

Accepted Manuscript

Illumination Normalization based on Correction of Large-scale Components for Face Recognition

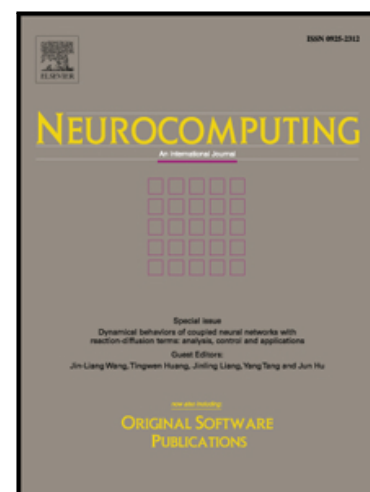
Xiaoguang Tu, Jingjing Gao, Mei Xie, Jin Qi, Zheng Ma

PII: S0925-2312(17)30918-9
DOI: [10.1016/j.neucom.2017.05.055](https://doi.org/10.1016/j.neucom.2017.05.055)
Reference: NEUCOM 18473

To appear in: *Neurocomputing*

Received date: 25 November 2016
Revised date: 22 May 2017
Accepted date: 23 May 2017

Please cite this article as: Xiaoguang Tu, Jingjing Gao, Mei Xie, Jin Qi, Zheng Ma, Illumination Normalization based on Correction of Large-scale Components for Face Recognition, *Neurocomputing* (2017), doi: [10.1016/j.neucom.2017.05.055](https://doi.org/10.1016/j.neucom.2017.05.055)



This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Illumination Normalization based on Correction of Large-scale Components for Face Recognition

Xiaoguang Tu¹, Jingjing Gao², Mei Xie², Jin Qi², Zheng Ma^{1,*}

No.2006, Xiyuan Ave, West Hi-Tech Zone, 611731 Chengdu, Sichuan, P.R.China

Abstract

A face image could be decomposed into two components of large- and small-scale components, which carry low- and high-frequency contents of the original image, respectively. The illumination field mainly locates in the spectrum of large-scale components, whereas the small-scale components hold the detailed image cues, like edge, corner, etc., which are less sensitive to the illumination changes. In this paper, we proposed a new illumination normalization framework with the idea of Correction on Large-scale Components (*CLC*). The logarithmic total variation (LTV) technique is firstly applied to decompose the large- and small-scale components of face images. We assume that there are two main contents in the large-scale components: the smoothly varied illumination field and the large-scale intrinsic facial features. Based on this assumption, an energy minimization framework is proposed to estimate and remove the smoothly varied field of the large-scale components in an interleaving fashion. The final normalization results can then be achieved with the integration of the smoothed small-scale components and the corrected large-scale components. Experiments on CMU-PIE, Extended Yale B and CAS-PEAL-R1 databases show that the proposed method can present a very good visual quality even on the images illuminated with deep shadow and high brightness regions, and attain promising illumination

*Corresponding author, Email: zma_uestc@outlook.com

¹School of Communication and Information Engineering, University of Electronic Science and Technology of China.

²School of Electronic Engineering, University of Electronic Science and Technology of China.

Download English Version:

<https://daneshyari.com/en/article/4946958>

Download Persian Version:

<https://daneshyari.com/article/4946958>

[Daneshyari.com](https://daneshyari.com)