Review on
"Face Recognition Using Fuzzy Integral and Wavelet Decomposition Method"
by *K. Kwak and W. Pedrycz*

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The authors present a new method for recognizing face images by combining wavelet decomposition, Fisherface method, and fuzzy integral. The proposed method is an attempt to utilize wavelet's ability of preserving image detail information at different levels while applying Fisherface method on the decomposed subimages. The final result comes from building a fuzzy integral model on a set of classification results from the subimages. The method architecture is thus a multi-classifier model with four Fisherface classifiers used for reducing feature dimensions. The paper only considers using four subimages from wavelet decomposition by applying Daubechies family wavelets.

The paper is self-explanatory with a brief review on wavelet, Fisherface, and fuzzy integral theories. However, for reader who is not familiar with the mathematic on these three subjects, it has to refer back to some previous works in order to understand the paper thoroughly. The paper is generally not hard to follow but some math notations are inconsistent. First half of the paper is denoted to the background knowledge related with face image recognition. The new method is presented following the architecture of design which is clear to be understood. The proof of correctness is not presented, which could be worked out formally for the sake of completeness. It is not obvious that the new method is better than others from theoretical point of view, although the three combined subjects used in the method have been well studied.

A shallow analysis of experimental results follows. The authors present the results in comparing with the conventional Eigenface and Fisherface methods. Although the results show better classification accuracy from the proposed method, the experiment is set in favor of the new architecture. Thus the conclusion from the experimental results is less promising. The experiments are all in fact done with wavelet decomposition, and the effect of applying wavelet decomposition can not be found from the experimental results. And clearly, the face sample images demonstrated in the paper are all frontal oriented, which could be more variations on scale, pose, and disguise to eliminate the experimental bias. A further systematic testing on different subjects with the proposed method, and a comparison with some state-of-art, would have been useful.

Nevertheless, the paper is interesting for its new idea on the multi-classifier model combing three well studied subjects. It would be more convincing if the authors can formally show the combination architecture mathematically and experiment on more face images systematically, however.