A New Refined-TLBO Aided Bi-Generative Adversarial Network for Finger Vein Recognition

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***[[1]](#footnote-1)*** Abstract—

Finger vein recognition is a biometric authentication scheme for analyzing human finger vein patterns. Over the past few decades, convolutional neural networks (CNN) have been widely used for finger vein recognition. However, the conventional issues of CNN are remaining unsolved which are translation invariance and the lack of considerations of position and orientation, thus unable to obtain a large recognition rate. In addition, pre-processing for all kind of finger vein images lead to extra overhead and increases the time for finger vein recognition. In this paper, we proposed a Bi-Generative Adversarial Network (Bi-GAN) with Teaching Learning Based Optimization (TLBO) for finger vein recognition. GAN is an architecture that can use CNNs and are really powerful in learning the underlying data distribution. Further, GAN has been applied previously for this application, but still, it has some serious issues such as hyper-parameters selection, and insufficiency for large feature extraction. Our proposed Bi-GAN with TLBO approach is involved four processes: (1). Image Quality Assessment (IQA), (2). Preprocessing, (3). Feature Extraction and (4). Feature Matching. We extract texture and soft biometric trait features by Bi-GAN and the parameters are optimized using the TLBO algorithm. In feature matching, we used Canberra Coefficient (CE). Experiments are conducted on the SDUMLA public database that exhibits the efficiency of the proposed Bi-GAN and TLBO in finger vein recognition. The results proved that the proposed approach is superior as analyzed to the CNN, GAN, and Bi-GAN approaches and gives the improvement in the accuracy of recognition.

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