Multimed Tools Appl (2015) 74:11003–11005
DOI 10.1007/s11042-015-2978-6

ERRATUM

Erratum to: Appearance-based bidirectional representation for palmprint recognition

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Published online: 9 November 2015

Erratum to: Multimed Tools Appl DOI 10.1007/s11042-014-1887-4

The authors have found errors with their original proposed method.

The authors used the BRBPC method for face recognition across pose in Ref. [34]. The palmprint recognition is different for face recognition as the database is larger. For example, for PolyU 2D and 3D palmprint database, the database contains a total of 8000 samples collected from 400 different palms. So for palmprint recognition, the test sample class should be expressed by class not by training samples one by one. The expression has been modified by class, as well as the formula (1)–(7) of the BRBPC method.

Suppose that there are m class training samples and each class provides n_i training samples. Let X_i be n_i training samples from the i_{th} class (i=1,…,m). Let y be the test sample.

Step 1. We assume that the test sample can be represented by the training samples class by class. Let X_i be n training samples from the i_{th} class (i=1,…,m), so we can write the first step of the NBR method by

$$y = \sum_{j=1}^{n_i} w_j^i x_j^i + \varepsilon_i = X_i w_i + \varepsilon_i \tag{2}$$

where $X_i=[x_1^i,\ldots,x_n^i]$, $w_i=[w_1^i,\ldots,w_n^i]^T$. Here, w_i denotes the coefficient of the i_{th} class training samples. We can calculate it by using

The online version of the original article can be found at http://dx.doi.org/10.1007/s11042-014-1887-4.

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$$w_i = \left(X_i^T X_i + \mu I\right)^{-1} X_i^T y \tag{3}$$

where μ is a positive constant and I is the identity matrix.
The deviation between the test sample and each class is calculated using Eq. (4)

$$dev_i = \|\varepsilon_i\| = \|y - X_i w_i\| (i = 1, \ldots, m) \tag{4}$$

Step 2. In the second step, we express a training sample by the test sample, as well as the training samples that belongs to the same class with this training sample, i.e.

$$x_j^i = w_0 y + \overline{X_j^i} w_i + \xi_j^i \tag{5}$$

where x_j^i is the j_{th} training sample from the i_{th} class, $\overline{X_j^i}$ denotes all of the samples from the i_{th} class except x_j^i, and ξ_j^i is the residue. In this way, each training sample is associated with a residue. Let $H_j^i = [y \quad x_1^i, \ldots, x_{j-1}^i, x_{j+1}^i, \ldots, x_m^i]$, $W_j^i = [w_0 \quad w_1^i, \ldots, w_{j-1}^i, w_{j+1}^i, \ldots, w_m^i]$, then we can calculate W_j^i as follows

$$W_j^i = \left(\left(H_j^i\right)^T H_j^i + \mu I\right)^{-1} \left(H_j^i\right)^T X_i \tag{6}$$

With W_j^i, we can obtain the complimentary deviation for x_j^i by

$$com_j^i = \left\|\xi_j^i\right\| = \left\|x_j^i - H_j^i \left(W_j^i\right)^T\right\| = \left\|x_j^i - w_0 y + \overline{X_j^i} w_i\right\| \tag{7}$$

1. Corrected tables of experimental results appear below. Corrections are marked with a bold, italic typeface.

Table 1. Classification accuracy rates of different methods on Green channel.

Methods	Classification accuracy rates
PCA(150)	0.9333
2DPCA	0.8050
LDA	0.9683
2DLDA	0.9483
2DLPP[36]	0.9576
SRC[24]	0.9820
LRC[37]	0.9310
The proposed method	***0.9933***

Table 2. Classification accuracy rates of different methods on Red channel.

Methods	Classification accuracy rates
PCA(200)	0.9600
2DPCA	0.8500
LDA	0.9750
2DLDA	0.9667
2DLPP[36]	0.9790
SRC[24]	0.9590
LRC[37]	0.9600
The proposed method	***0.9866***

Table 3. Classification accuracy rates of different methods on Blue channel.

Methods	Classification accuracy rates
PCA(250)	0.9700
2DPCA	0.8683
LDA	0.9700
2DLDA	0.9833
2DLPP[36]	0.9742
SRC[24]	0.9900
LRC[37]	0.9510
The proposed method	***0.9933***

Table 4. Classification accuracy rates of different methods on Near-Infrared channel.

Methods	Classification accuracy rates
PCA(250)	0.9583
2DPCA	0.8383
LDA	0.9667
2DLDA	0.9550
2DLPP[36]	0.9653
SRC[24]	0.9650
LRC[37]	0.9610
The proposed method	***0.9888***

Table 5. Classification accuracy rates of different methods on 2D palmprint images.

Methods	Classification accuracy rates
PCA(200)	0.9460
2DPCA	0.8520
LDA	0.9760
2DLDA	0.9880
2DLPP[36]	0.9785
SRC[24]	0.9883
LRC[37]	0.9590
The proposed method	***0.9978***

Table 6. Classification accuracy rates of different methods on MCI.

Methods	Classification accuracy rates
PCA(250)	0.9900
2DPCA	0.9800
LDA	0.9840
2DLDA	0.9900
2DLPP[36]	0.9863
SRC[24]	0.9857
LRC[37]	0.9860
The proposed method	***0.9966***