

**Jeng, Jin-Tsong; Chuang, Chen-Chia; Su, Shun-Feng**

**Support vector interval regression networks for interval regression analysis.** (English)

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Summary: In this paper, support vector interval regression networks (SVIRNs) are proposed for interval regression analysis. The SVIRNs consist of two radial basis function networks. One network identifies the upper side of data interval, and the other network identifies the lower side of the data intervals. Because the support vector regression (SVR) approach is equivalent to solving a linear constrained quadratic programming problem, the number of hidden nodes and the initial values of adjustable parameters can be easily obtained. Since the selection of a parameter  $\varepsilon$  in the SVR approach may seriously affect the modeling performance, a two-step approach is proposed to properly select the  $\varepsilon$  value. After the SVR approach with the selected  $\varepsilon$ , an initial structure of SVIRNs can be obtained.

Besides, outliers will not significantly affect the upper and lower bound interval obtained through the proposed two-step approach. Consequently, a traditional back-propagation (BP) learning algorithm can be used to adjust the initial structure networks of SVIRNs under training data sets without or with outliers. Due to the better initial structure of SVIRNs obtained by the SVR approach, the convergence rate of SVIRNs is faster than the conventional networks with BP learning algorithms or with robust BP learning algorithms for interval regression analysis. Four examples are provided to show the validity and applicability of the proposed SVIRNs.

**MSC:**

62J99 Linear inference, regression

62M45 Neural nets and related approaches to inference from stochastic processes

65C60 Computational problems in statistics (MSC2010)

90C90 Applications of mathematical programming

Cited in 16 Documents

**Keywords:**

Interval regression analysis; Outliers; Support vector interval regression networks

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