FACE DETECTION BASED ON VECTOR QUANTIZATION IN COLOR IMAGES

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Abstract. *Nowadays, face detection plays important roles in many applications, such as: human-computer interaction, security and surveillance, face recognition etc. In this paper, a novel scheme for human face detection in color images under non-constrained scene conditions is presented. Color clustering and filtering based on the vector quantization (VQ) technique are performed on the original input image, providing binary skin color regions. In order to provide a set of candidate face areas, constrains related to shape and size of faces are considered. Finally, mouths are searched in all of the candidate face regions by means of mouth detector to verify each face region. Experimental results show that the proposed method is efficient and robust to head rotation to some extent.*
Keywords: Face detection, Vector quantization, Color space

1. **Introduction.** Face detection determines the location of human faces in an input image, which plays important roles in applications such as video surveillance, human computer interface, video conference and biometric application. Automatic human face detection from images is a challenging task due to the variances in the image background, view, illumination, articulation, and facial expression. On the other hand, it is an interesting academic problem because a successful face detection system can provide valuable insight on how one might approach other similar pattern detection problems. It is also believed that a successful automatic face recognition system should have a powerful face detection system. Note that face detection can be viewed as a two-class (face and non-face) classification problem, thus some techniques developed for face recognition have also been used to detect faces, however they are computationally time-consuming and can't handle face images with large variations.

Various approaches to detect faces are discussed in [1,2]. Typical methods of face detection can be roughly divided into following different types: (deformable) template matching, eigenfaces (PCA), geometrical features statistics, artificial neural network and