

Special Issue on **Optimizations for Biometrics and Its Antispoofing Methods**



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There has been a significant progress in biometrics with the development of the small-size sensors in the last few years, and some traits such as fingerprint and iris now start to be applied to mobile devices for payment as well as security. However, most of them are vulnerable to spoofing attacks, for example, printed photos, mimic mask, and screenshot of a valid user for the face-based log-in system, driven by detailed strategies with various materials. To cope with these limitations, efficient optimization skills are strongly required for applications on the embedded systems. Specifically, the possibilities of advanced mathematical modeling, for example, low-rank analysis, tensor decomposition, frequency filtering, and normalization, can be extended to further biometric-inspired applications for smart home and robot-based security and service. To this end, many researchers have devoted considerable efforts to constructing simple yet powerful optimization algorithms for biometric-based recognition framework.

We kindly invite investigators to contribute reviews as well as original papers describing recent findings and breakthrough developments which are expected to revolutionize the field of biometrics and its antispoofing methods with a special attention on optimization.

Potential topics include but are not limited to the following:

- ▶ Biometric image (e.g., fingerprint, iris, and vein) enhancement with various optimization schemes (e.g., kernel estimation, subspace analysis) including denoising, reconstruction, and edge-aware filtering
- ▶ Sparse representation and low rank-based framework for biometric recognition
- ▶ Tensor-based feature point detection and matching for recognition
- ▶ Covariance updating-based incremental learning technique for biometrics
- ▶ Optimization techniques and their conceptual study for segmentation and recognition in biometric images
- ▶ Frequency filtering and normalization based feature modeling for biometrics and antispoofing
- ▶ Variational framework for biometrics and antispoofing
- ▶ Deep neural networks for biometric recognition and liveness detection (i.e., antispoofing technique) with new mathematical interpretation
- ▶ Variants of stochastic gradient descent methods for improving the conventional convolutional neural network for biometrics

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