Multi-Model Ear Database for Biometrics Applications

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Abstract. In this paper we describe the 3DEarDB, a multi-model Ear Database, including different types of human ears representation models depending either on the used device for data acquisition or on the concrete application. In difference from the existing ear databases, 3DEarDB is based on a precise 3D mesh model of the human ear, currently - for about 100 persons, for their right ear only, with a resolution of 1 mm and an accuracy of 0.050 mm. The 3D ear mesh models have been collected via VIUscan 3D laser scanner, available at the Smart Lab of IICT-BAS, in the frames of AComI[1] project. The main 3DEarDB objective is to provide to the biometrics community a unified tool for test and comparison of classification algorithms not only on 2D intensity and/or depth images, or videos, but also on precise 3D mesh models of human ears. Two more ear acquisition types are also included in the 3DEarDB: 3D Kinect ear depth maps and 2D high-definition video clips as accompanying to the basic mesh models. To demonstrate the 3DEarDB compatibility with previously known methods for 2D/3D ear detection and/or recognition, we have also generated two more ear model types: a set of 2D ear intensity projections (of different orientations and/or lightening directions) as well as 2D depth map projections generated from the basic 3D ear models in connection with two possible applications. Thus, we have also presented results evaluation for the recognition accuracy of 3D EGI (Extended Gaussian Image) descriptor [1] as well as for EFIRS (Experimental Fast Image Retrieval System) performance [2], designed for human authentication purposes. ...

Keywords: 3D Ear Database, 3D Mesh Ear Models, Ear Biometrics, EGI, …

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