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Human Identification based on Temporal Lifting using 5/3 Wavelet Filters and Radon Transform

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Highlights

- A spatio-temporal gait recognition system is proposed.
- A gait template approach (5/3GI) based on lifting 5/3 wavelet filters is introduced.
- Radon transform is performed on the generated temporal templates.
- PCA is utilized on Radon templates to reduce the dimensionality of feature vectors.
- The system achieves better performance compared with the recently published approaches.

Abstract

In this paper, a spatio-temporal gait recognition system is proposed to overcome the limitations associated with the most existing temporal template approaches such as gait energy image (GEI). These approaches do not preserve the whole temporal information in a gait sequence. They are also sensitive to changes in various conditions such as carrying and clothing. These limitations influence the performance of any gait recognition system. To address this problem, a temporal template approach based on lifting 5/3 wavelet filters is presented. In the proposed method named 5/3 gait image (5/3GI), the contour is first extracted from each image in a gait sequence. The gait contour images are then decomposed using 5/3 temporal wavelet filters into two temporal templates at the last temporal decomposition stage. These two templates are subjected to Radon transform for feature extraction. The principal component analysis (PCA) is subsequently applied to the Radon templates in the reference database to identify a subset of Radon template coefficients that carry the most important information

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