WEIGHTED FUSION OF GRADIENT, VERTICAL GRADIENT AND HORIZONTAL GRADIENT IN LOGARITHM DOMAIN FOR FACE RECOGNITION UNDER VARYING LIGHTING

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ABSTRACT—In this paper, the illumination problem of face recognition is investigated. A conclusion is drawn that the logarithm vertical gradient (LVG) of face images is more robust to varying lighting than the logarithm horizontal gradient (LHG). When the variation of illumination is large, LVG will be a better representation of the face image than logarithm gradient (LG). Although both LVG and LHG can weaken shadow boundaries, they lose the vertical component, horizontal component of facial objects’ edges, respectively. LG can capture more information of the facial objects’ edges, although it has no ability to weaken the shadow edges. By taking advantages of LVG, LHG and LG, a new algorithm integrating the LVG, LHG and LG at the decision level is proposed for robust face recognition under varying lighting conditions. The experimental results on the Yale B, CMU-PIE, and ‘Yale B + Extended Yale B’ face databases demonstrate the effectiveness of the proposed method.

Key Words: Face recognition, Logarithm gradient, Logarithm vertical gradient, Logarithm horizontal gradient, Illumination insensitive features