Face biometrics

Mobile applications, face recognition, image processing


Abstract

This paper presents an acquisition procedure and method of processing spatial images for face recognition with the use of a novel type of scanning device, namely mobile depth sensor Structure. Depth sensors, often called RGBD cameras, are able to deliver 3D images with a frame rate 30-60 frames per second, however they have relatively low resolution and a high level of noise. This kind of data is compared here with a high quality scans enrolled by the structural light scanner, for which the acquisition time is approximately 1.5 s for a single image, and which - because of its size - cannot be classified as a portable device. The purpose of this work was to find the method that will allow us to extract spatial features from mobile data sources analyzed here only in a static context. We transform the 3D data into local surface features and then into vectors of unified length by use of the Moving Least Squares method applied to a predefined grid of points on a reference cylinder. The feature matrices were calculated for various image features, and used in PCA analysis. Finally, the verification errors were calculated and compared to those obtained for stationary devices. The results show that single-image mobile sensor images lead to the results inferior to those of stationary sensors. However, we suggest a dynamic depth stream processing as the next step in the evolution of the described method. The presented results show that by including multi-frame processing into our method, it is likely to gain the accuracy similar to those obtained for a stationary device under controlled laboratory conditions.

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