Extended power-based aggregation of distance functions and application in image segmentation

Marija Delić • Ljubo Nedović • Endre Pap

Abstract

In this paper, we propose a novel method for construction of a distance function and demonstrate its application in image segmentation. In algorithms for image segmentation, distance functions represent a criterion which divides pixels into groups of segments. We introduce two extended aggregation functions, *extended powers product* and *extended weighted arithmetic mean of powers*. Their relevant properties are examined, as well as certain resulting properties of distance functions, which are constructed by an application of mentioned aggregation functions. In addition, one pixel descriptor, which is motivated by *Local Binary Pattern* family of descriptors (LBPs), is introduced and discussed. In the experimental section, we present an application of the introduced extended aggregation functions and descriptor, by a construction of a new distance function, used in *Fuzzy c-Means Clustering Algorithm* (FCM) for image segmentation.

Keywords: Distance function, Metrics, Extended aggregation function, Local binary pattern, Image segmentation, Fuzzy c-Means algorithm

MSC 2010: 28A75, 68U05, 68U10, 26E50, 47S40