8. Advanced Techniques for Face-Based Biometrics

13:00-16:30
Marriott Waterside, Room 12

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Abstract:
Face recognition is nowadays one of the most challenging biometric modalities for the identification of individuals. In the last two decades several experimental as well as commercial systems have been developed exploiting different physical properties of the face image. Either being based on processing 2D or 3D information all these methods perform a face classification of the individuals based on some relevant features extracted from the raw image data. The data acquisition, preprocessing and the feature extraction/selection are all topics of the greatest importance to design a good performing recognition system. At the same time, the right choice of the features to be used as the basis for the face representation, which must be based on the uniqueness of such features, as well as most advanced issues such as the incorporation of quality information and the cope for ageing effects, are all of paramount importance.

The tutorial will consists of two sessions (half day of total duration) devoted to the description of both the basic and most advanced techniques related to face recognition. The lectures will provide a comprehensive outline of face-based biometrics, its relation to biological systems (the psychophysics of the human visual system), including the existing applications and commercial systems.

The lectures will provide an in-depth analysis of the state-of-the-art algorithms for face-image analysis including: face detection and tracking, landmark localization, feature extraction, face representation and classification.

The lectures will mainly explore the image processing aspects of the recognition process. As for classification, machine learning algorithms will be also presented, including kernel methods as related to learning and the approximation theory. The most relevant issues and problems will be raised, providing practical solutions and algorithms responding to them. Particular attention will be given to the most advanced and new techniques for face representation and classification, as well as the current approaches presented in the literature. Attention will be also given to the performance evaluation of face recognition systems providing some examples and results from recent competitions and public evaluation contests.

Finally, the tutorial will present three relevant and novel issues: the use of face image sequences for exploiting the time domain, the extension to 3D face analysis, and the how to cope with ageing and data quality.

Topics Covered:

- Biometrics
- Face Recognition
- Human Vision System
- Face Detection
- Image Analysis
- Image Processing
- Computer Vision