Influence of Fuzzy Tolerance Metrics on Classification and Regression Tasks for Fuzzy-Rough Nearest Neighbour Algorithms

Andreja Naumoski, Georgina Mirceva, Petre Lameski

Ss. Cyril and Methodius University in Skopje, Faculty of Computers Science and Engineering, Skopje, Macedonia
{andreja.naumoski,georgina.mirceva,petre.lameski}@finki.ukim.mk

Abstract. In this paper, we investigate the influence of the fuzzy tolerance relationship (fuzzy similarity metrics) on two fuzzy and two fuzzy-rough nearest neighbour algorithms for both classification and regression tasks. The fuzzy similarity metric plays a major role in construction of the lower and upper approximations of decision classes, and therefore has high influence on the accuracy of the algorithm. The experimental results evaluated on the four approaches show the difficulty to estimate a single metric that will be good in all cases. Moreover, the choice of similarity metric on some datasets has not influence at all. This require further investigation, not only with similarity metrics, but also for evaluating the algorithms with different T-norms and implicators.

Keywords: Fuzzy tolerance relationship, Fuzzy rough sets, *k*-nearest neighbour, Classification, Regression