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Reconstruction of multidimensional data in artificial intelligence

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Proposed method, called probabilistic features combination (PFC), is the method of multi-dimensional data modeling, extrapolation and interpolation using the set of high-dimensional feature vectors. This method is a hybridization of numerical methods and probabilistic methods. Identification of faces or fingerprints need modeling and each model of the pattern is built by a choice of multi-dimensional probability distribution function and feature combination. PFC modeling via nodes combination and parameter γ as N-dimensional probability distribution function enables data parameterization and interpolation for feature vectors. Multi-dimensional data is modeled and interpolated via nodes combination and different functions as probability distribution functions for each feature treated as random variable: polynomial, sine, cosine, tangent, cotangent, logarithm, exponent, arc sin, arc cos, arc tan, arc cot or power function. The problem of multidimensional data modeling appears in many branches of science and industry. Image retrieval, data reconstruction, object identification or pattern recognition are still the open problems in artificial intelligence and computer vision. The paper is dealing with these questions via modeling of high-dimensional data for applications of image segmentation in image retrieval and recognition tasks. Handwriting based author recognition offers a huge number of significant implementations which make it an important research area in pattern recognition. There are so many possibilities and applications of the recognition algorithms that implemented methods have to be concerned on a single problem: retrieval, identification, verification or recognition. This paper is concerned with two parts: image retrieval and recognition tasks. Image retrieval is based on probabilistic modeling of unknown features via combination of N-dimensional probability distribution function for each feature treated as random variable. Handwriting and signature recognition and identification represent a significant problem. In the case of biometric writer recognition, each person is represented by the set of modeled letters or symbols. The sketch of proposed probabilistic features combination (PFC) method consists of three steps: first handwritten letter or symbol must be modeled by a vector of features (N-dimensional data), then compared with unknown letter and finally there is a decision of identification. Author recognition of handwriting and signature is based on the choice of feature vectors and modeling functions.

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