ACCURACY OF 3D FACE RECOGNITION FRAMEWORKS

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ABSTRACT:

This paper represents a survey of the state of art reached in 3D Face Recognition frameworks and show some different approaches developed and tested by its authors. We have designed a strong algorithm that is based on genetic algorithms, Principal Component Analysis (PCA) and face geometry assumptions, for head pose normalization of 3D scanned face models. Experiments conducted on the GavaDB database show a 100% success rate in correctly those models that “stare” at the camera (with a perfect alignment in 83% of the cases). A previously developed algorithm for nose-tip detection based on an adapted Khoshelham GHT has been used to create an automatic repere#s points detection system with the purpose of obtaining a biometric system for AFR (Automatic Face Recognition) using 3D Face templates. Subsequently two different methodologies, based respectively on an unsupervised self-organizing neural network (SOM) and upon a graph matching, have been implemented to validate the performance of the new 3D facial feature identification and localization algorithm. Experiments have been performed on a dataset of 23 3D faces acquired by a 3D laser camera at eBIS lab with pose and expression variations. Then an optimization of the search of the points ALS and ALD of the nose and a new graph approach for the recognition base on several new points has been implemented. Experiments have been performed on a dataset of 44 faces, acquired by a 3D laser camera at eBIS lab with pose and expression variations, scoring a result of 100% of recognition.

TOPIC: Image processing and pattern recognition
ALTERNATIVE TOPIC: Geometric modeling