Facial Recognition using Modern Algebra and Machine Learning

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Abstract: Facial Recognition Systems have been garnering attention from various researchers and enthusiasts in recent times, they are being deployed for numerous applications like those in identifying faces from a mass of subjects[1], noise removal from captured images, forensic applications[4], etc. The principle idea is to identify and extract individual features from the image of an individual's face. The RGB image is first converted to grayscale and then in reference to a threshold intensity, are transformed into a binary matrix[6]. The end-point demarcations[7] of individual features, called feature points are identified from the image and the relative distances between relevant points are calculated using a wide range of algebraic functions like Euclid distance, eigenvectors etc. These distances[5] are stored in the form of vectors and are then transformed as required. The images are classified on the basis of similar distances between concurrent features, and are grouped together under one class. This is represented as a point in a high dimensional space. Recent research is focused on improving the accuracy, efficiency and speed of existing systems. So, in this paper we focus on eigen values [3], eigen vectors arising due to factors like covariance matrix, dominant eigen values and principal components. The basic purpose of algebra, is to enhance the features, in terms of clarity , and also classification of data, using these features. In this paper, we have achieved, better extraction of features, when compared to artifacts[9], and also classification accuracies have improved when compared to existing literature.

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