ABSTRACT

Face recognition has been observed to be the most significant human abilities that can be utilized for the task of identifying an individual using their faces. This feature is now gaining huge traction worldwide due to its specialized contactless biometric aspects. This technique on the other hand appears to be a challenging system as its implementation in various situations is tedious in case of human face-based recognitions. Few of the applications are security & surveillance, authentication/access control systems, digital healthcare, photo retrieval, etc. So this research is mainly concentrate on the human face identification using different methods.

The First work concentrates on the issues related to the extraction of discriminant eigen features from that of the face image with respect to a specific group of training samples. The Eigen features are thereby regularized in different forms in these three subspaces. This inter-class scatter matrix is disintegrated into a reliable subspace, an unstable subspace and a null subspace appropriately. This new progress is employed for feature extraction. The feature space for recognising for both scenarios is then built to span the top K-eigenvectors, which correspond to the K-highest eigenvalues. The few non-zero eigenvalues linked eigenvectors are suggested that are taken into consideration for recognition is given varying weights. The most weight to the eigenvectors is provided with the highest eigenvalues and minimal weight to the eigenvectors with the lowest eigenvalues that are taken into consideration. The weight varies according to how many eigenvectors are taken into account during recognition. Last but not least, k-nearest distance measurement completes this modification of face recognizing module. Results from experiments using the ORL and FERET face databases demonstrate that the suggested strategies improve the rate of recognition.

In the second piece of work, Facial identification is a popular technology that can detect or authenticate an individual from a video frame or digital image from any source. There are numerous techniques involved in the operational principle of facial identification. However, the simplified approach involves extracting features by comparing the specific facial characteristics of the images from the collected dataset known as LFW and ORL dataset. Multiple algorithms exist for feature extraction, but they struggle to provide accurate results. In this paper, feature extraction is based on local phase quantization with directorial graph features for an efficient optimal path and the geometric features. Additionally, person identification based deep neural network PI-DNN is expected to achieve a high recognition rate. Various performance metrics, such as recognition rate, classification accuracy, accuracy, precision, recall, and F1-score, are evaluated. This method achieves impressive performance values when compared to other existing methods. Its main purpose is to identify human faces in a crowd, and it is also utilized for criminal identification.

The final work intends to apply DL (deep learning) based framework for face recognition by focusing on efficient tracking and accuracy. It aims to recognize faces by considering a real-time dataset and employing Face Tracking Recognition Network (FTRN). This network comprised of three stages, namely alignment stage, detection and tracking stage and recognition stage. The backbone network is used for extracting structural information in alignment stage which is a vital process to improve tracking. Further, Face ROI and heatmap is computed to track identical face area in each frames. Further, normalisation and point-to-point Euclidean is calculated to recognise suspected and normal faces. The new FTRN rely on DL which has the ability to perform effective learning and afford high quality outcomes. These advantages have made it explore better outcomes for both videos and their images. Analysis is carried out in terms of accuracy, specificity, sensitivity, precision, jaccard

coefficient, F1-score and missed classification for assessing its efficiency in face detection and recognition from video. Results explored the new FTRN system shows effective tracking and accuracy compared to traditional works.