ABSTRACT

Face Recognition System is considered to be one of the predominant area in the fields of Image Processing System. The Face Recognition system is very much critical by its nature due to its diversified set of applications in addressing information security, surveillance, access control and in image understanding. The Face Recognition System is not like other image processing systems like fingerprint analysis or iris scans or palm analysis where there is a possibility of having duplications in recognizing the image. The performance of the existing Face Recognition Systems Principle Component Analysis (PCA), Linear Discriminant Analysis (LDA), etc. remains unsatisfactory due to their failure in handling the dimensionality of feature vector.

The Local Binary Pattern (LBP) is a very popular texture descriptor for Face Recognition System because the LBP describes the local features of the face very effectively. In Uniform Local Binary Pattern (ULBP) based methods where a sub set of LBP will be considered to describe the texture image. In general more number of subset of LBP will be Non Uniform Local Binary Pattern (NULBP) by their nature and they are treated as miscellaneous which will degrade the performance of the system after the classification. The present thesis addressed this problem by deriving the Significant Non Uniform Local Binary Pattern (SNULBP) and Extended- Significant Non Uniform Local Binary Pattern (E-SNULBP) from the NULBP set which has improved overall performance. The present thesis further extends the research on ULBP and its fundamental nature. For this the present research derived Prominent Local Binary Pattern (PLBP) that holds transitions of LBP. The derived PLBP contains majority of ULBPs and small portion of NULBPs. The present thesis derived various variants of PLBP by integrating them with ULBP using union and intersection operators for efficient face recognition.

In the present thesis a concept of the Local Ternary Pattern (LTP) has been implemented and derived two PLBPs namely Prominent Local Binary Pattern-Low (PLBP-L) and Prominent Local Binary Pattern-High (PLBP-H). The PLBPs are more powerful and less sensitive to noise and exhibit more discrimination in a given uniform regions. The macro structure features are dominant in recognizing the facial images and
they play a vital role in identifying the facial images than micro structure features. The above problem has been addressed using Multi Region Local Binary Pattern (MR-LBP) which is considered as an efficient face recognition method. The advantage of the proposed MR-LBP is that it holds both macro and micro structures of a facial image. To eliminate most of the effects of illumination changes that are present in human face, the present thesis adopted various efficient preprocessing methods that preserve the significant appearance details that are needed for face recognition.