Image Biometric Verification in Spatial Frequency Domain

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Abstract:
Verifying a user's identity is critical in many applications such as access control to physical and virtual spaces. Most current authentication systems are password-based or based on the use of swipe cards or RF ID tags. These authentication approaches based on "what you know" and "what you have" are susceptible to problems such as forgetting the password and cards being lost or stolen. One way to overcome these problems is to employ biometrics (e.g., fingerprints, face images, signatures, etc.) for authentication since they rely on "what you are". Biometrics have physiological or behavioral characteristics that are unique to an individual. Some biometric modalities produce images and biometric verification involves matching these images. Most image biometric matching methods work in image domain, but there are advantages to working in the spatial frequency domain. This talk will provide an overview of spatial frequency domain image processing methods (simply called advanced correlation filters) to authenticate a person's identity based on their biometrics. In particular, the application of correlation filters to verify the identity based on face images and iris images will be discussed. Correlation filters offer several advantages such as shift-invariance, closed-form designs and graceful degradation. Although the focus of this talk is on verification, we will also show results of applying these methods to the task of face identification. We will also discuss the performance of correlation filters in independent evaluations such as the face recognition grand challenge (FRGC) and the iris challenge evaluation (ICE).