

An Epsilon Hierarchical Fuzzy Twin Support Vector Regression

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Abstract : The research presents epsilon- hierarchical fuzzy twin support vector regression (epsilon-HFTSVR) based on ϵ -epsilon-fuzzy twin support vector regression (epsilon-FTSVR) and epsilon-twin support vector regression (epsilon-TSVR). Epsilon-FTSVR is achieved by incorporating trapezoidal fuzzy numbers to epsilon-TSVR which takes care of uncertainty existing in forecasting problems. Epsilon-FTSVR determines a pair of epsilon-insensitive proximal functions by solving two related quadratic programming problems. The structural risk minimization principle is implemented by introducing regularization term in primal problems of epsilon-FTSVR. This yields dual stable positive definite problems which improves regression performance. Epsilon-FTSVR is then reformulated as epsilon-HFTSVR consisting of a set of hierarchical layers each containing ϵ -epsilon-FTSVR. Experimental results on both synthetic and real datasets reveal that epsilon-HFTSVR has remarkable generalization performance with minimum training time.

Keywords : regression, epsilon-TSVR, epsilon-FTSVR, epsilon-HFTSVR

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