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Trendiction SA

Dual Quantization

Abstract : The topic of optimal quantization goes back to the field of signal processing in the late 1940s. From a mathematical point of view it concerns the best approximation of a probability distribution by a discrete distribution with a given number of supporting points. In the euclidean case, the voronoi diagram plays a crucial role in defining the quantization mapping onto the discrete distribution. For dual quantization, a concept only introduced in 2010, this mapping is based on the dual counterpart of the voronoi diagram, the delaunay triangulation. This mapping is not anymore a deterministic one, but maps to the vertices of a triangle (or d-simplex) according to a probability distribution. This stochastic mapping allows us to get some sort of stationary for free with every dual quantizer, whereas such a property holds for regular quantization only in very special situations. In the second part of this talk we focus on the optimality of dual quantizers and establish their existence, extension to the case of unbounded distribution and sharp rate of convergence when the number of support points is sent to infinity.