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Summary of Final Project:

Multi-Classifier System for Face Recognition

Introduction:

Face recognition is well known challenge in the field of machine learning, as mentioned an identification set-up the similarity between a given face image and all the face images in a large database is computed, the top match is returned as the recognized identity of the subject.

Face recognition system involves following steps The Acquisition Module, The Pre-Processing Module, The Feature Extraction Module , The Classification Module, Creating Face Database. In this project the first three steps are done by well known PCA and LDA method, further the state of the-art is while selecting the model to classifying the each sample.

Steps:

Here we have used Multi Classifier System (MCS) to combine the power of PCA and LDA, we have computed PCA and LDA, saved the scores for each sample separately.

Mode 1: The PCA and LDA scores saved are loaded, calculated the target matrix for 40 samples based on if-else rule, inserted zero-matrix or one-matric. Calculated the maximum, minimum and average scores matrix out of PCA and LDA.
Plotted the ROC curve for each step i.e avgPlot, minPlot, maxPlot, LDAplot and, PCAplot.

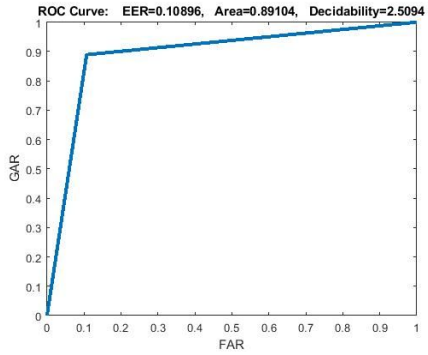

Fig:ROC curve for Minimum Score MCS

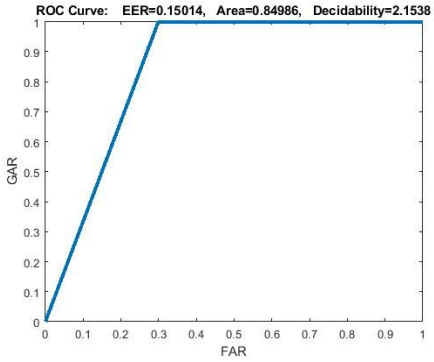

Fig: ROC curve for Maximum Score MCS

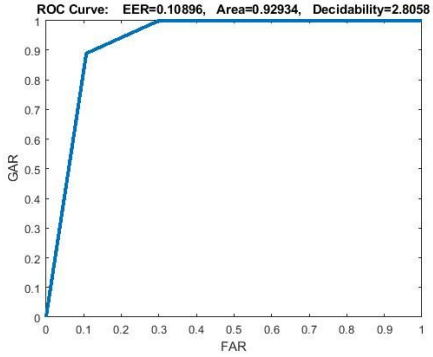

Fig: ROC curve for Average Score MCS

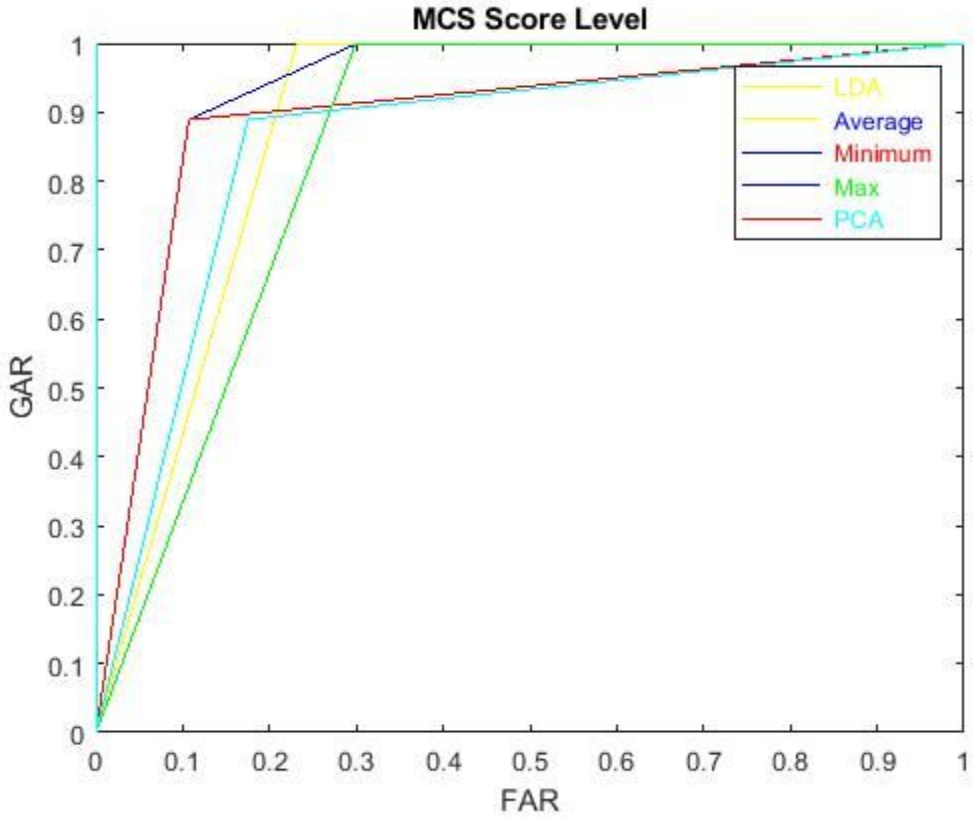

Fig: ROC curve for MCS

Inference/conclusion:

In the field of face recognition system, no doubt stand alone PCA and LDA had set there own benchmarks. The recent findings to combine multi-classes have improved the accuracy of the classifier, by observing the figure ROC curve for MCS at the score level, the Maximum score level performs well, the LDA and PCA are noteworthy, later comes the minimum score and average score level MCS.

Mode 2: The PCA and LDA scores saved are loaded the decision matrix (0/1) is calculated based on the threshold value, calculated the target matrix for 40 samples based on if-else rule, inserted zero-matrix or one-matric.

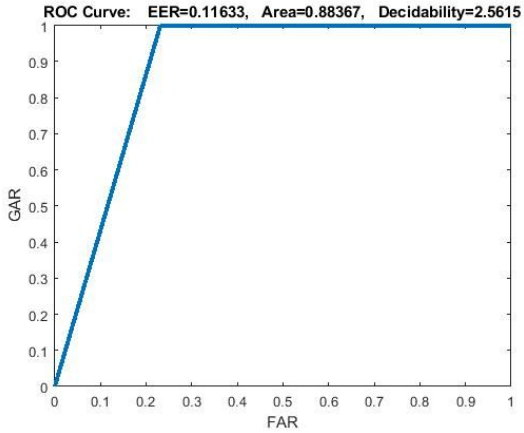

Fig: ROC curve for LDA

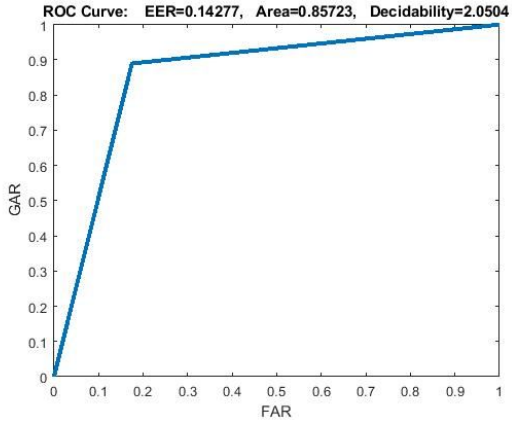

Fig: ROC curve for PCA

Inference/Conclusion:

	LDA	PCA	MCS decision level
FAR	0.17	0.17	0.05
GAR	0.88	0.88	0.94
Accuracy	0.88	0.85	0.94
Threshold	0.002	0.002	

Table: Shows FAR, GAR, Accuracy for LDA, PCA, MCS respectively

It is clear that accuracy of MCS (decision rule) is better than PCA and LDA .