

# Principal Component Analysis Based Face Recognition System Using Fuzzy C-means Clustering Classifier

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*Abstract* — Face detection is to find any face in a given image. Face recognition is a two-dimension problem used for detecting faces. The information contained in a face can be analyzed automatically by this system like identity, gender, expression, age, race and pose. Normally face detection is done for a single image but it can also be extended for video stream. As the face images are normally upright, they can be described by a small set of 2-D characteristics views. Here the face images are projected to a feature space or face space to encode the variation between the known face images. In this paper, PCA is used for dimension reduction, the projected feature space is formed using fuzzy c-means clustering algorithm. The above process can be used to recognize a new face in unsupervised manner. It takes into consideration not only the face extraction but also the mathematical calculations which enable us to bring the image into a simple and technical form. It can also be implemented in real-time using data acquisition hardware and software interface with the face recognition systems. Fuzzy sets can efficiently manage the vagueness and ambiguity of face images degraded by poor illumination component.

*Keywords* — Face Recognition, Principal Component Analysis, Fuzzy C-means Clustering, Eigen Face, Euclidian Distance.