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Shui-Hua Wang , Preetha Phillips , Zheng-Chao Dong ,
Yu-Dong Zhang

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Intelligent Facial Emotion Recognition based on Stationary Wavelet Entropy and Jaya algorithm

Running Title: Intelligent FER based on SWE and Jaya

Shui-Hua Wang¹, Preetha Phillips², Zheng-Chao Dong³, Yu-Dong Zhang^{1,3,*},

1. School of Computer Science and Technology, Henan Polytechnic University, Jiaozuo, Henan 454000, P R China
2. West Virginia School of Osteopathic Medicine, Lewisburg, WV 24901, USA
3. Translational Imaging Division & MRI Unit, Columbia University and New York State Psychiatric Institute, New York, NY 10032, USA

Email: shuihuawang@ieee.org, pPhillips@osteo.wvsum.edu, zd2109@cumc.columbia.edu, yudongzhang@ieee.org,

* Correspondence should be addressed to Y. D. Zhang

Abstract: (Aim) Emotion recognition based on facial expression is an important field in affective computing. Current emotion recognition systems may suffer from two shortcomings: translation in facial image may deteriorate the recognition performance, and the classifier is not robust. (Method) To solve above two problems, our team proposed a novel intelligent emotion recognition system. Our method used stationary wavelet entropy to extract features, and employed a single hidden layer feedforward neural network as the classifier. To prevent the training of the classifier fall into local optimum points, we introduced the Jaya algorithm. (Results) The simulation results over a 20-subject 700-image dataset showed our algorithm reached an overall accuracy of $96.80 \pm 0.14\%$. (Conclusion) This proposed approach performs better than five state-of-the-art approaches in terms of overall accuracy. Besides, the db4 wavelet performs the best among other the whole db wavelet family. The 4-level wavelet decomposition is superior to other levels. In the future, we shall test other advanced features and training algorithms.

Keywords: emotion recognition; stationary wavelet entropy; Jaya algorithm; facial expression; affective computing; single hidden layer; optimal wavelet; optimal decomposition level; feedforward neural network.

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