

# *Biometric Consortium 2004 Conference*

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**Topic:** A Texture-based Approach to Face Detection

**Abstract:** We present a texture-based technique for detecting faces in static gray-scale images under diverse conditions. The proposed method uses a moving window to examine the texture of an image at multiple scales in order to detect facial patterns. The feature set considered in this work is a set of 9 statistical and multi-resolution texture features including a 3-level wavelet transform that uses an orthonormal Daubechies filter of length 8. The algorithm first utilizes the feature vectors extracted from a set of training images containing facial patterns to compute a pair of thresholds (based on the Euclidean distance metric) which is later used to eliminate non-facial window patterns from an image. The training vectors are next subjected to a clustering procedure that emits a pre-determined number of clusters each characterized by a centroid, a radius and a covariance structure. When a test image is presented to the system, the non-facial window patterns are eliminated by utilizing the aforementioned threshold values. The feature vectors associated with the remaining candidate face windows are then compared with the centroid of individual clusters via the Mahalanobis distance in order to determine facial patterns. The algorithm uses fewer training samples than current learning-based techniques; does not require non-facial training patterns; can detect multiple faces in a scene; and is observed to perform well on images containing frontal, side-profile and slightly tilted faces under diverse lighting and background conditions.

**Biography:** ARUN ROSS is an Assistant Professor in the Lane Department of Computer Science and Electrical Engineering at West Virginia University. Ross received his B.E. (Hons.) degree in Computer Science from the Birla Institute of Technology and Science, Pilani (India), in 1996. He obtained his M.S. and Ph.D. degrees in Computer Science and Engineering from Michigan State University in 1999 and 2003, respectively. Between July 1996 and December 1997, he worked with the Design and Development group of Tata Elxsi (India) Ltd., in Bangalore. He also spent three summers (2000–2002) with the Imaging and Visualization group at Siemens Corporate Research, Inc., Princeton, developing fingerprint recognition algorithms. His research interests include statistical pattern recognition, image processing, computer vision and biometrics.