Facial Expression Recognition

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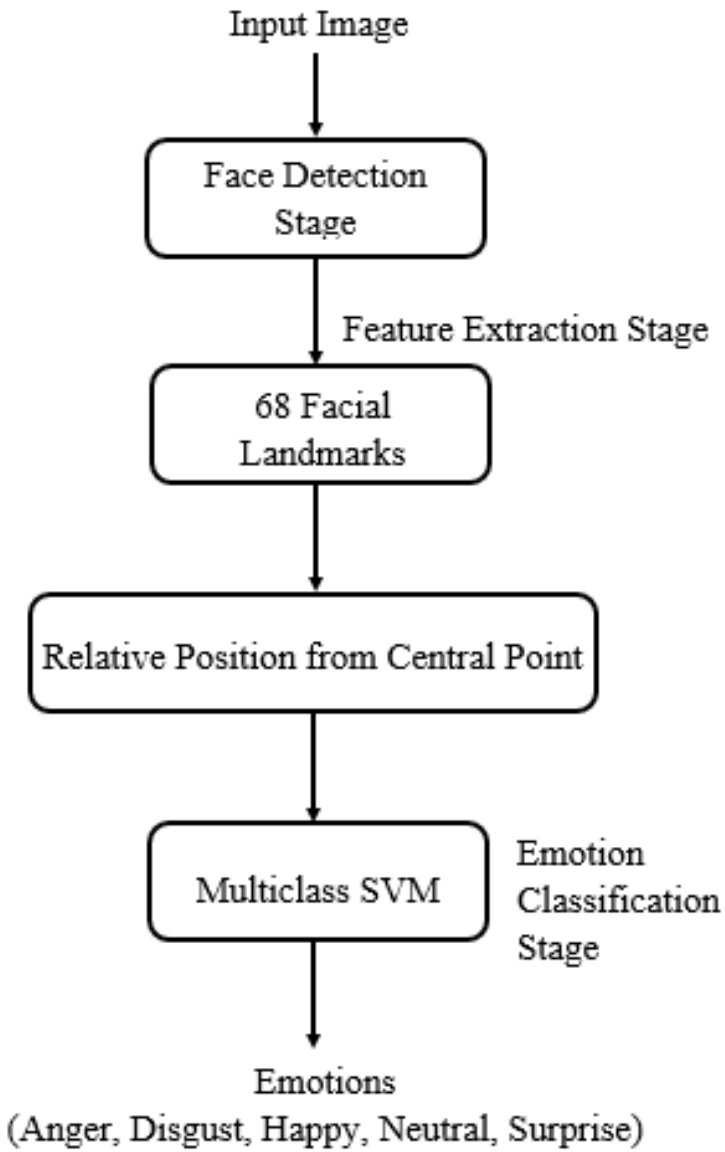
Model


Input Image
Face Detection Stage
Feature Extraction Stage
68 Facial Landmarks
Relative Position from Central Point
Multiclass SVM
Emotion Classification Stage
Emotions
(Anger, Disgust, Happy, Neutral, Surprise)

Facial Feature Extraction on Detected Faces

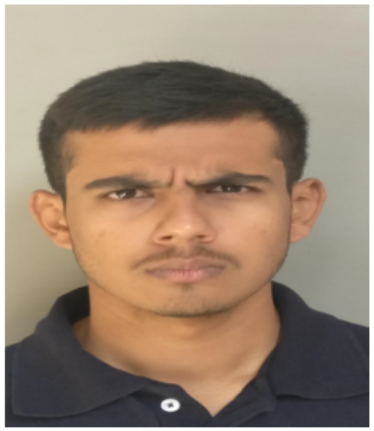
68 Facial Landmarks

Relative position from central point

Results

- We obtain an accuracy of 84.1%, when classifying the data into 8 emotions on the CK+ dataset.
- We then reduce the set to 5 emotions(leaving out contempt, fear, and sadness), because the three categories had very few images and this approach gives 91.10% accuracy a lot better than previous results.

Kernel	**Mean Accuracy**
linear	91.10%
polynomial	89.40%
rbf	57.20 %



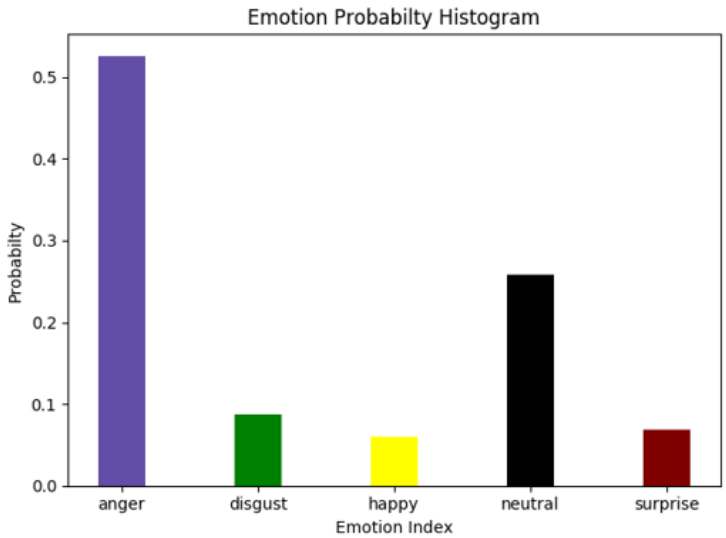
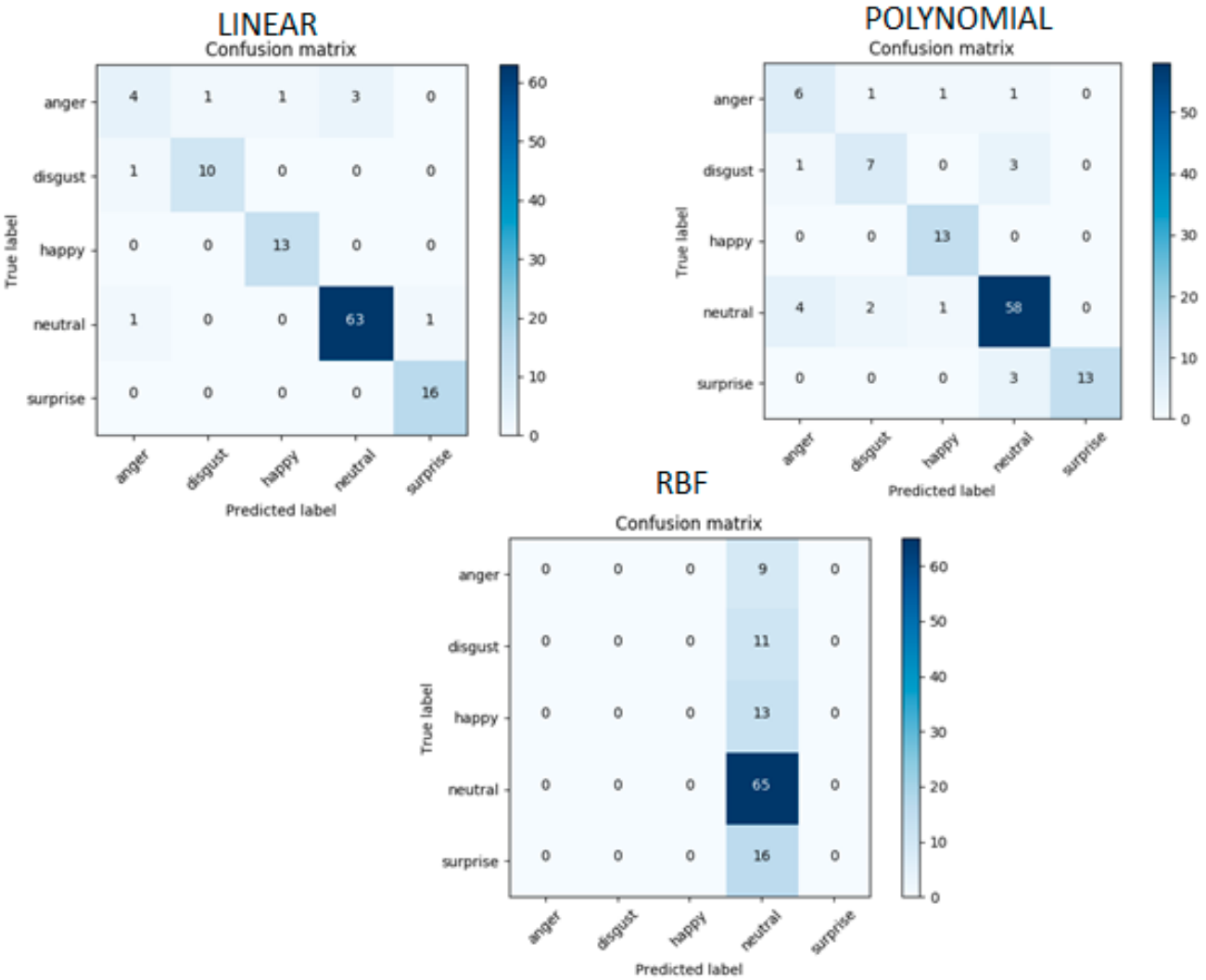


Figure: Results on Class Image

Confusion Matrix for CK+ Dataset



Live Testing of trained SVM Model

- We have implemented the above approach for live webcam, it shows five emotions:
- Anger, Disgust, Happy, Neutral Surprise
- The results can be visualized from the images shown here.

Figure: Results from Live Webcam

References

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- Fukui, K., Yamaguchi, O.: Facial feature point extraction method based on combination of shape extraction and pattern matching. Syst. Comput.Jpn. 29(6), 4958 (1998)
- http://www.paulvangent.com/2016/08/05/emotion-recognition-using-facial-landmarks
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- Ping Du, Yankun Zhang, Chongqing Liu, Inst. of Image Processing and Pattern Recognition, Shanghai Jiao Tong University. Face Recognition using Multi-class SVM, The 5th Asian Conference on Computer Vision, 2325 January 2002, Melbourne, Australia.