Image Based Face Detection and Recognition by Gabor SVM

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ABSTRACT: Linear filters are normally applied to act as the pre-processing aspect in various category functions present in the computer acting vision. The basics applied are the Gabor filters in the next categorized level. Support vector machine (SVM) is normally used in computer vision usage for face identification and expression recognition. The main error is encountered but due to increased dimensionality present in the closely Gabor filter, the outcome responses as a result of more demand and computational better work efficiency when carrying out the tests. Mostly the capability of the Gabor filter need to be increased and to achieve this the invention of SVM technique was suggested and placed to function and it resulted to a 1% modification improvement of the available existing neural network for based Gabor filter on face recognition criterion.

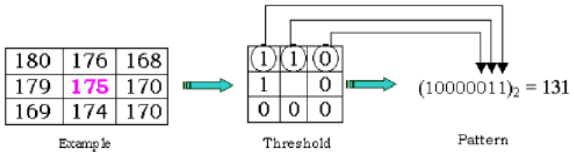
Keyword: Face Detection, Face Recognition, Gabor, (linear discriminant analysis) LDA, (support vector machine) SVM.

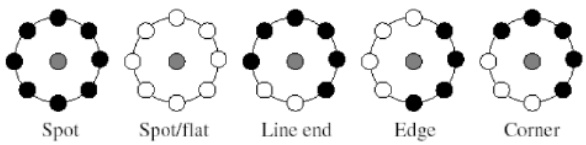
1. INTRODUCION

Majorly face detection is a modern computer generation which normally detects the place and the magnitude of human in modern appearance. Usually, it denotes face only and rejects everything for instance houses and plants [1]. It is usually recommended as a very crucial case when dealing with face localization. During the localization of the face, the main aim is to realize the place and the magnitude of values of face which are not recognized. During the process of face detection, the face is manufactured and grouped bitwise in regards with the following reflection image in the main data base [1]. Meanwhile the face detection can also be a mentally involved process which major on identifying a place and giving attention to a visual target. Various factors including color and orientation indicate the likelihood to recognize faces and how they are interfered with. The face is a very important aspect in relaying identity and to give a clear feeling [1]. The face usually performs this crucial role. It is very rare to lose memory on face that an individual had recognize before, this is very vital even though there are various changes in the visual stimulus objects to facilitate vision. It can be affected by the alteration of the conditions, old age and withdrawal of attention majorly in classes and in cases of lifestyle of an individual [2].Some of the fascinating computational models of face recognition is that it not only contribute to theoretical knowledge but also practical application. Areas of employment of computers whose function is detection and recognition of faces includes the film processing, image processing, criminal identification , security system, human-computer intervention, tagging purposes and identity verification. Because faces are complex, multidimensional and also a meaningful vision, developing a computational modelof face detection [3]. Some websites hosting images like Picasa, photo bucket and face book usually applies face detection. Anew dimension to the sharing pictures among the people who are in the picture and also giving ideas to other individuals about the person in the image are done by the automatically tagging feature [2].

2. LDA ALGORITHM

LDA based algorithm is better than BCA in solving pattern classification problems due to optimized in low dimension to object relating to discriminate feature extraction, meanwhile the other one is engaged in object reconstruction. The early LDA is less suitable due to reparability method relatively to accuracy present in output of them, to counter this, UN rapweighty function is allocated o LDA, in some occasion classes of certain objects should be nearer together within the output space and this will results to misclassification and mostly of height weight around the input space. To achieve this fractional state linear discriminant analysis algorithm has been introduced, in this scenario, dimensional decrease is placedin action in very small fraction stapes hence making relevant distant accurate.





3. LBP BASED FACIAL REPRESENTATION

Micro pattern is constituted by each face image and it is normally realized by LBP operator. The discovery of LBP based face recognition, for face identification according Ahonen et al. to have keen interest in shape data they give non-overlapping from face image, normally the LBP face histogram generated from every Sub-group are grouped as a single, and achieved spatial histogram is defined as shown:

$$H^{(i)} = \sum_{x,y} I(I(x,y) = i) I((x,y) \in R^{j})$$

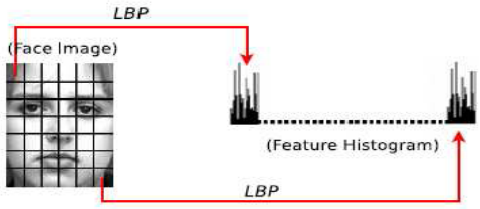


Figure 1

Dataset	Recognition			
	PCA	LDA	LBP	Gabor
[1]	72.10%	79.39%	85.93%	93.49%
[2]	68.87%	76.61%	80.47%	89.76%
[3]	70.95%	78.34%	84.14%	92.68%
[4]	74.79%	81.93%	86.45%	96.91%
[5]	68.0%	73.21%	77.69%	88.93%
Mean	71.15%	77.90%	82.94%	92.35%

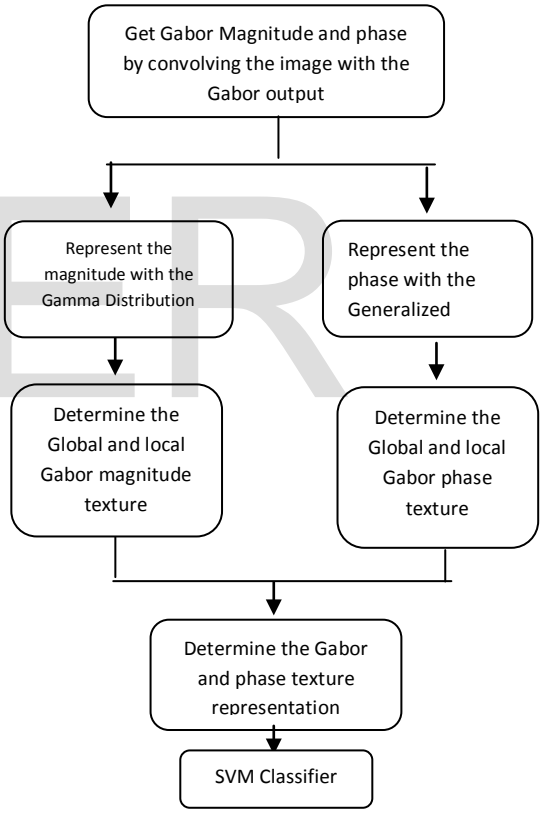
4. PROBLEM STATEMNT

When the Linear filters are applied as a pre-processing level for various categories roles in computer thorough vision. Majorly the use of Gabor filters being in a position to work with the category stage like the vector machine (SVM) actually is applicable in computer vision majorly the face detection and the expression of the face recognition. The major error encountered in relations to increased sections within theclose Gabor filter action due to the memory applicable andthe highlycomputational correct outcome while giving the right training and testing for high standard level. Normally the preprocessing method of making use of linear filters can mostly be represented to give some rough outcomes of the basic type present in the margin to be to the highest level on the linear SVM. This outcome has resulted to normal applicable memory and even the high computational merits relative to the present criteria. The new mechanism does not rely on any filters, and this makes it unique for proper examination for increased number present in the linear filters.

5. GABOR- SVM PROPOSED

The improved SVMs are categorized into a class of generalized and mostly they can be interpreted to give clear information. Sometimes they are applied as very special and more crucial. What makes them suitable is they possess a feature that reduces the empirical what category problem and also to reduce the geometric margin level hence referred to has maximum. Normally the efficiency of the SVM is determined on the ground of the selection of the kernel that is the kernel's parameters, Soft margin parameter C. The most applied criteria is the Gaussian kernel, and it normally produces the only one parameter γ. The most proffered mixing of C and γ is generated by a with highly upcoming level sequences of C and γ.

$C \in \{2^{-5}, 2^{-3} \ldots 2^{13}, 2^{15}\}$
$\gamma \in \{2^{-15}, 2^{-13}, \ldots., 2^{1}, 2^{3}\}$



Typically, each combination of parameter choices is checked using, and the parameters with best cross-validation accuracy are picked. Alternatively, recent work in can be used to select C and γ, often requiring the evaluation of far fewer parameter combinations than grid search. The final model, which is used for testing and for classifying new data, is then trained on the whole, training set using the selected parameters.

6. RESULT

We are comparing the results of PCA, LDA, LBP, Gabor NN, Gabor-SVM .In this we are proving that Gabour –SVM is giving the better accuracy as compare to Gabor NN. We are also working for face expression.

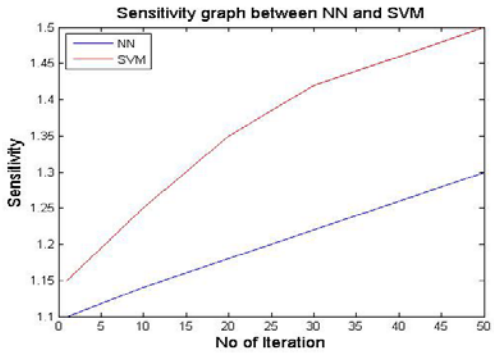


Figure2

In Figure 2 shows the comparison of face sensitivity in between SVM and NN technology.

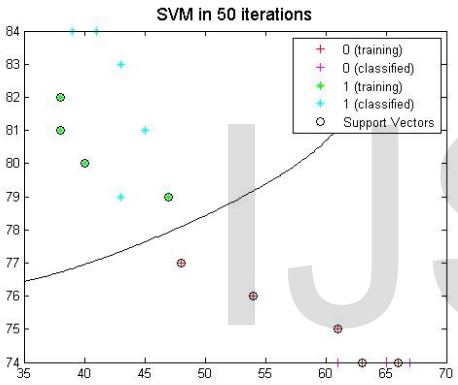


Figure3

n figure 3 the number of rounds are shown. We have 50 number of rounds for SVMmethodology. .

Figure 4

In figure 4 we show the sample image for which we are performing our results.

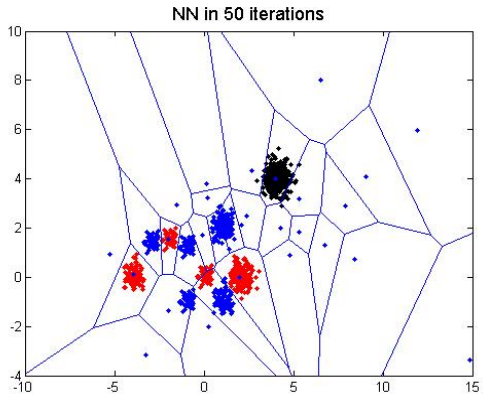


Figure 5

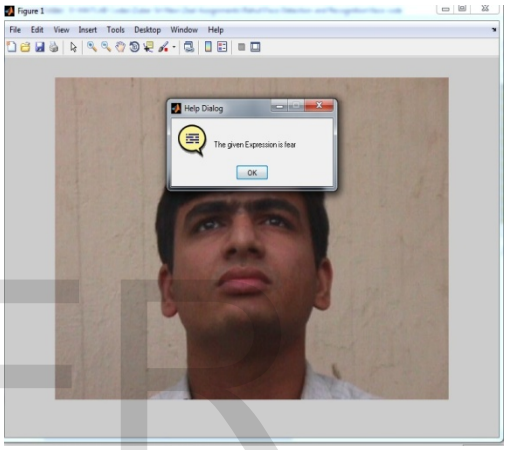


Figure 6

In fig 6 you can find the image expression.

Dataset	Recognition				
	PCA	LDA	LBP	Gabor NN	Gabor SVM
[1]	72.10%	79.39%	85.93%	92.61%	94.65%
[2]	68.87%	76.61%	80.47%	87.20%	89.80
[3]	70.95%	78.34%	84.14%	91.73%	93.85%
[4]	74.79%	81.93%	86.45%	94.01%	97.77%
[5]	68.0%	73.21%	77.69%	86.11%	89.19%
Mean	71.15%	77.90%	82.94%	90.33%	93.05%

Table 2

Table 2 is a comparison for PCA, LDA, LBP, GABOR NN, and Gabor SVM.

7. CONCLUSION

A novel face recognition algorithm by using existing Gabor filter information and applying neural networks and SVM technique is proposed in this report. It is done in order to enhance the quality and perseverance of detected and recognized images. Recognition of faces was done using a set of trained data by using neural networks technique and then it was applied to a new database of images in detecting the faces of that given image. In order to further increase the capability of GA filter, SVM technique was proposed and implemented which gave around 1% improvement in the existing neural network based Gabor filter face recognition method.

8. REFERENCES

1.Faizan Ahmad, Aaima Najam and Zeeshan Ahmed "Image based Face Detection and Recognition: State of the Art" International Journal of Computer Science Issues, Vol. 9, Issue 6, No 1, November 2012 PP:169-172.

2.Kamal Nasrollahi and Thomas B. Moeslund . "Haar-like features for robust real-time face recognition" 2013 IEEE, pp: 3073-3077

3.S.Kalaimagal M.Edwin Jaya Singh "Face Recognition. Using GaborVolume Based Local Binary Pattern" International Journal of Advanced Research in Computer Science and Software Engineering
Volume 2, Issue 6, June 2012 ISSN: 2277 128X

4.Taranpreet Singh Ruprah "Face Recognition Based on PCA Algorithm". Special Issue of International Journal of Computer Science & Informatics, Vol.- II, Issue-1, 2

5.Steven Fernandes and Josemin Bala, "Performance Analysis of PCA-based and LDA- based Algorithms for Face Recognition" International Journal of Signal Processing Systems Vol. 1, No. 1 June 2013.

6.Kanhaiya Kumar , "artificial neural network based face detection using gabor feature extraction" International Journal of Advanced Technology & Engineering Research Volume 2, Issue 4, July 2012 ,pp: 221-225

7. Wenkai Xu and Eung-Joo Lee , "Human Face Recognition Based on Improved D-LDA and Integrated BPNNs Algorithms" International Journal of Security and Its Applications Vol. 6, No. 2, April, 2012 pp:121-126

8. R.Madhura, P.Suthanthira Devi "Automatic Face Recognition Using Gabor Wavelet and Robust Structured Spares Representation" IOSR Journal of Computer Engineering Volume 16, PP:82-85

9.Priyanka Dhoke, M.P. Parsai "A MATLAB based Face Recognition using PCA with Back Propagation Neural network" , International Journal of Innovative Research in Computer and Communication Engineering, Vol. 2, Issue 8, August 2014, pp:5291-5297

10. V. Balamurugan , Mukundhan Srinivasan, Vijayanarayanan.A "A New Face Recognition Technique using Gabor Wavelet Transform with Back Propagation Neural Network" , International Journal of Computer Applications (0975 – 8887) Volume 49– No.3, July 2012

11. Sachin Shende1 & Rahila Patel, "Efficient Face Detection using PCA and ANN Techniques", International Journal onAdvanced Computer Theory and Engineering,Volume-2, Issue-5, 2013, pp: 155-159

12. Navneet Jindal, Vikas Kumar. "Enhanced Face Recognition Algorithm using PCA with Artificial Neural Networks" International Journal of Advanced Research in Computer Science and Software Engineering Volume 3, Issue 6, June 2013

13. Vijayalaxmi, P.Sudhakara Rao and S Sreehari "Neural network approach for eye detection", Computer Science & Information Technology, 2013.

14. Omaima N. A. AL-Allaf "Review of face detection systems based artificial neural networks algorithms", The International Journal of Multimedia & Its Applications Vol.6, No.1, February 2014

15. Aruna Bhadu, Rajbala Tokas, Dr. Vijay Kumar "Facial Expression Recognition Using DCT, Gabor and Wavelet Feature Extraction Techniques" International Journal of Engineering and Innovative Technology (IJEIT) Volume 2, Issue 1, July 2012.

16.Dinesh Kumar, Rajni , "Face Recognition Based on PCA Algorithm Using Simulink in Matlab" International Journal of Advanced Research in Computer Engineering & Technology Volume 3 Issue 7, July 2014.

17. Poonam dhankhar, Neha sahu , "Edge based human face detection using matlab" Proceedings of IRF International Conference, 16th February 2014, Goa, India.

18. Jaishree Tawaniya, Ms. Rashmi Singh, Ms. Neha Sharma, Jitendra Patidar "Image–Based Face Detection and Recognition using MATLAB" ,International Journal Of Core Engineering & Management Volume 1, Issue 2, May 2014.

19. Jawad Nagi, Syed Khaleel Ahmed Farrukh Nagi." A MATLAB based Face Recognition System using Image Processing and Neural Networks" , 4th International Colloquium on Signal Processing and its Applications, March 7-9, 2008, Kuala Lumpur, Malaysia