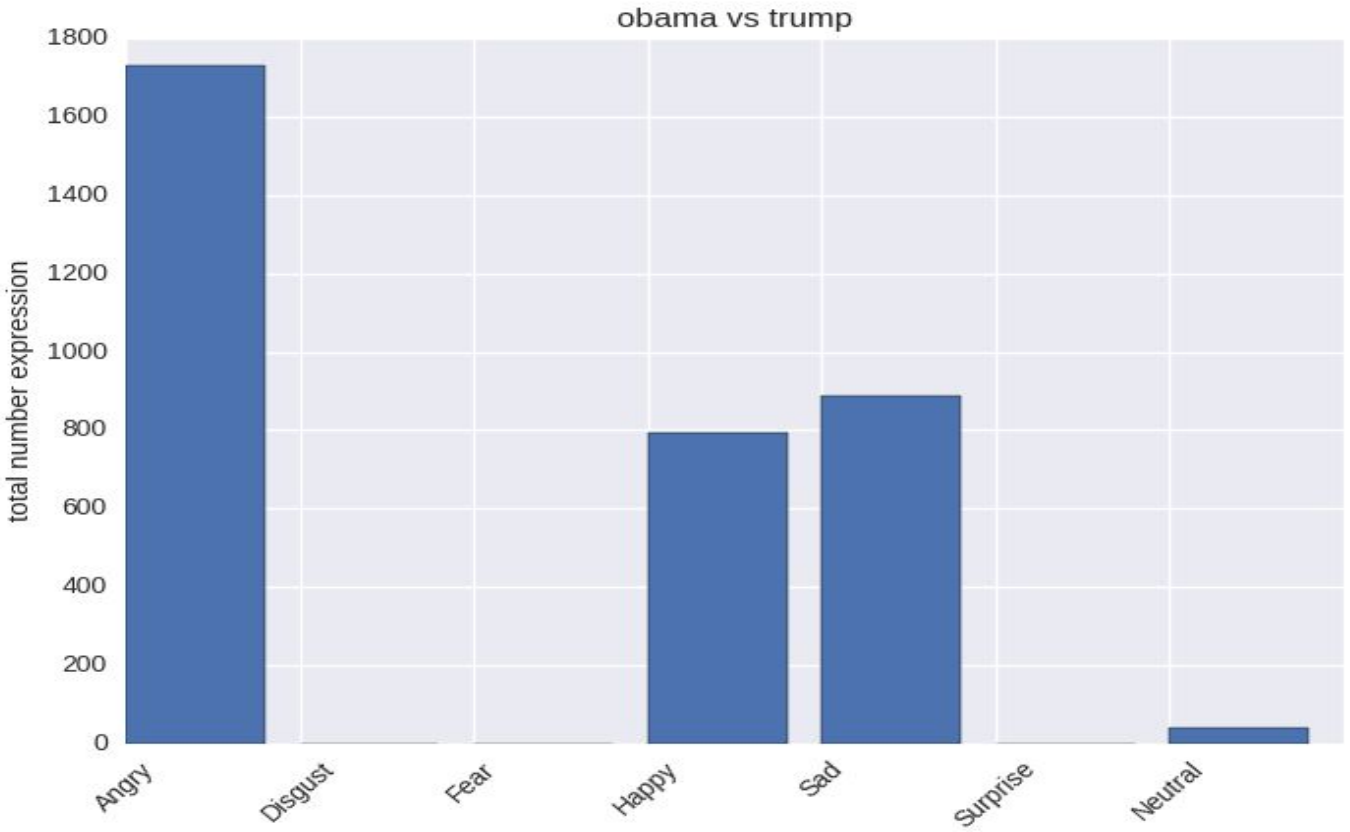
SVM : 47.05%
CNN : 62.63%

- The maximum accuracy we got is 62.63% (We know! Not very good but we are working on it).

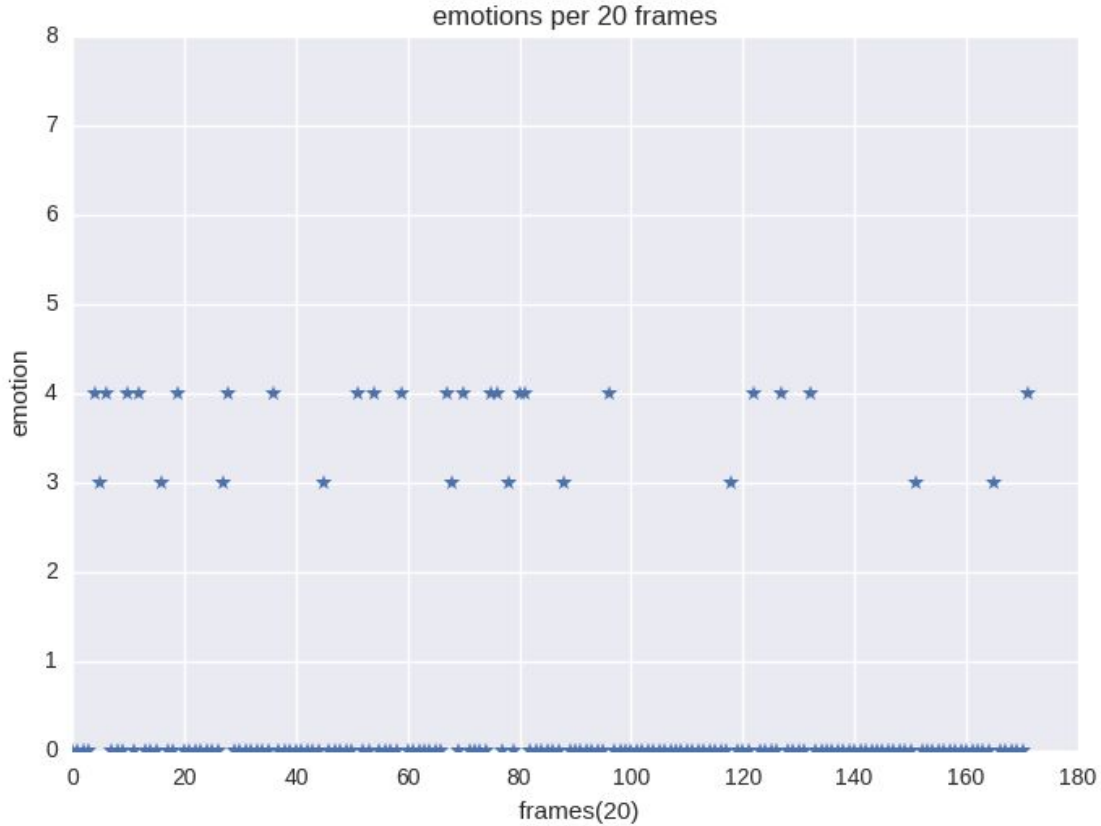
Testing on videos

- To test our model against real life videos we took some videos from YouTube as an example.

- Following are the results we got from them.



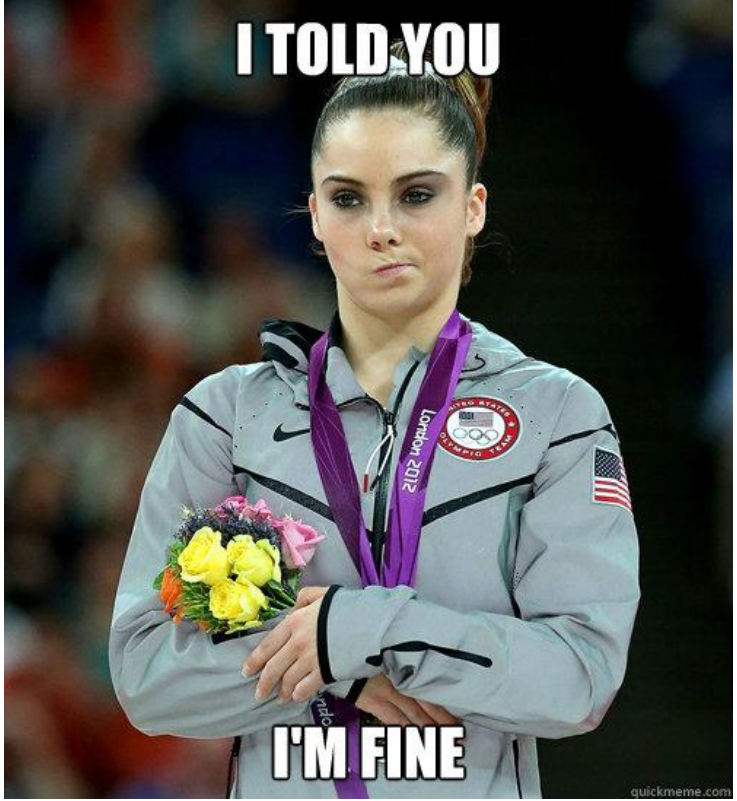
Total counts of emotions detected in the the video.



Emotions distribution throughout the video

Applications

- Human behaviour studies
- Can be useful for Psychiatrists and Counselors.
- Recognize your partner’s true emotional state
- Attention engagement for ads



Car **driver** → detect state and **alert** other **cars**

- analyzing the stress levels of drivers and recommending them whether to drive or not.