FACIAL EXPRESSION RECOGNITION

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Our Goal

Our goal is to make a system that is able to identify and classify a person's expressions into one of the following seven basic emotions -

- Anger
- Disgust
- Fear
- Happiness
- Sadness
- Surprise
- Neutral

With researchers now theorizing Web 5.0, a Sensory Emotive Web, Facial Expression Recognition has more applications than ever. For example, a FER system could allow technology to dynamically adapt to how a person is feeling. This concept could have a lot of applications especially in the field of smart technology.

Summary Of Mid 1 Presentation

LITERATURE REVIEW

Rapid Object Detection using Boosted Cascade of Simple Features

A Human Facial Expression Recognition Model Based On Eigen Face Approach

Facial Emotion Recognition using Convolutional Neural Networks

Facial Expression Recognition using Convolutional Neural Networks: State of the Art

Proposed Methodology

Choosing Dataset

Choosing a Model

Writing The Program

Training and Testing the Model

Described Deliverables

Our final deliverable for this project will be a python application which would take a live video stream from the user's webcam as input and classify the user's expression into one of seven basic emotions in real time

Methodology

1. **Choosing a Dataset** - For this problem statement, we used the FER2013 dataset. It contains 35,685 examples of 48x48 pixel grayscale images of faces. These Images are categorized based on the emotion shown in the facial expressions.

2. **Choosing and Building our Model** - From the research that we had done, we observed that a CNN based model tends to yield a higher accuracy as compared to other models. This is because they work better for image processing tasks since they are able to capture spatial features of the inputs due to their large number of filters. Thus, We decided to implement the model mentioned in the paper "*Facial Emotion Recognition using Convolutional Neural Networks" by Akash Saravanan, Gurudutt Perichetla & Dr. K.S.Gayathri*.

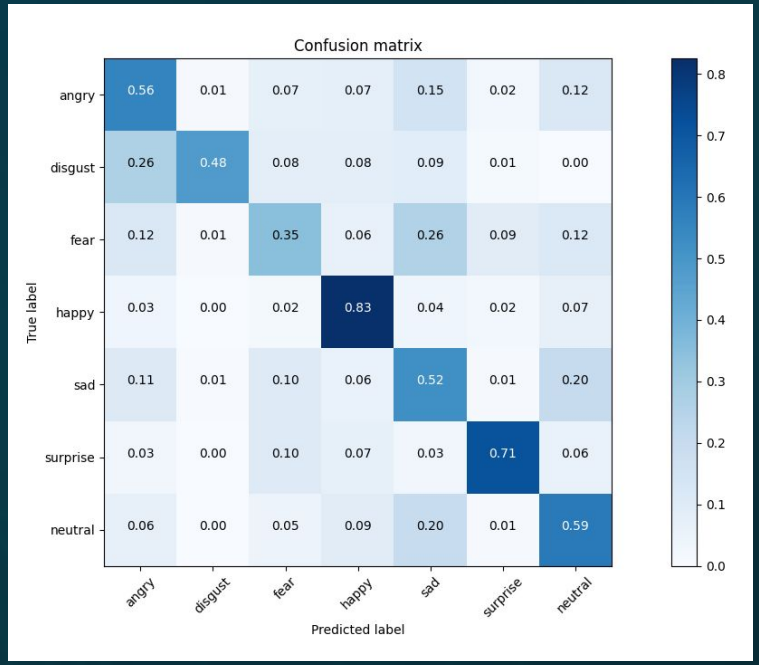
3. **Capturing Frames from Web-Cam**

4. **Detecting face(s)**

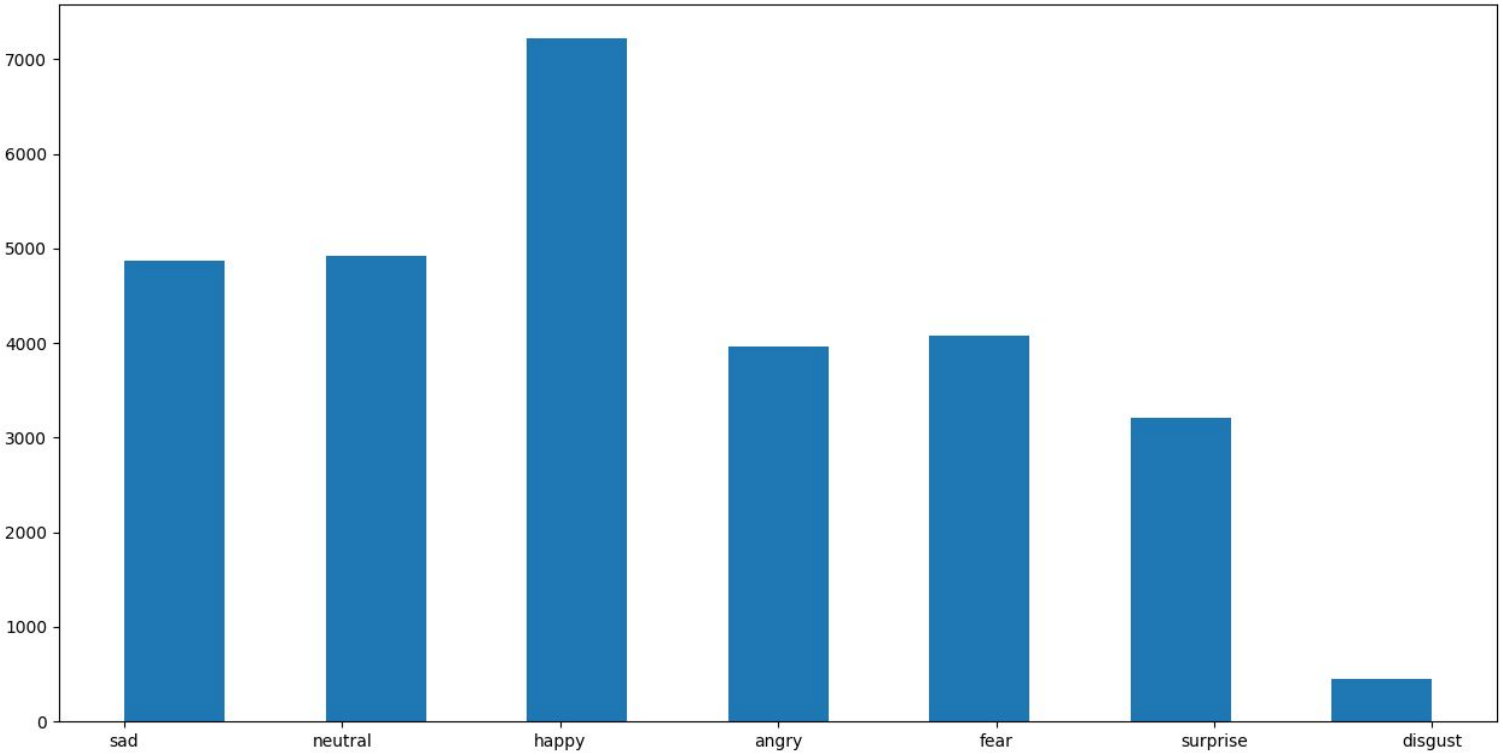
5. **Classifying using model**

6. **Show classified image**

Results




```
accuracy: 60.85%
60.85% (+/- 0.00%)
```


7000
6000
5000
4000
3000
2000
1000
0
sad
neutral
happy
angry
fear
surprise
disgust

Analysis of the results

Why does ‘happy’ have highest accuracy?

Model is trained on a lot of ‘happy’ images (shown in bar graph)

Why do ‘sad’ and ‘neutral’ have less accuracy compared to ‘surprised’?

Model wrongly classifies ‘sad’ as ‘neutral’ and ‘neutral’ as ‘sad’ because they look similar, even to humans, while ‘surprised’ is distinct in appearance

Scope of Improvement

1. **Identifying faces** - Currently our code can recognize multiple faces and can also wrongly identify objects as faces. We can avoid this and choose the biggest face in the frame or use an alternative to detect faces

2. **K-fold cross validation** - A good method to increase the accuracy of our model would be to perform K Fold Cross Validation on our data. By doing this we can decide what would be the best possible split in order to train our data.

3. **Boost Classifier** - Another possible way of improving our model would be to apply boosting to multiple variants of our model trained with different splits of our training set. By treating our different trained models as weak classifiers, and applying a boosting algorithm to them, we might be able to train a model with a much better accuracy.

Thank You

Any Questions?